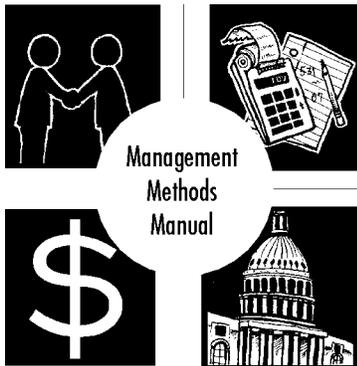


*MECHANICAL CONTRACTORS
ASSOCIATION OF AMERICA, INC.
1385 Piccard Drive
Rockville, MD 20850-4340
301-869-5800
Fax 301-990-9690
www.mcaa.org*

**MANAGEMENT
METHODS
MANUAL**





Management Methods Manual

**Mechanical Contractors Association of America, Inc.
1385 Piccard Drive
Rockville MD 20850-4340
Phone 301-869-5800**

MCAA Management Methods Manual

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Rockville, MD 20850-4340

Foreword

The Management Methods Manual has been developed under the auspices of MCAA's Management Methods Committee. The information contained in this manual is the result of many years of effort by the members of the committee. This publication reflects the members' best information about current industry practices and procedures of mechanical, plumbing, and service contractors.

The material contained in this manual is intended as a business reference. It is not meant to provide absolute costs nor percentages that would be incurred, nor verbatim examples of how you should handle your company's business decisions. Each project, locale, and situation is unique and variances will occur even within the same jurisdiction. Each company utilizing this manual should determine how the material contained within these pages will apply to its specific circumstances. Every company must decide its own contract terms. It is unlawful for contractors to agree to use any particular cost or percentage figure in contract provisions which can affect the ultimate price.

MCAA wishes to thank the many members of the Management Methods Committee – past and present – who have served and contributed their time, insight, and experience to the development of the material found in this manual.

Management Methods Manual

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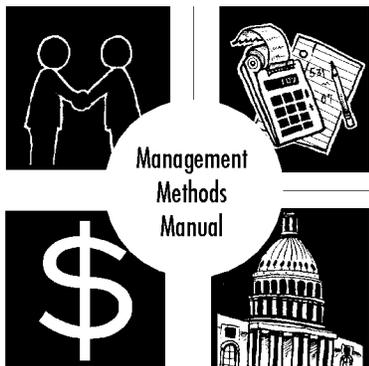
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Bulletin

Labor Burden

Labor burden is best described as the costs a contractor must pay in addition to wages and fringe benefits.

The purpose of this bulletin is to aid the contractor in determining his actual hourly cost for labor. This information should save time in estimating, invoicing and cost accounting. Any presentation on this subject may overlook some items. Therefore, it should be considered a guide or checklist and modified to fit the actual cost per manhour. A contractor should consider at least the following:

1. **Wages and fringe benefits** are costs contained in a union agreement, including:

a. Base Wages

- Zone Pay
- Shift Pay
- Paid Holiday
- Hazard Pay
- Supervisory Pay
- Premium Time

b. Fringe Benefits

- Vacation
- Pension
- Health and Welfare
- National Guaranteed Wage (SASMI)
- Uniforms and/or Special Protective Clothing or Gear
- Training, Apprenticeship, Industry Funds

2. **Direct labor burden** is the cost the contractor is required to pay in addition to wages and fringes, either by law, union agreement or business necessity. These may include:

a. Taxes and Insurance

- F.I.C.A.
- Federal Unemployment
- State Unemployment
- Workmen's Compensation
- Liability Insurance



- b. Tools and Equipment
 - Small Tools
 - Expendable Materials
 - c. Trucks (Assigned to Mechanics Only)
 - Operation and Maintenance
 - Insurance and Depreciation
 - d. Travel and Subsistence When Not Included in Item No. 1, Wages and Fringe Benefits
 - Subsistence
 - Transportation Fares
 - Parking and Toll Charges
 - Auto Mileage
 - Travel Time
 - Emergency and Safety
3. **Indirect labor burden** is the cost the contractor will incur in addition to direct labor burden to support the mechanic in the field. These items may sometimes be referred to as job expenses but they should be carefully considered and possibly added as a percentage to the cost per manhour. They consist of, but are not limited to:
- a. Off-Job Supervision and Scheduling
 - b. Lost Time, Show-Up Time, Stand By
 - c. Labor Contract Administration
 - d. Training and Qualification or Testing
 - e. Clean Up
 - f. Warehouse Men and Yard Equipment Delivery Men and Trucks
 - g. Warranty
 - h. EEO and OSHA Regulations
 - i. Equipment and Truck Expenses
 - j. Engineering
 - Detail Drawings
 - Operation Instruction
 - Marking, Tagging
 - k. Other
 - Ice Water
 - First Aid
 - Toilet Facilities
 - Special Equipment
 - Temporary Heat
 - Move On—Move Off
 - Tests, Job Photos
 - Job Phone
 - Job Office
 - Fees and Permits
 - Equipment Rental
 - Blue Printing
 - Shop Expense
 - Special Tools and Instruments.
- As indicated, the above lists are not exhaustive. They contain suggested items and should serve only as a guide in preparing your own lists to calculate labor burden.



Bulletin

Credit Policy Criteria

Introduction

A credit policy is a vital ingredient for any well-run mechanical contracting business. The essential ingredients of a credit policy are:

- the policy itself, including all rules and regulations to be followed by company personnel;
- the personnel to implement the policy;
- outside sources of credit information; and
- legal and/or professional collections services to augment failures of in-house policy.

Credit Policy

A short credit policy in memorandum form should be established for each of your departments. For example, the sales department should have a policy requiring that the same credit terms be stated on each contract. You may wish to have 20 percent down with equipment delivery on each negotiated job, or perhaps have that policy only for sales up to \$10,000. For larger jobs you might want a billing policy of no deposit when the order is placed, but a month-to-month billing with terms requiring payment of the net amount of the bill within 10 days (net 10), the exact amount to be determined by labor and materials ac-

rued to the job at the end of each billing period. Service departments may need a different approach, such as naming C.O.D. customers (choose those whose past actions indicate they will not pay without prodding or new accounts on which credit checks are not readily available) and service billing terms as net 10 or 30.

It is better to have a standard policy on company billings, either a net 10 or net 30. Net 10 is preferable because if a customer does not pay within 10 days after invoicing, you have sufficient time to remind him that your invoices are marked net 10. This gives you a chance to get paid within a month after the invoice is sent out. Whereas, in net 30 billings, you have to wait a full month to find out if the customer will not pay. The result: it will probably be 60 to 90 days before you can persuade him to pay.

Personnel Implementation

Your credit policy should be in writing and clearly stated. Then, someone should be assigned to act as credit manager. In most companies, this will probably be the treasurer or controller. He, in turn, can delegate the various tasks, such as collection phone calls or payment and past due notices, to staff in his area. They will report to him the success they are having with accounts

receivable and the collection of past due accounts. In the case of sensitive accounts, the credit manager might call upon other officers of the company to approach the delinquent customer.

Salesmen often want to try their hands at collecting special problem accounts and, depending upon the customer, they may do a good job. It is necessary to have an efficient accounts receivable aging report form with columns indicating: "current," "30 days old," "60 days old," and "120 days or older." The form might also contain such information as the account's name, address, phone number and person to contact regarding past due amounts. This information can also be kept in a separate card file, which is more easily updated. An "aging" form indicates the status of an account at any time, and you should at least post the amount due on the form under the proper aging column.

Your credit manager should be responsible for the following:

1. Check each new contract on negotiated or bid and spec work to determine the terms of payment and assure that the Billing Department abides by the terms spelled out in the contract, regardless of its originator. Additionally, at the time you agree to a job quotation requiring a bid bond, your credit manager should be aware of the withholding terms offered in the specs. You may not want a job with ridiculous withholding percentages or service guarantees enforced by five percent withheld for one or more years, etc.
2. Check turn-key or "negotiated" work to see that those responsible for writing your firm's contracts comply with the firm's credit policy.
3. See that various departments (service, etc.) do not initiate busi-

ness with new accounts without the proper credit check, or fail to go C.O.D. if no credit check has been made. Before the service department makes a call, all new accounts should be referred to the credit manager for a credit check. In a smoothly working system, the credit manager can perform this function in a matter of minutes. This is another excellent reason for assigning credit management authority to an employee with the most appropriate experience.

Those contractors whose operations are basically confined to plan and spec work, and who primarily sign contracts drawn by others, may feel that a credit policy and a credit manager are not necessary. However, even these firms can speed up delayed payments when someone watches cash flow versus billings. Accordingly, a credit manager should be appointed to trace problems on the job site that may be adversely affecting payments. This type of credit policy is just as effective in bringing in slow money as telephoning delinquents from an "aging" report form. The amount of money lost because of late payment is larger than many contractors suspect. Owners must be convinced that chronic slow payments increase overall costs. If cash flow can be expedited, the cost of billings may be reduced by one to three percent or more. Try offering your customers two percent for payments made prior to the tenth of the following month, for example, if your billings offer net 10 days.

Outside Sources of Credit Information

Another vital ingredient of credit policy is how to run credit checks on new accounts. Dun & Bradstreet is a good, albeit slow, service for checking an account's dollar volume and financial statement. However, its reliability is not

always the best because many contractors refuse to give D & B either adequate or current information. An alternate source of information in this case would be appropriate suppliers who may also be able to steer you to other contractors who have worked with the account and know their paying habits. Barring this, another way of obtaining credit information is to phone competing contractors to see if they have had any experience with this account's paying habits. Surprisingly, many contractors are happy to share this sort of information with their peers. Banks and local credit bureaus are two other excellent sources of credit information.

Legal and/or Professional Collection Services

You can hire a lawyer to write a collection letter or file a construction lien; these tasks should not take more than an hour. Collection agencies not only take more time, but they often charge higher fees than lawyers, regardless of the amount collected. Understand the fee structure or hourly rate of any agency or lawyer before engaging them for collection services.

You can justify using a lawyer to collect a large amount if the hourly rate does not exceed, in total, five or 10 percent of the amount collected, perhaps higher. It does not make economic sense to pay an attorney \$400 to collect \$100. There is a break-even point on larger accounts beyond which it pays to turn the collection over to an attorney. On the other hand, collection agencies almost always charge high fees to cover the time spent on accounts they have not been able to collect.

Construction Liens

A device that you can often use to free

money being withheld from a contractor after completion of a job is the construction lien. While the laws of various states differ widely, every state in the nation has some version of a construction lien law.

Construction lien laws benefit two different classes of participants in the construction process. The first is the contractor who has contracted directly with the owner, the man or firm referred to as the "general" or "prime" contractor. Even though he can choose whom he contracts with and, accordingly, should perhaps be held to assume the risk of the owner's credit, it is still reasonable to give him a lien on the owner's property, which has increased in value by his labor. The second class of participant is the person who puts labor and/or material into the construction, but has no direct contractual relationship with the owner. This class includes subcontractors, suppliers (material men) and laborers employed by either prime or subcontractors. Although this class has no privity of contract with the owner (they may not even know who he is), they still add to the value of his land. The reason for providing them a lien on the owner's property is that, should the entity with whom they have contracted with fail to pay, they ought to have a legal claim against the land they have enriched.

The basic problem with the construction lien laws of any state rests with the second class of participant. Often the owner is unaware of the possible lien rights of these claimants. He pays his prime contractor in full only to find, too late, that the contractor is either dishonest or insolvent. As a result, the prime contractor does not pay the more remote claimants. Yet, under the law, they may still have lien rights, which, if successfully exercised, will require the owner to pay twice or face losing his property and its improvements.

The same thing can happen if the prime contractor pays his subs in full, but one of the subs fails to pay his more remote suppliers, sub-subs or laborers. In such cases, even these remote claimants may still have lien rights (though state laws differ widely on this issue, and you should consult your counsel in questions of lien rights). It becomes a question of how remote can you be and still have lien rights. Some states limit those who can secure a lien to the first two, three or four tiers, whereas others impose no limit on the remoteness of the tier. Also, in about half the states, an owner is protected against double liability if he pays his prime in good faith prior to any demand for payment being made against him by a potential lower-tier lien claimant.

In most states, an owner is subject to the risk of either paying twice for his construction or losing his land and its improvements through no fault of his own. As a result, knowledgeable owners, and in some cases their mortgage lenders, insist upon waivers of lien. To further confuse the issue, several archaic state lien laws permit the owner and prime contractor to file with the state recorder's office (where the construction site is located) an agreement stating that the job will be a no-lien job with no duty to notify subcontractors, material men or laborers of that fact. Accordingly, if these persons fail to check the recorder's office on every job, they often operate with a false assumption that they have lien rights.

In short, the lien claimant or potential lien claimant wants his payment guaranteed in some manner and the owner wants to be assured that he will not be compelled to pay twice. The prime contractor is in the middle, pressing the owner for payment and the subcontractors and others for a waiver of lien to satisfy the owner's demands. Adding to the complexity of such situations,

construction mortgage lenders get into the act and will not pay unless they are assured of a secured position ahead of construction lien claimants and owner-borrowers in the event of foreclosure. The conflicts of interests in this area make it impossible to solve the dilemma to everyone's satisfaction through statutory enactment. Aside from understanding that construction lien laws can play havoc with your cash flow, it is important to realize that you cannot know enough about this facet of the law in any state in which you operate. Further, no matter how sophisticated you may be in getting a construction lien, it is wise to consult with your attorney on filing requirements and other methods of securing your claims by proper procedure—or in getting rid of a lien by one of your own sub-contractors.

Be Cautious In Granting And Obtaining Waivers Of Liens

As noted above, the procedures for obtaining payment for work performed on a construction project often conflict with the practical use of liens (the legal mechanism to assure payment). As a subcontractor, you should attempt to retain the protection of a lien by giving the general contractor only:

- conditional waiver of lien, that is a waiver conditioned upon receipt of the progress payment involved (conditional waivers are sometimes placed in escrow with the owner or a title company and released upon receipt of payment);
- a waiver of lien work through a certain date, typically the last 30 days; or
- a waiver of lien for a specified dollar amount. Avoid blanket waivers.

Contract documents frequently require a general contractor to furnish waivers from his subcontractors through the date

of the previous progress payment. You should resist any effort by a general contractor operating under such a provision to require you to furnish a more far-reaching waiver.

Of course, you should obtain from your own subcontractors and material suppliers a waiver no less extensive than the waiver that you intend to furnish to the general contractor.

Subcontractor Credit

Finally, you should check the credit of your subcontractors. A rule of thumb used by many experienced mechanical contractors is to never have a subcontractor perform a sub-contract in excess of two or three times his net worth. This practice will at least protect you for the last third of their invoicing, should they fail to perform. Obviously, you should never overpay a sub. Always withhold money from him until you are sure he has performed to within 10 percent of the dollar amount for which he has filed.

A subcontractor should be bound to you by an enforceable legal contract for each job in question, and if the subcontractor has no net worth to mention and/or you have to bond him—you should weigh whether it is worth using his services in the first place. Remember that you may have to finish the job with your own resources, and paying money loose from a bonding company is no easy chore.

Payment and Performance Bonds

Bonding companies are experienced, tough and shrewd. They insist that every “i” be dotted and every “t” be crossed, and they demand high standards of proof before they pay any money.

Accordingly, if you are trying to collect on the bond of a contractor who has failed, be prepared and able to wait,

perhaps two to five years, for your money. Even then, you will probably get only a partial settlement. The burden is always on you to compel the bonding company to divulge information and admit their liability. If you have a company with a good reputation and adequate financing for your projects, you can probably obtain a completion bond for about one percent of the contract price. This guarantees that the bonding company will complete any uncompleted work under your contract and/or pick up material bills then owned in the case of insolvency. If you are bondable and such a bond satisfies the owner, it is a good buy.

When examining a payment bond, be certain you know whether it is a bond for labor *and* materials or only for labor *or* materials. The wording must be scrutinized. Never assume coverage is complete for both labor and materials unless it is clearly stated in the bond.

Federal Projects

Federal and state government construction projects differ from private construction projects in the protection afforded subcontractors and material suppliers. Unlike private construction projects, mechanics' and material men's liens are not available on public construction projects to ensure that subcontractors and suppliers receive payment for material or services supplied. To alleviate the negative effects that might result from the unavailability of such liens, federal and state governments have created statutes requiring prime contractors to obtain payment bonds designed to provide protection commensurate with that available from mechanics' and material men's liens. These statutes also typically require performance bonds for the protection of the government.

The federal statute, known as the “Miller Act,” requires a payment bond, by which

a surety guarantees payment of a prime contractor's obligations to qualified subcontractors and suppliers, and a performance bond, by which the government obtains assurances that the contract will be completed. This latter bond is required solely for the protection of the government, and provides no protection to subcontractors or suppliers.

In any case, a prudent subcontractor or supplier should determine whether its contemplated work falls within the protection of a Miller Act bond. Although there is support for filing a lien against money owed to the prime contractor by the government, parties should not rely on such authority. Additionally, parties should not automatically assume a Miller Act payment bond has been posted, as the government may occasionally neglect to include the bond requirement in the prime contract.

Appropriate areas of inquiry for a subcontractor seeking to determine whether a particular project is subject to the Miller Act include the following:

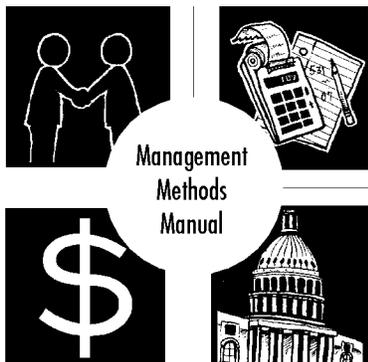
1. Is the contract a standard form contract (such as Standard Form 23-A, Construction Contracts)? Use of Standard Form 23-A is a strong indication the Miller Act applies.
2. Do the terms of the contract require a Miller Act bond?
3. What is the nature of the work to be performed under the contract? If the work described is primarily construction, a bond is usually required. If the work is divisible into construction and non-construction items, the higher the percentage of construction work, the more likely it is a bond will be required.

4. Was the contract advertised through an Invitation For Bid (IFB)? (Government construction contracts are advertised.) Did the advertisement specify that Miller Act bonds would be required?
5. What are the obligations of the prime contractor; i.e., is the prime contractor simply a construction manager or is the firm required to perform some construction of the project? The probability of a bond requirement increases if the prime contractor is responsible for some construction activities on the project.

The Miller Act performance bond only protects the government, and therefore, failure to require this bond does not affect the rights of any other party. This is not the case, however, with the failure to provide a payment bond, since it is for the protection of subcontractors and suppliers rather than the government. Generally, the United States is not liable for failing to require Miller Act bonds. To avoid the adverse possibilities, it is always wise to contact legal counsel.

A Final Caveat

If your average net profit is running two percent, remember that it takes \$50,000 in new business to make up for each \$1,000 that is uncollectible at year's end.



Bulletin

Cash Flow

INTRODUCTION

Effective cash management can mean the difference between success and failure for the mechanical contractor. A contractor actively managing its cash can produce greater profits and grow at a quicker pace as a result. The contractor that does not practice cash management has a much greater chance of failing when the company experiences cash flow problems or the economy turns down. The skill with which you manage your company's cash has a direct effect on your company's health and strength.

CASH MANAGEMENT FUNCTIONS

Cash management is the attempt to maximize cash as an investment and as a vehicle to meet current obligations. An effective cash management program for every contractor should include:

Forecasting Cash Flow

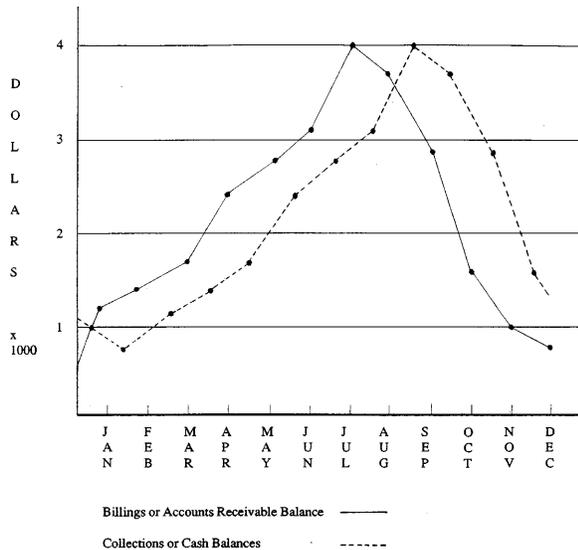
A cash flow forecast enables your company to predict future cash needs by exam-

ining past and future project billings, cost, overhead expenses, etc. The forecast can be prepared on a project-by-project basis, as well as for the company as a whole. Additionally, a cash forecast will help identify those periods when surplus cash is available for investment. An example of a simple cash flow forecast model is included as Table 1 located at the end of this bulletin.

Accurately forecasting cash flow can be difficult for the typical contractor because the seasonal nature of the construction industry often results in periods of excess cash on hand followed by periods of cash deficiencies. Following the high activity months, contractors generally have surplus cash on hand resulting from collections for work performed during the peak season. Cash deficiencies generally occur during the early part of the busy season as the contractor gears up for its peak season. A typical relationship between sales volume and cash collections for a contractor with very seasonal operations, assuming a constant 45 days age of accounts receivable, is illustrated in Figure 1.



Figure 1. Cash Flow Projections



As indicated in the Exhibit, this contractor may experience operating cash shortages during the months of January through August. During this period the workload is increasing and cash is needed to finance new projects. The cash shortage forces this contractor to stretch available cash, especially if the company is attempting to expand operations and increase work volume. If cash is not available, the contractor will have to make provisions to borrow during this period. During the months of August through December when cash flow is on the upswing, the company must determine how to make efficient use of the cash through investment or acquisition of equipment.

The above scenario is typical for many contractors. In regard to the cash fluctuations experienced each month, the same questions arise for those contractors attempting to take a progressive management style in operating their business. Some of these questions include:

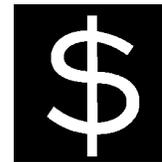
1. What impact will the seasonal nature of the company have on the company's cash balances?

2. How does a contractor predict exactly when to borrow due to cash shortages or invest due to surplus cash?
3. How can a contractor reasonably determine which months the cash swings will occur and in what amounts?

The best management tool a contractor can use to answer these questions is the previously mentioned cash flow forecast.

A cash flow forecast is the most effective tool for predicting when your company will experience deficient or excess operating cash balances. The overall goal of forecasting cash flows is to maintain a satisfactory cash position while maximizing cash as an investment vehicle. Determining cash fluctuations, caused by the seasonal nature of the construction industry, is not the only reason for preparing a forecast. When prepared on a continuous basis as part of an active cash management program, a cash flow projection will also:

- Ensure that the cash balance will always remain above zero or a desired minimum level.
- Determine periods of excess cash for investment or acquisition of capital items.
- Minimize idle funds and therefore maximize investment opportunities.
- Provide efficient use of cash by timing cash disbursements to coincide with cash receipts.
- Matching maturity schedules of short term investments with any debt funding requirements.
- Highlight periods of cash deficiency so that borrowing requirements can be arranged or liquidation of investments can be made.



- Establish the ability to take trade discounts.
- Indicate the need for additional permanent working capital in the company business.

Additionally, properly predicting the timing of the cash fluctuations, particularly cash deficiencies, will put you in a better bargaining position with your banker. The lender will recognize that you have not haphazardly prepared a loan application under a cash crisis situation but have taken the necessary steps to avoid the cash crisis and are prepared for it. Therefore, your chances of a loan being approved are increased. Additionally, cash forecasting demonstrates the use of sound management tools and an awareness of any cash problems well in advance.

It is important to realize that a cash flow forecast is simply a prediction of the future and is subject to error. When your company uses a cash flow forecast, you must take this uncertainty into account. Additionally, you must evaluate the assumptions made about the timing and amount of future cash flows. When completed on a continuous basis, monitored, evaluated and compared to actual cash flows, you will be able to confidently determine, within an expected margin of error, your cash needs and availability.

If your company does not forecast cash flows, you should begin re-evaluating the tools you use to manage your company. If you don't, you are probably foregoing additional income simply by not monitoring your cash flow. Additionally, you may have lost a great opportunity, the opportunity to remain in business when the economy is on the downswing.

If your company is currently forecasting cash flows, make the time now to evaluate the accuracy of the projections. If there are prob-

lems, determine whether they are consistent from month to month. Attempt to find the source of the problem and correct it. Additionally, evaluate the results of your investments and borrowing activity as a result of your cash flow forecast and attempt to determine the effectiveness and efficiency of your cash plan. Actively managing your plan on a continuous basis will result in greater profits and a more stable financial position.

Accelerate Cash Receipts and Decelerate Cash Disbursements

This strategy is an attempt to create and maintain as much available cash as possible by speeding the billing process, slowing the disbursement process and managing bank float.

Following are suggested strategies that, when applied consistently, will help increase your cash flow through these and other techniques:

1. Minimize the amount of cash to be swept into overnight investment accounts and maximize the cash available for higher yielding investments. Overnight investment accounts (or sweep accounts) often become a passive cash management tool. Do not assume that excess cash swept into an investment account is the best use of investable cash.

2. Request additional discounts from all of your vendors, not just the standard discounts offered by some. If you have the cash and can pay within one to five days rather than the standard ten, you may be able to obtain an additional 1% or even 2% discount. Conversely, if you cannot negotiate additional discounts either because you do not have the cash or the vendor will not negotiate, then ne-



gotiate for extended payment terms. Simply moving your payables from 45 to 60 days (especially for major suppliers) can have a dramatic effect on available cash.

3. If necessary, use a line of credit to cover cash short-falls when paying vendors and suppliers so that you don't miss the discount period.

4. If you can manage it, you should minimize the use of your bank credit line. Today, many banks are requiring the payment of a commitment fee ranging anywhere from 1/2% to 1% of the line to maintain your line. If you do not use the line, then do not pay any interest, but if you still need it for bonding purposes, you might want to negotiate a higher rate of interest to eliminate the commitment fee.

5. Establish accounts at three or four different banks and deposit owners' or general contractors' payments into the bank on which they have drawn the check to reduce float days and to allow immediate credit to your account. If this does not increase your float, then look at the cost of maintaining multiple accounts and evaluate closing some to reduce your costs.

6. Negotiate instant credit to your account at the time of deposit regardless of the bank the check is drawn on.

7. Invest idle cash in certificates of deposit or commercial paper and match their maturity dates and amounts to future cash requirements such as debt maturities or anticipated capital investments.

8. Minimize inventory balances to reduce handling, insurance and personal property tax costs.

9. Negotiate skip payment months for long term debt such as financed equipment pur-

chases to match cash inflow and minimize cash outflow when cash flow is tight.

10. Sell under-utilized equipment to minimize repair, maintenance, insurance, personal property and handling costs. Consider renting this type of equipment after an analysis of all your financing and operating costs.

11. Negotiate and include in the contract a provision for incentive payments for early completion of various phases of the contract or the entire contract.

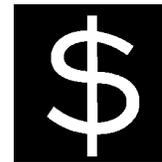
12. Plan to meet payroll tax deposit requirements by monitoring total payroll levels. Manage payroll levels by reducing officers' compensation and careful timing of bonus payments.

13. Manage tax liability and estimated tax payment requirements by deferring taxable income at the end of each quarter.

14. Departmentalize cash budgets and require department managers to manage their budgets.

15. For those working on government contracts, most states now allow contractors to earn interest on the retention funds held by the government. This allows the contractor to invest this money in Federal or state securities providing investment income and possibly capital gains. However, in most states this is an active election that the contractor must pursue. Consider also negotiating this with private owners.

The best approach is to develop a formal cash management program that applies all the appropriate cash management principles including budgeting, accelerating cash receipts, decelerating cash disbursement, obtaining credit and investing cash. Consistently applying, monitoring and evaluating these strategies can only help improve your cash flow.



Establish a Plan to Increase Cash Flow on Every Project Before You Start

The success of any construction project can be directly related to the planning that goes into it. The same concept applies to planning cash flows on your major construction projects. The best time to begin cash flow planning is before and during contract negotiations. The payment terms agreed upon can have a significant impact on the cash flow of the project and the company. The following points are recommendations for making the impact a positive one for your company.

1. Determine the Owner's Ability to Pay

Before owners enter into a contract, they often require financial data from a contractor and may require surety bonds guaranteeing payment and performance. The owners protect themselves; is there any reason contractors should not do the same?

As a contractor, you want to know that the owner has the ability to pay under the terms set forth in the contract. Require the owner to submit to you financial statements audited or reviewed by a CPA. Obtain credit reports on the owner and determine the owner's payment history by contacting other contractors and vendors. Your goal is to determine the owner's ability to pay you on a timely basis before you sign the contract, not after. Once you are comfortable with the owner's financial situation, it is up to you to perform under the terms of the contract while monitoring your billings and collections.

2. Negotiate Lower Retainage Balances

If you have worked with the owner in the past and they are satisfied with your perfor-

mance, you may be able to eliminate the retainage provisions or negotiate a lower retainage based on your prior performance. If you are not successful in agreeing on a lower retention, request a reduction in the retainage balance at an earlier stage of completion. For example, request a retainage reduction from 10% to 5% when the job is 40% complete versus 50% complete. A lower retainage will provide you with additional cash earlier to finance additional operations, prevent potential cash shortages, and minimize the need to borrow.

3. Negotiate Assets to be Held in Lieu of Retainages

Occasionally, owners will agree to pay or forego holding retainages if contractors agree to depositing funds into an account that the owner can control. The funds continue to earn interest for the contractors. Although the total cash available is reduced, you have the ability to increase your cash balances over the long run by investing the escrowed funds. If retainages are held, contractors must often cut into their invested balances or draw on their line of credit in order to fund project mobilization or negative cash flow.

4. Agree to a More Frequent Billing Schedule

Billing on a more frequent basis can improve your cash flow and reduce the likelihood of bad debts. If the owner will not agree to a more frequent time schedule, consider an event-based billing schedule.

With an event-based billing schedule, you are able to control the billings by completing the agreed-upon phases before you bill. Then, you can concentrate on completing



the agreed-upon events before incurring time on other phases of the project.

5. Negotiate Incentive Payments

Incentive payments can be negotiated for early completion or completion within owner-defined timeframes. The incentive payments can be for various phases of the project or for the overall project. To eliminate the risk of not receiving anything, incentive payments are more favorable to you if paid throughout the contract based on phases completed. If you agree to incentive payments based on total completion of the project, the opportunity to earn the incentive payment could be lost in the final project phase. The goal is to collect the cash you have earned as early as possible.

6. Submit Unbalanced Bids

Another technique used to generate positive cash flow in the early part of the construction project is to submit unbalanced bids. This front-end loading procedure accelerates the cash collections to be generated from the project because a larger portion of the total contract price is allocated to phases of the work that will be completed in the early stages of the contract. Even though in most cases the contractor must have the lowest qualifying bid to win the job, the owner may allow the contractor the flexibility of assigning higher cost to the early phases of the contract. This gives the contractor the ability to fund start-up costs such as stored materials, shop drawings, bond premiums and mobilization.

7. Discuss the Billing and Payment Procedure During the Final Contract Settlement

Although the procedures are outlined in the contract, address the billing and payment

procedures in the final contract discussions. Make sure that the owner understands that you expect them to abide by the contract. Let them know that you will be more efficient and productive if you can pay yourself, the sub-contractors and suppliers in a timely manner. The result will be timely completion of the project, cash flows based on projections and a happy contractor and owner.

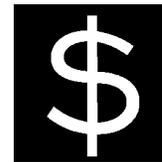
After Contract Negotiations

Once the contract has been signed and the project has started, the contractor must take an active role in enforcing the contract terms.

The following suggestions are steps you can take to improve cash flow and to protect your company against loss.

1. Agree on What to Bill Prior to Preparing the Requisition

Today, most contractors have their billings pre-approved by the owner and the architect before they are presented in the form of a monthly bill. This procedure will help to avoid having the requisitions you submit to the architect or owner sent back for changes or with a payment that is less than the requisition amount. Every contractor should adopt this procedure. This process will allow you the opportunity to talk about any requisition disputes before you submit a bill. In addition, discussing and agreeing on the percentage of completion and the amount that can be billed before the requisition is prepared can eliminate disputes. As always, attempt to address potential problems before they become real. When significant billings are involved, walk the job site with the architect or owner



and come to an agreement prior to preparing the requisition. You can avoid disputes and, in most cases, will receive the cash quicker.

2. Challenge the Architect's Changes

Architects will sometimes reduce requisitions out of habit rather than due to improper or incomplete work. Be conservative with the first requisition. If the architect adjusts your first requisition, you will know that he has developed a bad habit. If they do not make an adjustment, you may have earned their trust in your billing process. This will certainly make future requisitions easier to collect.

Also consider involving the owner in any disputes. Don't simply let the architect make the decisions. The owner usually is involved in the construction and knows what is complete and what is not, so it is appropriate for him to have an understanding of the billing process. In some cases, you may find the owner is more lenient than the architect and may encourage the architect to allow the billing.

3. Eliminate Grace Periods

Demand payment on time. If payment is due by the 25th of the month, stick to the 25th. Set the trend with the first billing. If the owner is made aware of this early in the process, he will understand that this is important to you and will develop a sense of urgency in processing the payments or in resolving disputes that may arise.

4. Consider Charging Late Fees

Include the terms of your finance fees in the contract and on the bill. Explain your reasons for the fee during your discussion at the contract settlement. A typical fee is 1.5% per month. Some contractors do not feel right

charging a finance fee, but once you realize that the money owed to you could be in the bank earning interest, your opinion changes quickly.

5. Include the Contract Payment Provisions Clause with Second Notices for Late Payments

If necessary, follow up with a second notice and include the payment provision clause from the contract to remind the owner of their contractual obligation. This will suggest to the owner your seriousness regarding timely payment. In addition, a follow-up telephone conversation can be effective. When done in a businesslike manner, you can still maintain a good relationship with the owner.

6. Define Contract Completion to Determine the Timing of Retainage Releases

Retentions are a cost to your company. You can lose significant amounts of interest income or incur substantial interest expense for loans you had to obtain because someone else has your money. Contractually agree on the specific terms to be met before retainages will be released. Project completion should be defined in the contract. If billings are based on the completion of phases, the phases should also be defined. Additionally, consider defining the punchlist process in the contract. Once the project is completed as defined, take an active role in enforcing the contract terms.

The points above stress collecting the money that you have earned as soon as possible. The quicker you collect, the more you will be able to invest, whether your investment is the next project just beginning or a certificate of deposit. Keep in mind that you are not a bank. You do not want the owner to be holding your money when it belongs to you.



The objective is to finance your operations, not the owner's operations.

Each of the above functions can be performed exclusive of each other, however, a properly managed plan will consist of a balance of all functions.

Direct Benefits of Cash Management

The primary goal of cash management is to increase profitability. However, cash management can do more for your construction company than just improve your bottom line. A properly managed program can do the following for your construction company:

- Eliminate, or at least minimize, borrowing needs
- Indicate when cash needs will arise to pay income taxes, loans, vendors, payroll, and any other obligations
- Reduce the amount of cash unnecessarily tied up in accounts receivable
- Improve the timely investment of excess cash in safe and profitable investments
- Minimize the number of transactions to reduce processing and administrative costs by timing cash disbursements to coincide with cash receipts

Indirect Benefits of Cash Management

Indirectly, cash management can improve relationships with your banks, surety vendors, subcontractors, general contractors and owners. Your construction company will become less of a credit risk to suppliers, banks, your bonding company and other creditors. In addition, the use of such tools as cash flow forecasts can increase your cred-

itability with both your bank and bonding company which ultimately can benefit you through increased lines of credit from both. They will recognize that you are taking the necessary steps to monitor a critical asset of the company. Additionally, by becoming actively involved with the timing of your billings, collections and disbursements, your company will become more profitable.

Cash Management Organization

The cash manager in most construction companies has more than one responsibility. In medium and small construction companies, it may be the owner, president, treasurer, controller or accounting manager, each having other primary responsibilities with cash management assigned as a secondary responsibility. The ideal situation is to assign the cash management responsibilities to an individual who is not involved with the day-to-day accounting of cash transactions. For the small contractor, this may not be possible. But for most larger construction companies, the organizational structure and staffing resources are available to properly segregate these responsibilities.

What is important in both large and small construction companies is to assign cash management responsibilities to an individual that is part of your management team. Cash management should become part of that individual's job description which would describe their responsibilities including the individual's authority over cash transactions. The responsibility should be defined and the method of measuring the results of the cash management program should be determined.



CONCLUSION

A cash management plan of most construction companies should include the following:

- Project cash flow budgets on a monthly basis combined to produce a company based cash flow budget.
- Cash receipts and disbursements projections on a weekly or, at a minimum, monthly basis for both project related re-

ceipts and disbursements and fixed disbursements.

- Daily cash reports for operating and invested funds.

The above-mentioned items are necessary when approaching banks in order to evaluate lending alternatives.

Cash management is much more than just investing idle funds. It is a critical component of every contractor's operation and should be treated as such if you wish to be successful in the long term.

TABLE I
CASH FLOW FORECAST

	MONTH		YEAR-TO-DATE	
	ESTIMATE	ACTUAL	ESTIMATE	ACTUAL
Receipts				
Cash balance beginning of period				
Contract accounts receivable receipts				
Retention receipts				
Interest				
Loans				
Other cash receipts				
Total Cash Available				
Disbursements				
Subcontractors				
Trade suppliers				
Payroll including burden				
Indirect job costs				
General & administrative expenses				
Capital additions				
Income taxes				
Debt service				
Other				
Total Disbursements				
Cash balance end of period				
Management's minimum cash reserve				
Cash Available				
Balance Line of Credit				
Total Cash & Credit Available				



Bulletin

Tips to Help Contractors Manage Through an Economic Downturn

INTRODUCTION

And you thought death and taxes were the only sure things in life. You can add economic business cycles to the list. A common definition of an economic business cycle is a recurring and fluctuating level of economic activity that an economy experiences over a long period of time. There are generally five stages that make up a business cycle:

1. Growth (expansion)
2. Peak
3. Recession (contraction)
4. Trough (bottom) and
5. Recovery

A cycle tends to indicate a normal pattern. At times in the past, business cycles may have been considered regular and predictable. But today, they are quite variable and unpredictable. According to the National Bureau of Economic Research, between 1945 and 2009, there have been 11 confirmed business cycles, with the latest one lasting from December 2007 (peak) through June 2009 (trough). The average duration of the 11 business cycles from peak to trough during that time frame was 11.1 months and 68.5 months from peak to peak.

For the contractor, early recognition of an economic downturn can make the difference between survival and demise. Managing through an economic downturn and coming out whole on the other side requires planning, savvy business decision making, execution of a plan and, frankly, a little luck.

EARLY WARNING SIGNS

There are many recognized early warning signs for the economy that indicate some sort of business downturn is on the horizon. The contractor must always be aware of the current business climate. What is happening to economies around the world? How are housing starts, unemployment, GDP and inflation trending, just to name a few?

It is generally true that the construction industry lags behind economic cycles. During robust and expanding economic times, contractors generally have plenty of work. Owners and developers are flush with cash and capital budgets are healthy. Businesses build new facilities, expand existing facilities, modify and improve processing equipment, and install new technologies. Construction work is plentiful. Backlogs expand and the outlook is bright.

When an economic downturn begins to set in, the brightness begins to dim. Owners stop spending uncommitted cash fairly quickly, preferring to sit on the cash to see how the economic cycle develops, while projects that had funds already committed may still move forward, but possibly at a slower or reduced rate.

For developers, the effects of this beginning downturn are different. Their project funding is often based on pre-sales and venture capital. Those sources of funds dry up quickly in the face of a downturn, and those projects can stop overnight.

So while an economic business cycle may be showing signs of trending down, often contractors are still busy with work under contract. That committed work may allow a contractor to work deep into an economic recession. But without replacing that booked work with new work, the backlog quickly runs out and the contractor is faced with making some difficult business decisions, even when the economy may already be picking back up.

What are some early warning signs particular to the contractor that indicate an economic slowdown or even an economic recession is looming?

- **The architect and engineering community begins to slow down.** In the contracting world, the harbingers of market trends are the architects and engineers. For the construction market to be healthy and busy, projects must be in design and development. They will naturally flow down to the construction community. However, when the volume of new projects flowing in to architects and engineers begins to slow down, designers will be laid off and small shops shut their doors; the signs are there that a slowdown in the construction market is near. Conversely, you will have a good feeling that the market is coming out of a full-fledged economic recession when the

architecture and engineering community gets busy again.

- **The numbers of participants on bid lists are growing.** When the number of available projects begins to shrink, that leaves fewer and fewer projects to feed the construction community. Therefore, an early warning sign is an increase in the number of competitors for new business.
- **The bid margins shrink.** With less work available and more participants competing for what work is out there, the natural economic forces of supply and demand will begin to drive bid margins down quickly.
- **The bank and bonding companies start tightening lending products and seeking more and more detailed information about your current work.** Financial institutions have to manage a lot of financial risk with contractors, and when they see an economic downturn coming, they jump to attention and want to make certain that their clients are in healthy financial shape for the coming storm.
- **Accounts receivables start to lengthen out.** When an economic recession is looming, owners and general contractors quickly go into cash conservation mode. That does not bode well for the contractor as it starts to stretch out the spend-to-collection time cycle. Your average day's sales outstanding may go from 30 - 45 to 90 - 180 days. Owners and general contractors can find lots of reasons to hold on to the money that the contractor has earned. Consequently, you have to manage the relationship with your customer along with managing your cash.

- **When receivables start stretching out, so does your available cash reserves or line of credit.** During good economic times when cash flow is regular and timely, funds are plentiful to finance your current work. But when your customers start hanging on to your money longer and longer, you are forced to dig deep into your cash reserves to finance your work or to borrow more and more funds from your bank. Your cash drops significantly and your bank line maxes out. You may have work that you booked during the peak of the cycle and you are working it off, but you are getting strained to meet payroll and other financial obligations because the flow of cash begins to slow significantly.
- **The number of disputes and claims with your customers for extra work increases.** When cash starts to tighten up in an economic downturn, you will experience more challenges from your customers about your claims for extra work. They will find reasons to claim “that was implied in your contract” or “you should have known you had to do that” or some other similar excuse to pay for the extra work performed.
- **Your suppliers and subcontractors start calling earlier for payment.** In an economic downturn, your suppliers and subcontractors are facing the same economic challenges as you. Cash is the lifeblood of the construction industry.

All of the above are among several red flags that signal an economic downturn is starting. When it does, no one really knows how deep it will go or how long it will last. But the contractor needs to be prepared for the worst. You will need to navigate through the downturn and be poised to take every advantage of the upturn when it comes (and it will). To do so requires planning and execution along with some good business sense.

SURVIVAL STEPS

When the economic downturn begins—even though you may be flush with work—you need to act early to prepare for the difficult times ahead and position yourself and your company to be successful when the economy recovers.

- **CASH IS KING.** Cash is the lifeblood of the contractor. You can have all the work you can stand at margins that make you smile, but if you do not have access to the cash to finance the work, those projects can disappear virtually overnight. Here’s how to manage your cash flow:

- a. **Make sure your bank is knowledgeable about the construction industry and your business.** Your financial institution should understand the construction industry and contractor business cycles. It is sort of like insurance. In the good times, you do not need them much, but when times are tough, you need your bank more than ever. Manage that relationship. Keep your bank apprised of your work in progress (WIP) and possible awards. Let them know that you have a plan to manage through an economic downturn. Make sure your line of credit is large enough to carry your business deep into a recession.

Banks that are unfriendly to contractors or unknowledgeable about their business will tend to tighten up credit and be reluctant to lend or put covenants in place that will be difficult to meet. This is especially true when you are looking for an increase in the middle of the storm.

- b. **Manage your accounts receivable as though it is your own personal money (and often it is).** Don’t get lazy with your receivables. Work

hard to claim the money that you have earned. Make sure your billings are 100% correct and in accordance with the requirements of your contract before you submit them. Don't give your customer a reason to send them back for a "correction," which only lengthens the payment cycle.

Manage your customer relationship. Your customers should see you more often than when you want payment. Let them know that for you to continue doing the fine job you were contracted for, the cash needs to flow in a timely fashion. Don't let your receivables get 30, or 60, or 90 days past due before you take action. BEFORE the due date, give your customer a friendly reminder that payment is due soon and ask if there is anything you need to do on your end to make sure payment is timely. Be proactive, not reactive.

- c. **Manage your accounts payable like you are giving away your most prized possession, which it is, your cash.** Work with your vendors to achieve the most advantageous payment terms. This is best done BEFORE an economic downturn hits. Negotiate extended payment terms. Remember, your vendors are in competition for your business. In addition to negotiating on the price of commodities, you can negotiate payment terms too as a part of the deal. Don't always settle for their standard 30-day payment terms, especially if your terms with your customer are longer. Negotiate for 60 or 90 day terms, all the while giving the same effort with your customers to shorten your receivable days. Try to work toward the biggest gap between shorter receivable days and longer payable days that you can. You should prefer

to use someone else's money rather than your own to finance your work. In the end, whatever you commit to, stand by your commitment. Be a contractor of integrity.

- d. **Maximize your overbillings and minimize your underbillings.** Always, but especially in the early stages of an economic downturn, it is crucial to manage your billings. This starts with a thoughtful schedule of values which allow for creative billing. Bottom line, you need to bill for as much as possible as early in the job as possible. Create a schedule of values that allows for invoicing early and often. The goal is to get way ahead of billings versus costs. Lump sum projects are ripe for effective cash management, but you need to strategize early on in the process to maximize this effort.

Conversely, large time and material projects are difficult to manage during a downturn unless you are substantially capitalized. Those projects require large outlays of cash before you can invoice and well ahead of getting paid for your services. Minimize those projects where you can only bill based on some sort of completed project milestone or achievement. Bill ahead, early and often.

- e. **Drive down the cost of commodities.** Just as more bidders compete for less work during a downturn, more vendors will compete for your business. Take advantage of getting price concessions you normally would not enjoy in a robust economy. Bid and rebid your commodity materials. Drive those prices down. Ask for services you normally would not see, like free bundling, kitting, special

deliveries and pre fabrication. Use your vendors to your advantage.

- f. **Manage the efficiency of work on jobsites.** While efficient productivity is normal practice for all successful contractors, it is crucial during an economic downturn. You must squeeze every fractional percent of efficiency out of a dollar spent. Take a look at your crew ratios, and then get that crew mix down with a higher number of apprentices. Foremen need to work with their tools when available. Maximize your pre-fabrication efforts in a more efficient work area such as your shop. Solicit your vendors to deliver your commodities to the work area, not just to the front gate. Get them to package and prefab the equipment as much as possible so that you do not spend your field labor dollars on those tasks. Maximize safety efforts to minimize the amount of money, time and effort spent on workers' compensation claims. Identify your absolute best employees—field and administrative personnel—and maximize their contribution to your projects.
- g. **Manage your overhead, but do not unnecessarily go too deep.** In an economic downturn, everyone goes into cost-cutting mode, and well they should. When times are good and work is plentiful, we can all enjoy the benefits of higher overhead. But as soon as an economic downturn hits, we tend to start slashing cost and personnel like there is no tomorrow.

Downward trends in a business cycle are certainly good times to get rid of unproductive and wasteful costs, whether those are processes or personnel. But be sure to give due consideration before making those cuts, especially on the people

part of the overhead. Often times, contractors will send employees packing citing that they cannot afford to have them stay. Sometimes we go too deep and send some really good and productive personnel out the door. And as sure as death and taxes, economic recessions will turn into economic expansions. When that happens and work becomes available, you want to be positioned to take advantage of every opportunity. If you have cut too much of your overhead personnel, you will be faced with the quandary of, "Do I take on work and then go hire the people to run it, or do I go hire the people to run work and then try to get it?" You also run the risk that when you let too many of your good employees go, they will not be available for rehire or, even worse, your competitors will have hired them and now they are working against you.

Bottom line: don't make a knee-jerk reaction and unload the boat at the first sign of a leak. Be mindful of your best folks. While you may need to spend a few unproductive dollars during a downturn, when the economy recovers, you will want to have the resources available to jump on the available work and be ahead of your competition while they try to figure out how to get the work without having the people to run it.

SUMMARY

The Boy Scouts' motto is *Be Prepared* and the same motto should apply to contractors. Have a plan for an economic slowdown. Watch for the early warning signs. Don't get caught in the middle of one and only then start thinking about survival. Contracting is a risky business. Manage that risk each and every day during good times and difficult ones.



Bulletin

Service Mark-ups vs. Construction Mark-ups

Introduction

By definition, a "mark-up is an amount of money, stated in either dollars or a percentage, that is added to your cost."

(<http://www.merriam-webster.com/dictionary/mark%20up>)

The mark-up serves several functions by providing:

- funds to cover **overhead** costs
- a fair and reasonable **profit**
- some cushion in case **estimated costs** are exceeded. This factor will vary based on **risk**

The following describes the components of each function and then discusses potential elements of a job estimate that may be considered for mark-up.

Overhead

Overhead (OH) originally meant "what's OVER your HEAD," or in other words, YOUR ROOF or your office space. In our industry, we have two streams of cost: *Direct Job Costs* (DJC) and *Indirect Costs* that cannot easily be allocated directly to any particular project (i.e., overhead).

Construction Contractor's Overhead:

Every contractor's OH will vary depending on how their business is structured and by their volume of work. For example, suppose there are five

people in your office space, who generate a total of \$200,000 per year in total "overhead" costs covering wages/fringes/taxes/rent/utilities etc. If you bill-out a total of \$1 million this year, your OH costs would be 20 per cent of your sales. But, perhaps you could do \$2 million in sales with the same size office and staff. Now your OH is only 10 per cent of your sales. Your DJC increases in direct proportion to the volume of work incurred, but your OH does not. The more dollar volume of work you do, without increasing your OH, actually drives your OH down as a percentage of your sales. However, as your sales increase, you WILL reach a point where you will have to increase your OH and that changes the equation again.

Service Contractor's Overhead:

Service work normally calls for a higher percentage of OH than construction work. Aside from the high DJC of labor, fringes, taxes, trucks, uniforms etc., a service technician requires a lot of office support. The costs for handling customer calls, dispatch, billing, paperwork, callbacks and other non-billable time should be considered in determining a mark-up.

Profit

Profit is what remains after all the DJC's are paid, the OH is paid and the revenue

comes in from the customer actually paying your invoice. Profit is what makes someone invest their money in a mechanical contracting business instead of investing in other mediums, i.e., the stock market, real estate, mutual funds, etc. The business should provide a rate of return that is competitive with other investment opportunities having a similar risk. A mark-up should allow for a reasonable rate of return on investment.

Risk

Every bid you produce has a certain amount of risk to its profitability. Each part of a mechanical contractor's DJC structure, by its very nature, has a different level of risk.

Construction Contractors: Your DJC's consist of four basic parts:

- **Subcontractors**
- **Equipment**
- **Sundry materials**, such as pipe, valves and fittings
- **Labor**

Subcontractors probably have the lowest risk. A subcontractor quotes the job, and must perform the work at the quoted price. The risk to you is that the subcontractor will not perform, either through disputes with the plans/specifications, recalcitrance, bankruptcy or other problems. But, if the subcontractor is a financially sound company run by people who care about an ongoing relationship with you, your risk may be lower with a subcontractor than with your other costs. Therefore, the mark-up on your subcontractors may be adjusted accordingly.

Equipment. The contractor will be responsible for the equipment purchased for the job—its installation, warranty problems, delivery and scheduling issues, and any costs

associated with meeting the plans and specifications.

Suppose the owner/CM/GC buys the equipment? A contractor should consider that his job-risk for this category still exists in some form and a mark-up associated with that risk might still be appropriate.

Sundries. Since the contractor usually prepares a bill of materials from his own take-off of the job and then applies pricing, the risk of contractor error may be greater than an error would be for an equipment take-off. The quantity could be in error or the price-factors could either be wrong or could increase.

Labor. Labor presents the highest potential DJC risk to a contractor. Regardless of how sophisticated the tools are that we use to estimate labor on a job, there is no way to know precisely the number of man-hours needed for a job until the job is completed.

Service Contractors: Some DJC's are the same. However, usually the labor costs are a much higher percentage of the total DJC's. The OH structure for Service is, by its nature, much higher than on construction work.

Remember that every job is different and every contractor's OH cost structure is unique to that company.



Bulletin

Guide to Financial Statements

INTRODUCTION

Understanding the elements of a basic financial statement is a “must” for anyone in business. Banks, sureties, customers and any other entity that engages in business transactions with your company require information about your company’s financial status. At the same time, you need to be able to read and understand the financial statements of those entities with whom you are considering entering into a business transaction.

This bulletin is all about basic financial statements—the purpose of each statement; what information they contain; and how to understand what that information is saying about a company. This bulletin is designed to take the mystery out of preparing and analyzing information that’s essential to your successful conduct of business for your company.

So, what do financial statements do?

IT’S ALL ABOUT THE MONEY

A company’s financial statements draw a picture of its “money” in all of its forms from different perspectives. They describe what the money is, its comings and goings, and its current location. There are four kinds of financial

statements: (1) Balance Sheets; (2) Income Statements; (3) Cash Flow Statements; and (4) Statements of Shareholders’ Equity.

Balance sheets state what a company owns and how much it owes at a fixed point in time.

Income statements report the revenues a company earned over a specific time period.

Cash flow statements show the exchange of money between a company and the outside world over a period of time.

Statement of shareholders’ equity reports changes in the retained value of ownership of the company’s share holders over time.

Let’s look at the first three financial statements in more detail.

BALANCE SHEETS

A balance sheet shows a company’s assets, liabilities and shareholders’ equity at the end of the reporting period. It does not show the flows into and out of the accounts during the period.

Assets are items or property that have value and that can be bought, sold and/or

used. Assets include land and buildings as well as building contents, such as office furniture and equipment, machines, vehicles and inventory. Monetary assets are cash and investment holdings. Assets also may be less tangible, but still retain value, such as a company's licenses, brand, reputation, and customers' good will.

Liabilities are debts and obligations, such as bank loans, building and equipment rentals, invoices for supplies and materials and payroll and benefits payouts. Liabilities also include obligations to customers to provide future goods or services.

Shareholders' equity, often referred to as capital or net worth, is the money that would be left if a company sold all its assets and paid off all of its liabilities. This leftover money belongs to the shareholders—or the owners—of the company.

Construction companies typically have several contracted projects in various stages of completion at any given time. These contracts might be "overbilled," meaning that billings exceed costs and estimated earnings on uncompleted contracts, or "underbilled," meaning that costs and estimated earnings exceed billings on uncompleted contracts. An overbilling is carried as a liability, and an underbilling as an asset.

A company's assets must equal the sum of its liabilities and shareholders' equity.

A company's balance sheet (Exhibit 1) is set up like a basic accounting equation. The left side lists the company's assets and the right side lists the company's liabilities and shareholders' equity. Balance sheets may present this information top-down, with assets at the top, then liabilities, with shareholders' equity at the bottom.

Assets are generally listed according to how quickly they will be converted into cash.

Current assets are things a company expects to liquidate or convert to cash within one year. For example, most companies expect to sell their inventory within one year.

Noncurrent assets are things that would take longer than one year to sell. These include fixed assets which are used to operate the business but that are not available for sale, such as trucks, office furniture and other property.

Liabilities are generally listed based on their due dates. Liabilities are either current or long term.

Current liabilities are obligations that a company expects to pay off within one year, such as a short-term loan.

Long-term liabilities are obligations with payment periods spanning more than one year.

Shareholders' equity (Exhibit 2) is the amount owners invested in the company's stock plus or minus the company's earnings or losses since inception (Also known as "Retained Earnings). Sometimes companies distribute earnings or dividends instead of retaining them.

Multiemployer Plan Disclosure

The Financial Accounting Standards Board has recently adopted new disclosure requirements for companies participating in multi-employer defined benefit pension plans. These disclosure requirements take effect for annual periods ending after December 15, 2011 for publically owned companies, and for periods after December 15, 2012 for privately owned companies.

Exhibit 3 is a sample page showing how this disclosure could look, as a supplemental sheet to a contractor's balance sheet.

INCOME STATEMENTS

An income statement reports a company's revenues earned over a period of time (usually one year or a portion of a year). An income statement also states the costs and expenses associated with earning that revenue. The literal "bottom line" of the statement depicts the company's net earnings or losses or how much the company earned or lost over the period.

Income statements also report earnings per share (or "EPS"). This calculation is how much money shareholders would receive if the company distributes all of its net earnings for the period.

Income statements are like a pyramid (see Exhibit 4) with total sales made during the accounting period at the top, and at each descending level, deduct each cost or other operating expenses associated with earning the revenue. At the base (after deducting all of the expenses) are the company's actual earnings or losses for the accounting period, otherwise known as the "the bottom line."

At the top of the income statement is the total amount of money generated from the sale of products or services. This top line is often referred to as **gross revenues or sales**. "Gross" means that expenses have not yet been deducted; hence, the number is gross or unrefined.

Below the gross revenue line are several lines for entering various operating expenses. Although these expenses can be reported in any order, the section after revenues typically shows the **costs of the sales**. This

number states how much the company spent to produce the goods or services it sold during the accounting period. In the mechanical contracting industry, the "cost of goods sold" is our direct job cost which includes field-labor costs, fringe benefits, payroll taxes, materials, equipment and subcontractor costs.

The next line subtracts the costs of sales from the revenues which becomes the subtotal called "**gross profit**" or "**gross margin**." The number is "gross" because certain expenses have not yet been deducted.

Next are **operating expenses**. These cover a company's operations for a given period. They include office staff salaries, office equipment rentals, utilities, etc., otherwise known as "overhead" costs. These costs are not directly related to a specific job, but are essential to running the business. In fact, the term "**overhead**" came from the idea that it was "... *over your head*..." meaning, your office. Operating expenses are different from "costs of sales," which were deducted above, because operating expenses cannot be linked directly to the production of products (job-costs) or services being sold.

Depreciation is next and is also deducted from gross profit. Depreciation accounts for the wear and tear of assets used over a period of time, such as tools, vehicles, welding machines and furniture. Companies spread the cost of these assets over the period they are used, which is called "depreciation" or "amortization." The "charge" for using these assets during the period is a fraction of the original cost of the assets.

Once all operating expenses are deducted from gross profit; the result is operating profit before interest and income tax expenses. This is called "**income from operations**."

Companies also need to account for interest income and interest expense. **Interest income** is a payment by a financial institution for the use of money deposited in interest-bearing savings accounts, money market funds, certificates of deposit, etc. **Interest expense** is a fee paid for borrowing funds. Income statements may list interest income and interest expense separately or combine the two numbers. The interest income and expense are then added and subtracted as appropriate from the operating profit before income tax is considered.

After **Income tax** is deducted, the result is the bottom line—net profit or net losses. (note: net profit is also called net income or net earnings.) This very important number tells how much the company actually earned or lost during the accounting period.

Earnings per Share or EPS

Most income statements include a statement of earnings per share or EPS. This number is the amount of money company owners would receive for each share of their stock if all the company's net income for the period was distributed.

To calculate EPS, the total net income is divided by the number of outstanding shares of the company.

Many mechanical contracting firms are closely held entities and EPS is not a concern. However, for those firms with a large amount of shareholders or those that are publicly traded, EPS is a required calculation.

CASH FLOW STATEMENTS

Cash flow statements (Exhibit 5) report the flow of cash into and out of a company. A company must have

enough cash to pay its operating expenses and other obligations. While an income statement shows whether a company made a profit, a cash flow statement shows whether the company generated cash. And, the cash flow statement's bottom line shows the net increase or decrease in cash for the period.

A cash flow statement also reports changes over time rather than absolute dollar amounts at a point in time. It uses and reorders the information from a company's balance sheet and income statement.

Generally, cash flow statements are organized in three parts or types of activities: (1) operating; (2) investing; and (3) financing.

Operating Activities

A cash flow statement usually begins with an analysis of the company's cash from net income or losses. In general, the net income stated on the income statement accounts for the cash the company received from or used in its operations. To make this happen, add back in non-cash items (such as depreciation expenses) and reconcile cash from or used by other operating assets and liabilities.

Investing Activities

Next, a cash flow statement reports the cash flow from all investment activities. These include purchases or sales of long-term assets, (i.e., property, plant and equipment) as well as investment securities. If a company buys a new welding machine, the purchase would appear on a cash flow statement as a cash outflow from investing activities because the purchase involved cash. If the company decided to sell some investments, the sales proceeds would appear as cash inflow from investing activities.

Financing Activities

The third part of a cash flow statement shows the cash flow from all financing activities. These include cash raised from the sale of stocks and bonds or from bank loans. And, buying stocks and bonds or paying back a bank loan would appear as a cash outflow.

FOONOTES

Footnotes to financial statements provide a treasure trove of valuable and important information, so be sure to read them. For example:

First, companies must report the **accounting policies** that have the greatest effect on the company's financial condition and bottom-line. These are the management team's subjective judgments that guide a company's strategies and operations.

Next, footnotes contain detailed information about the company's current and deferred **income taxes** at all levels, including foreign tax obligations and payments, and its tax rate at all levels.

Also included in footnotes is information about the company's **retirement program** and specific plans, the costs of these programs and their funding status.

Officer and employee **stock options** also appear in footnotes, including how the company accounts for stock-based salaries and the impact of that accounting on reported results.

WHY MD&As ARE IMPORTANT TOO!

A narrative explanation of a company's financial performance makes up ONE section of the quarterly or annual report entitled, "Management's Discussion and Analysis of Financial Condition and Results of Operations" or the MD&A.

This is where management tells investors how it perceives the financial performance and condition of the company. MD&A also tells investors what the financial statements show and do not show, as well as important trends and risks that have shaped past performance or may shape the company's future.

The Securities and Exchange Commission's (SEC) rules governing MD&A require that companies disclose trends, events or uncertainties that management knows would have a material impact on the reported financial information. It is information that the company's management believes is necessary for investors to understand about the company's financial condition, changes in financial condition and results of operations. In effect, the MD&A completes the picture of the company's finances by providing context for the financial statements and information about the company's earnings and cash flows.

FINANCIAL STATEMENT RATIOS AND CALCULATIONS

You may have seen the terms "P/E ratio," "current ratio" and "operating margin," but they do not appear in financial statements. They are, in fact, used to evaluate the information that is reported on financial statements.

Exhibit 6 lists some of the many ratios that investors calculate from information on financial statements. Banks and bonding companies look closely at certain ratios and may have covenants in loan documents requiring minimum ratios to be maintained. As a general rule, desirable ratios vary by industry.

Debt-to-equity ratio compares a company's total debt to shareholders' equity. Both numbers may be included in a company's balance sheet.

To calculate debt-to-equity ratio, divide a company's total liabilities by its shareholder equity. In other words, a company with a debt-to-equity ratio of 2 to 1 has two dollars of debt to every one dollar that shareholders invest in the company. Or, the company is taking on debt at twice the rate that its owners are investing in the company.

Operating margin compares a company's operating income to net revenues. Both numbers are on a company's income statement.

To calculate operating margin, divide a company's income from operations (before interest and income tax expenses) by its net revenues. The operating margin is usually expressed as a percentage. It shows, for each dollar of sales, what percentage was profit.

P/E ratio compares a company's common stock price with its earnings per share. To reach that ratio, divide the company's stock price by its earnings per share. If a company's stock sells at \$20 per share and the company is earning \$2 per share, then the company's P/E ratio is 10 to 1. The company's stock is selling at 10 times its earnings.

Working capital is the money remaining if a company paid its current liabilities (that is, its debts due within one-year of the date of the balance sheet) from its current assets.

BRINGING IT ALL TOGETHER...

Although this bulletin discusses each financial statement separately, keep in mind that they are all related. The changes in assets and liabilities that appear on the Balance Sheet are also reflected in the revenues and expenses that are on the Income Statement, which result in the company's gains or losses. Cash flows provide more information about cash assets listed on a Balance Sheet and are related, but not equivalent, to net income shown on the Income Statement.

No one financial statement tells the complete story, but combined, they provide very powerful information for owners, banks, bonding companies and stockholders!

Exhibit 1
ABC Mechanical, Inc.
Balance Sheet

ASSETS

CURRENT ASSETS

Cash and cash equivalents		\$ 266,444.60
Accounts receivable		5,222,576.50
Cost and estimated earnings in excess of billings on uncompleted contracts		525,000.00
Prepaid expenses		<u>653.71</u>
TOTAL CURRENT ASSETS		\$6,014,674.81

Property and equipment, including transportation, field and office equipment	\$1,588,109.29	
Less: Accumulated depreciation	<u>1,187,804.11</u>	
Net property and equipment		<u>\$ 400,305.18</u>
TOTAL ASSETS		<u>\$6,414,979.99</u>

Exhibit 2
ABC Mechanical, Inc.

Balance Sheet

LIABILITIES AND STOCKHOLDER'S EQUITY

CURRENT LIABILITIES

Accounts payable – trade	\$2,087,157.38
Pension payable	61,954.00
Payroll costs payable	39,177.09
Billings in excess of costs and estimated earnings on uncompleted contracts	675,000.00
Sales tax payable	3,045.78
Accrued expenses	246,640.00
Loans payable	<u>44,573.59</u>

TOTAL LIABILITIES

\$3,157,547.84

STOCKHOLDER'S EQUITY

Common stock	\$ 100,000.00
Retained earnings	<u>3,283,869.06</u>

TOTAL STOCKHOLDER'S EQUITY

\$3,383,869.06

**TOTAL LIABILITIES AND
STOCKHOLDER'S EQUITY**

\$6,541,416.90

Exhibit 3

**ABC Mechanical, Inc.
Multiemployer Pension Plan Disclosure**

Pension Fund	EIN/Pension Plan Number	Pension Protection Act Zone Status		FIP/RP Status Pending/Implemented	Contributions of Entity A			Surcharge Imposed	Exp. Date of Coll. Barg. Agreement
		20X0	20X0		20X0	20X8	20X9		
ABC Fund 34	32-1899999	Red as of 9/30	Yellow as of 9/30	Yes	\$ 1,883,000	\$2,309,000	\$2,226,000	Yes	12/31
ABC Fund 37	52-5599999 – 002	Green	Yellow	No	3,342,000	3,609,000	3,586,000	No	12/31
ABC Fund 40	92-3499999	Yellow	Yellow	No	5,796,000	6,435,000	6,374,000	No	12/31
ABC Fund 43	82-4299999	Red	Red	Pending	3,539,000	3,234,000	3,218,000	Yes	12/31
ABC Fund 46	82-6899999	Green	Green	No	778,000	816,000	833,000	No	12/31
ABC Fund 49	52-6199999	Yellow	Yellow	No	534,000	547,000	491,000	No	12/31
ABC Fund 52	72-8599999 – 001	Red	Green	Implemented	1,349,000	1,134,000	1,050,000	No	12/31
ABC Fund 55	82-2999999	Green	Green	No	1,224,000	1,946,000	1,151,000	No	12/31
Plans for which plan financial information is not publicly available outside Entity A's financial statements									
ABC Fund 61	N/A	N/A	N/A	N/A	418,000	482,000	491,000	N/A	12/31
ABC Fund 73	N/A	N/A	N/A	N/A	1,872,000	1,764,000	1,693,000	N/A	12/31
Other Funds				Total contributions	147,000	160,000	169,000		
					\$20,884,000	\$21,536,000	\$21,282,000		

Exhibit 4
ABC Mechanical, Inc.

STATEMENT OF INCOME AND RETAINED EARNINGS
FOR THE PERIOD ENDING JUNE 30

	Period Ending 06/30
Contracts billed	\$10,000,000.00
Costs and estimated earnings in excess of billings on uncompleted contracts	525,000.00
Billings in excess of costs and estimated earnings on uncompleted contracts	<u>(675,000.00)</u>
Contracts completed	9,850,000.00
Direct costs	<u>8,212,657.11</u>
Gross profit	1,637,342.89
General and administrative expenses	<u>1,206,640.39</u>
Net operating income (loss)	<u>430,702.50</u>
Other income (expenses: Interest income	458.60
Other	<u>22,546.67</u>
	<u>23,005.27</u>
Net income (loss)	453,707.77
Retained earnings (previous year-end)	3,080,161.29
Less: Dividends (S-Corp. Distributions)	<u>(250,000.00)</u>
RETAINED EARNINGS	<u><u>\$3,283,869.06</u></u>

Exhibit 5
ABC Mechanical, Inc.

STATEMENT OF CASH FLOWS
FOR THE PERIOD ENDING JUNE 30

Cash Flows from Operating Activities

New income/(loss) \$ 453,707.77

**Adjustments to reconcile net income
to net cash provided by operating activities:**

Depreciation 58,234.42

Change in assets and liabilities:

(Increase)\decrease in accounts receivable 2,707,306.80
(Increase)\decrease in work in progress (198,932.00)
(Increase)\in prepaid expenses 76,500.13
Increase\decrease in accounts payable (1,270,383.34)
Increase\decrease in accrued expenses (1,382,704.88)

Total adjustments (9,978.87)

Net cash provided by operating activities 443,728.90

Cash flows from investing activities
Purchases of property and equipment 126,693.84

Cash flows from financing activities
Distribution to stockholders 250,000.00

Net increase\decrease in cash and cash equivalents 67,035.06

Cash and cash equivalents at beginning of year 280,353.16

Cash and cash equivalents at 6/30 \$ 347,388.22

Supplemental Disclosure:

Interest paid \$ 4,410.21

EXHIBIT 6

ABC MECHANICAL RATIO ANALYSIS

	Year beg. 1/1 <u>ABC Mechanical</u>	Industry <u>Median*</u>
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Current Ratio	=	$\frac{\text{Current Asset}}{\text{Current Liabilities}} = \frac{6,014,674.81}{3,157,547.84}$	=	1.90:1	
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Indicates the amount of liquid assets available to liquidate current debt or the company's ability to meet its current obligations. Typically, lenders and sureties like this ratio to be 1.25:1 or greater.

Return on Total Assets	=	$\frac{\text{Net Income/(Loss) - annualized}}{\text{Total Assets}} = \frac{912,484.90}{6,414,979.99}$	=	14.22%:1	5.68%:1
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Indicates how productively the company uses its assets to produce profits. The higher the ratio, the more effective the use of assets.

Return on Equity	=	$\frac{\text{Net Income/(Loss) - annualized}}{\text{Common Stockholders Equity}} = \frac{912,484.90}{3,383,869.06}$	=	26.97%:1	13.92%:1
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Total Liability to Equity	=	$\frac{\text{Total Liability}}{\text{Equity}} = \frac{3,157,547.84}{3,383,869.06}$	=	0.93:1	1.45:1
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Indicates the percentage of total liabilities to equity. Typically, sureties like this ratio to be less than 4:1 or 3:1.

Age of Receivables	=	$\frac{\text{Avg A/R X \# days per mos}}{\text{Contract Revenues}} = \frac{146,660,158.35}{1,641,667.00}$	=	89 days	65 days
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Estimates the average collection period for contract receivables. Typically, lenders and sureties like this number to be 45 days or less.

Age of Payables	=	$\frac{\text{Avg A/P X \# days per mos}}{\text{Contract Cost}} = \frac{51,517,101.30}{1,368,776.00}$	=	38 days	N/A
-----------------	---	--	---	---------	-----

Estimates the average number of days required for payment of contract costs. Typically, lenders and sureties like this number to be 45 days or less.

- Industry median figures per survey of 140 construction companies with annual revenue between 410 million and \$25 million.



Bulletin

Other Direct Job Costs (ODJC's) and Indirect Job Costs

INTRODUCTION

What are “Indirect Job Costs”? What are “*other* direct job costs? Sounds confusing, doesn't it? Job cost is pretty straight forward, isn't it? Labor, some material, a couple of subcontracts—simple—or is it? Items like lift rental, permits, trailer rental might be obvious also, but what about hard hats, fab shop expenses, drill bits, grinding wheels, company vehicles? Are those overhead expenses? Are they the same on every project? How do you track and estimate those expenses?

These are examples of “other direct job costs” (ODJC) and a management system that accounts for and helps you identify and manage these expenses is very important to a successful business.

Accounting and financial management reference tools tell us that we should assign account numbers to these costs, but they don't offer much detail beyond that general advice. The problem is that there are many types of ODJCs, and tracking them individually, by project, could be very time consuming, require significant resources, and is not necessary.

This bulletin is intended to help identify ODJCs and provide *some* options to assist in managing and understanding these costs.

SAFETY GLASSES, GRINDING WHEELS, FAB SHOP UTILITIES – ISN'T THE COST OF THESE ITEMS OVERHEAD?

The mechanical construction costs we incur every day can be placed into one of three broad categories:

1. Selling, General and Administrative Costs (SGA, or overhead);
2. Direct job costs; and
3. Indirect job costs or, other direct job costs, if you prefer.

Although this bulletin addresses ODJCs, we must first touch on the other two categories. At the risk of over simplifying, let's start by further defining these three cost categories.

Selling, General and Administrative (SGA) Expenses

SGA expenses are those costs incurred to operate the business, even if you subcontracted all of the trade-related work. You would need management personnel, an office (rent and utilities), estimating and engineering staff, accounting staff, computer and phone systems, outside consultants, administrative staff, phones, entertainment expenses, etc.

Direct Job Costs

These items include: the pipe, valves, fittings and equipment installed; the trade labor needed to install those items; CAD/BIM labor; subcontractor costs; and the project-specific supervision needed to manage the project.

Direct Job Costs can be further sorted into four cost categories:

1. **Labor** – Typically includes wages, taxes and insurances, and fringe benefits
2. **Material** – Installed materials
3. **Equipment** – Installed equipment NOT construction equipment
4. **Subcontracts.**

Other Direct Job Costs (ODJC)

These costs include lift rentals, permits, site office expenses, drinking water, temporary toilet facilities, drug testing, welder testing, etc. Some of these items are straight-forward and included in most estimates and easily job-charged. But, many ODJCs are not obviously job-specific, or easily job-charged and include items such as small hand tools, saw blades, safety glasses, company vehicles, fabrication shop overhead and depreciation of major tools and equipment. If you believe these are job costs or overhead, consider the following:

1. Would you incur these costs if you subcontracted the work?
2. Do they vary by project type?
3. Do they vary by the mix of labor, subcontracts, material and equipment on a project?

These ODJCs are driven by type and size of project and are a cost of performing the work. You should know exactly what you are spending for them on every project.

And, you should get reimbursed for them on change order work.

General Categories of ODJCs

These include:

- **Small tools** that do not have a multi-project life, such as tape measures, screw drivers, channel locks and PPE items such as gloves, safety glasses, and hard hats.
- **Consumable items** are materials that are used up during construction. Examples include drill bits, rags, weld rods, gases, flux and saw blades.

*The MCAA's **Tool and Equipment Rental Guide** includes an extensive list of both small tools and consumables.*

- **Vehicle expense** covers depreciation, lease expense, fuel, registration, insurance, repairs and maintenance.
- **Fabrication shops** include rent, utilities, equipment depreciation, non-working supervision, testing/certification labor and materials, and small tools and consumables used in the shop.
- **CAD and BIM infrastructure costs** include computer hardware, software licenses, plotters, paper, ink, and training.
- **Job Site Office Expenses** cover trailer rentals (office and storage), phone systems, plotters, copy machines, water, coffee, etc.
- **Construction equipment** should be job charged whether owned or rented and can include items such as scaffolding, scissor lifts, cranes, and welding machines

Many companies make the mistake of including these items in overhead costs. It is easy to understand the error if you think about the different nature of projects.

Consider these three projects:

- A. An 18-month project with a large work force, full time project management and a great deal of welded pipe and shop fabrication.
- B. A six-month project with a very high percentage of the work performed by subcontractors.
- C. A three-man job lasting five days and performed by a mobile work force in company trucks.

Consider the ODJCs identified previously and then how these costs will vary by project type. Are vehicle, fabrication and CAD expenses the same for all projects? These projects will incur very different ODJCs. ODJCs are a direct result of the work and driven by the type and nature of the work; they are job specific.

Charging ODJCs

It is efficient to be able to buy and inventory many small tools and consumables and dispense them as needed. However, charging each one to a project is not practical. Likewise, you cannot charge each kilowatt of electricity used in the shop to a specific project. But, we can use job numbers or general ledger accounts (the benefits of using annual job numbers are numerous) to track and budget costs for these items.

For example, job number “13pipeshop” might have cost codes for 2013 depreciation, shop tools, utilities and even rent. The total cost of this 2013 job number would equal your shop burden – a topic tackled in other MCAA materials. Likewise, job numbers for vehicles, consumables, safety training and personal protective equipment and CAD can easily be used to budget and track these ODJCs. Later in this bulletin, we’ll discuss how to associate, or allocate, these costs to specific projects.

ODJCs, such as lift rental and job site office expenses, can be easily job-charged. Previously, we talked about four cost categories on any project—ODJCs lead us to an additional cost category, that is **5. Other Job Costs.**

Mark-ups

Can different mark-ups be used for various projects to cover ODJCs?

There are problems with using different mark-ups on different types of projects. Even if you have a good handle on ODJCs, varying mark-ups is not the preferred method to recover these costs. Instead, developing a system to job-cost ODJCs provides many benefits. Most important is that more people in your company see and understand the costs. Focusing attention on these costs will improve their management, and estimators and project managers will make better financial decisions.

The classic example is the “break-even project,” the one which the project manager (PM) points to and says, “It may be a 0% gross margin, but at least we didn’t lose money”. That “break-even” project has very different consequences if it is a subcontract-heavy job or one that uses a great deal of CAD and fabrication. Gross margin goals do not capture the true cost of the work as effectively as job-cost details that are supported by solid accounting. Think of that top project manager who watches every dollar; is he really as focused on a target gross margin as he is on the vehicle charge hitting the job because every mechanic has a truck?

Additionally, if you are involved with cost-reimbursable work or have the misfortune of ending up in a claim, you will benefit from a job cost methodology that is proven and includes as many job costs recorded at the project level as possible.

The Importance of Detailed Cost Data

ODJCs have a material impact on your bottom line. An impact that can sneak up on a company happens when it does not have a process to measure and manage these costs. For example, assume your cost for small tools and consumable items is 3.0% of labor. Assume that on average, labor costs account for 40% of your project selling price and, at year-end, your net profit is 2.5% of revenue. **In this real life example, your cost for drill bits and hard hats is 50% of your annual net profit** – that is a significant cost that should be tracked and aggressively managed. How closely do you track these costs?

Do you believe 3% of labor is high for small tools and consumables? Let's think of it in terms of a man-year. What is the cost to outfit one trades person with a fall protection harness, hard hat, safety glasses, gloves, reflective vest, hand tools, grinding wheels, tape measures, ladders, welding gases, flux, etc.? And, how many times during the year will you replace those gloves and hand tools? A union pipefitter with an hourly cost of \$70/hour who works 1800 hours carries a total annual cost of \$126,000. Three percent of that annual expense is only \$3,780, or \$73 a week. Can you outfit a trades person with all of the required PPE, small tools, and consumables required for \$73 per week? Can you recover those costs on additional or change order work? Detailed job-cost strategies help manage, reduce and recover these types of costs.

Managing and Job Charging ODJCs

Using job numbers and cost codes to collect ODJC data is very effective and even allows you to assign a PM to those jobs. This approach provides an excellent way to not only carefully manage costs—consumable expenses, shop expenses, etc.—but also allows project managers to understand the *true* cost of the work.

Job-cost data can then be compared to annual hours worked to calculate hourly cost rates for these ODJCs. These hourly

costs – otherwise known as “burden” or “allocated overhead” – can easily be job-charged based on hours worked. This process can be expanded to create various hourly costs (burden or allocated overhead) for different types of work. For example, say all of your shop labor is charged to a cost code beginning with a “5” and, at year-end, these cost codes total 20,000 hours. If the shop overhead job-cost totaled \$200,000, we can allocate a \$10 per hour cost to every hour charged against a cost code beginning with a “5.”

The following chart shows the levels of allocation used at one company and demonstrates the flexibility of hourly burden to accurately cost your projects:

Cost Codes	Hourly Allocated Overhead (Burden)
All Trades	\$2.25 (small tools /consumables)
Pipe Shop	Add \$8.00 = \$10.25 /hr
Sheet Metal Shop	Add \$14.00 = \$16.25/hr
Mobile work force (vehicles)	Add \$13.50 = \$15.25/hr
BAS techs	Add \$9.00 = \$11.25 /hr
Engineering Staff	\$8.50/hr
CAD Group	\$13.50/hr

Each of these hourly costs is associated with an overhead job and a project manager, and they are updated quarterly as those forecasted costs AND the company man-hours change. Each quarter, the forecasted pipe shop costs are divided by the forecasted shop hours which produce an updated hourly shop burden. Today's estimating, accounting and job-cost software packages make these tasks very simple.

An option preferred by some companies is to allocate some ODJCs on a dollar of cost (versus hourly) basis. For example, they may add 7.5% of every dollar of material

purchased to recover the cost of consumables such as weld rod, gases, grinding wheels etc., but the principle remains the same. This approach creates a sixth and final job-cost category; **6. Burden /Allocated Overhead.**

CONCLUSION

- The true and accurate cost of the work includes many items that vary by type of work and are difficult to job-charge.
- These costs can be significant and should be accurately measured and managed.
- Grouping these costs, budgeting and charging them to one job number that is actively managed helps to control costs.
- These costs, divided by forecasted hours, creates an easy-to-use and easy-to-manage system for identifying and managing costs.
- Applying hourly burdens to job-charged hours is an easy and effective way to allocate many ODJCs directly to projects. By job-charging these expenses, you increase exposure and attention to actual costs and, as a result, will inevitably reduce ODJCs.
- Project Costs are best separated into 6 categories:
 1. **Labor** – Direct project labor and project specific supervision
 2. **Material** – Installed materials
 3. **Equipment** – Installed equipment
 4. **Subcontracts**
 5. **Other Direct Job Costs** – large ODJCs that are easily posted to a project such as equipment rentals and permits
 6. **Burden, or Allocated Overhead** – ODJCs most efficiently managed through costs applied to each hour of labor, or dollar of project cost, such as small tools, consumables and fab shop burdens.



Bulletin

Business Forms

Foreword

Please be reminded that the use of any form which includes elements of a competitive nature, such as price, credit terms or warranty terms, must be adopted on the basis of individual decisions. It is a violation of the antitrust laws for firms to agree to use certain provisions concerning such matters, by way agreeing to use certain forms or otherwise.

This section of the Management Methods Manual was developed to assist our members in locating a particular type of form or forms that may be used for their own company. Some of the forms found in this section are duplicated in other sections of this manual or in other MCAA publications. Under this heading, you will find several alternatives for each type of form. This provides you the opportunity to select the one that best fits your company's needs.

Feel free to add your company name/address to the forms and use as is or

modify to better meet your individual requirements. It is also recommended that you have your own legal counsel review each form prior to use to ensure that it contains all the terms and proper language necessary under applicable local laws.

By providing sample forms to its members, MCAA does not intend to promote the use of any particular form or of any of the terms set forth in any particular form. Certain terms in the sample forms may be subject to negotiation.

PURCHASE ORDER

YOUR COMPANY / MECHANICAL CONTRACTORS

Address _____

Phone _____

TO: _____

P.O. No.: _____ This number must appear on all Invoices, Shipping Memos, Bills of Lading & Packages.

Order Date _____, 19____

Our Job No.: _____

Ship To: _____

_____ Copies of operation, maintenance & installation instructions are required for the owner's use. Final Payment will not be made until after these instructions are received.		Shipment Terms F.O.B. Freight Prepaid. DO NOT SHIP COLLECT		PLEASE ADD STATE SALES TAX	
Payment Terms <input type="checkbox"/> Original Order <input type="checkbox"/> Confirming order. DO NOT DUPLICATE SHIPMENT.		Date required at job <input type="checkbox"/> Or Sooner <input type="checkbox"/> Not Before		Copies of Submittals Required. <input type="checkbox"/> Approval Required <input type="checkbox"/> Approval Not Required <input type="checkbox"/> Before Shipment <input type="checkbox"/> Required	
ITEM	QUANTITY	DESCRIPTION	Unit Price	Total Price	
<p>ACKNOWLEDGEMENT COMPLETE AND RETURN ACKNOWLEDGEMENT AT ONCE</p>					

1. Our Order Number must appear on all documents and shipments.
2. Two packing slips showing P.O. # must accompany each shipment.
3. This order shall not be binding until acceptance and return, within five days, of the signed acknowledgement copy specifying the shipping date. Such acceptance is subject to the TERMS AND CONDITIONS STATED ON THE FACE AND REVERSE SIDE OF THE ORIGINAL AND ACKNOWLEDGEMENT COPIES HEREOF, which seller agrees shall constitute the final and complete agreement between Purchaser and Seller. Any modification or rescission of this agreement shall be ineffective unless in writing and signed by both Purchaser and Seller.
4. Advise 48 hours in advance of delivery (telephone number). No delivery after 2:00 P.M.
5. _____ % of purchase price will be withheld for startup & service requirements.

Even though your quoted price may include freight, startup & other similar nontaxable items; All invoices must be itemized so that freight, startup & other non taxable items can be identified.

(Total)

(COMPANY)

Your Purchase Order Is Hereby Acknowledged and Accepted, including terms and conditions slated on the face and reverse side hereof.

Authorized Signature _____ Date _____

We Will _____ Our Order
Ship On _____ No. Is _____

Person Controlling This Order _____

Subject to the TERMS AND CONDITIONS STATED ON THE FACE AND REVERSE SIDE OF ORIGINAL AND ACKNOWLEDGEMENT COPIES HEREOF

GENERAL CONDITIONS AND INSTRUCTIONS

1. Identification of shipments. The Purchaser cannot and will not be responsible for any material received unless each package, case, etc., is clearly identified on its outer covering as to: 1. Seller 2. Purchase Order Number. If Purchaser furnishes shipping tags for direct shipment to Purchaser's customer, Seller assumes responsibility of nonacceptance of shipments by Purchaser's customer in the event such shipping tags are not attached to packages, cases, etc. On shipments direct to Purchaser's customer where no shipping tags are furnished, packages, cases, etc., must be marked as specified on face of order.
2. Boxing, Packing or Cartage. No charges for boxing, packing, or cartage will be allowed unless stated hereon or later agreed to by this company in writing.
3. Invoices. Invoice showing Purchase Order Number, must be mailed to the Purchasing Department of the Purchaser not later than the day following shipment, irrespective of whether shipment is in part or in whole.
4. Inspection. The material or apparatus to be supplied against this Purchase Order shall, at the Purchaser's option, be subject to inspection and test at the maker's works.
5. Rejected material. Rejected material shall be returned to the Seller at Seller's expense.
6. Time of delivery of this order is of the essence, and Purchaser reserves the right to cancel without cancellation charges, all or any part of this order if not filled within the specified time. Exercise of such right of cancellation shall not be deemed a waiver of any other right reserved to the Purchaser herein, or by law, for any delay or failure to deliver as specified.
7. No partial shipments accepted unless agreed upon by both parties.
8. The Seller agrees to comply with any and all Federal, State, County and Municipal and/or other local regulations, laws, ordinances and enactments of whatever kind, applicable at the time of sales or which may become effective during the period of construction or fabrication, shipping and/or installation (if installation is included) of the materials comprised under this Purchase Order.
9. The price or prices of this order are not subject to change or any surcharges resulting from the imposition now or in the future of any sales taxes, Federal, State, Municipal or otherwise, unless agreed to or requested by Purchaser.
10. In the event approval is not secured from the Owner, or if the Owner's order to the Purchaser is cancelled, cancellation of this order shall occur automatically, without cancellation charges by the Seller; and no obligation of any description, whatsoever, shall exist on the part of the Purchaser toward the Seller.
11. The contract price appearing on this Purchase Order is final as to payment for the material covered by the specifically listed items, as defined by the enumerated specification paragraph numbers, with exceptions as noted, and there shall be no additions to or other modifications of such contract price, except as such modifications may result from actual change in the specifications. If such changes become necessary, any alteration of the contract price shall be covered by separate order, which shall be issued to cover such changes. Seller shall not proceed with changes affecting contract price without specific authorization in WRITING from the Purchaser.
12. Payment and discount periods shall commence only upon receipt of both the material and proper invoice or invoices at designations specified in this Purchase Order. The Purchaser reserves the right to return to the Seller for correction any and all invoices containing error and/or not in agreement with this Purchase Order.
13. The Purchaser reserves the right to return to Seller at the invoice price all items which are regularly carried in Seller's stock.
14. Seller represents and warrants to Purchaser that all material and/or equipment rented, leased or purchased under this purchase order meets all standards of the Occupational Safety and Health Act of 1970 and Construction Safety Act of 1969, as amended from time to time, and of applicable State and Local laws, regulations, standards or requirements pertaining to safety, as amended from time to time.
15. All material and/or equipment furnished under this order shall be guaranteed by the Seller against defects, and Seller agrees to replace without charge to Purchaser said material and equipment, or remedy any defects, latent or patent, not due to ordinary wear and tear, or not due to improper use or maintenance, which defects may develop within one year from date of acceptance by Owner, or within the guarantee period set forth in applicable plans and specifications, whichever period is longer.
16. All material and equipment furnished under this order shall be subject to the approval of the architect, engineer, or any other party designated, and Seller shall furnish the required submittal data and/or number of samples for said approval. In the event such approval is not obtained, the order is cancelled, with no liability on the part of either Purchaser or Seller, unless the order is placed with the understanding that the material and/or equipment is to be supplied of the type and in such a manner as to meet requirements of plans and specifications. In the latter case Seller shall comply without further cost to Purchaser.
17. All material and equipment furnished hereunder shall be in strict accordance with plans, specifications and general conditions applicable to the contract of Purchaser with the Owner or another contractor, and Seller shall be bound thereby in the furnishing of material and equipment under this Purchase Order.
18. Seller shall guarantee equipment covered under this purchase order to produce capacities or meet design specifications and function: (1) as called for in the plans, specifications or addenda; and (2) as herein set forth; and (3) as published or warranted by the manufacturer for the equipment involved. In the event the equipment does not meet the foregoing requirements, Seller shall immediately on notice replace same, or remedy any deficiency, without expense to the Purchaser; and further, Seller shall pay to Purchaser all consequential loss or damage resulting therefrom.
19. The Seller hereby agrees to indemnify and save harmless the Purchaser from and against all claims, liability, loss, damage or expense, including attorneys fees, by reason of any actual or alleged infringement of letters patent, or of any litigation based thereon covering any article purchased hereunder.
20. Seller shall furnish all necessary lien waivers, affidavits or other documents, required to keep the Owner's premises free from liens or claims for liens, arising out of the furnishing of the material or equipment herein, as payments are made from time to time under this purchase order.
21. All prior representations, conversations, or preliminary negotiations shall be deemed to be merged in this order, and no changes will be considered approved unless this purchase order is modified by an authorized representative of Purchaser in writing.
22. In the event of default of any of the terms or conditions set forth herein, the Seller agrees to pay all costs resulting therefrom, including but not limited to, reasonable attorneys' fees.
23. This purchase order, when accepted by Seller, shall constitute a valid and binding contract.

PURCHASE ORDER

YOUR COMPANY / MECHANICAL CONTRACTORS

Address
Phone

TO: _____

P.O. No.: _____ This number must appear on all Invoices, Shipping Memos, Bills of Lading & Packages.

Order Date _____, 19____

Our Job No.: _____

Ship To: _____

Copies of operation, maintenance & installation instructions are required for the owner's use. Final Payment will not be made until after these instructions are received.		Shipment Terms: F.O.B. Freight Prepaid. DO NOT SHIP COLLECT		PLEASE ADD STATE SALES TAX	
Payment Terms	<input type="checkbox"/> Original Order <input type="checkbox"/> Confirming order. DO NOT DUPLICATE SHIPMENT.	Date required at job	<input type="checkbox"/> Or Sooner <input type="checkbox"/> Not Before		Copies of Submittals Required. <input type="checkbox"/> Approval Required Before Shipment <input type="checkbox"/> Approval Not Required
ITEM	QUANTITY	DESCRIPTION		Unit Price	Total Price

1. Our Order Number must appear on all documents and shipments.
2. Two packing slips showing P.O. # must accompany each shipment.
3. This order shall not be binding until acceptance and return, within five days, of the signed acknowledgement copy specifying the shipping date. Such acceptance is subject to the TERMS AND CONDITIONS STATED ON THE FACE AND REVERSE SIDE OF THE ORIGINAL AND ACKNOWLEDGEMENT COPIES HEREOF, which seller agrees shall constitute the final and complete agreement between Purchaser and Seller. Any modification or rescission of this agreement shall be ineffective unless in writing and signed by both Purchaser and Seller.
4. Advise 48 hours in advance of delivery (telephone number). No delivery after 2:00 P.M.
5. _____ % of purchase price will be withheld for startup & service requirements.

Even though your quoted price may include freight, startup & other similar nontaxable items; All invoices must be itemized so that freight, startup & other non taxable items can be identified.

(COMPANY)

(Total)

By _____

Questions regarding this order should be directed to

Subject to the TERMS AND CONDITIONS STATED ON THE FACE AND REVERSE SIDE OF ORIGINAL AND ACKNOWLEDGEMENT COPIES HEREOF

GENERAL CONDITIONS AND INSTRUCTIONS

1. Identification of shipments. The Purchaser cannot and will not be responsible for any material received unless each package, case, etc., is clearly identified on its outer covering as to: 1. Seller 2. Purchase Order Number. If Purchaser furnishes shipping tags for direct shipment to Purchaser's customer, Seller assumes responsibility of nonacceptance of shipments by Purchaser's customer in the event such shipping tags are not attached to packages, cases, etc. On shipments direct to Purchaser's customer where no shipping tags are furnished, packages, cases, etc., must be marked as specified on face of order.
2. Boxing, Packing or Cartage. No charges for boxing, packing, or cartage will be allowed unless stated hereon or later agreed to by this company in writing.
3. Invoices. Invoice showing Purchase Order Number, must be mailed to the Purchasing Department of the Purchaser not later than the day following shipment, irrespective of whether shipment is in part or in whole.
4. Inspection. The material or apparatus to be supplied against this Purchase Order shall, at the Purchaser's option, be subject to inspection and test at the maker's works.
5. Rejected material. Rejected material shall be returned to the Seller at Seller's expense.
6. Time of delivery of this order is of the essence, and Purchaser reserves the right to cancel without cancellation charges, all or any part of this order if not filled within the specified time. Exercise of such right of cancellation shall not be deemed a waiver of any other right reserved to the Purchaser herein, or by law, for any delay or failure to deliver as specified.
7. No partial shipments accepted unless agreed upon by both parties.
8. The Seller agrees to comply with any and all Federal, State, County and Municipal and/or other local regulations, laws, ordinances and enactments of whatever kind, applicable at the time of sales or which may become effective during the period of construction or fabrication, shipping and/or installation (if installation is included) of the materials comprised under this Purchase Order.
9. The price or prices of this order are not subject to change or any surcharges resulting from the imposition now or in the future of any sales taxes, Federal, State, Municipal or otherwise, unless agreed to or requested by Purchaser.
10. In the event approval is not secured from the Owner, or if the Owner's order to the Purchaser is cancelled, cancellation of this order shall occur automatically, without cancellation charges by the Seller; and no obligation of any description, whatsoever, shall exist on the part of the Purchaser toward the Seller.
11. The contract price appearing on this Purchase Order is final as to payment for the material covered by the specifically listed items, as defined by the enumerated specification paragraph numbers, with exceptions as noted, and there shall be no additions to or other modifications of such contract price, except as such modifications may result from actual change in the specifications. If such changes become necessary, any alteration of the contract price shall be covered by separate order, which shall be issued to cover such changes. Seller shall not proceed with changes affecting contract price without specific authorization in WRITING from the Purchaser.
12. Payment and discount periods shall commence only upon receipt of both the material and proper invoice or invoices at designations specified in this Purchase Order. The Purchaser reserves the right to return to the Seller for correction any and all invoices containing error and/or not in agreement with this Purchase Order.
13. The Purchaser reserves the right to return to Seller at the invoice price all items which are regularly carried in Seller's stock.
14. Seller represents and warrants to Purchaser that all material and/or equipment rented, leased or purchased under this purchase order meets all standards of the Occupational Safety and Health Act of 1970 and Construction Safety Act of 1969, as amended from time to time, and of applicable State and Local laws, regulations, standards or requirements pertaining to safety, as amended from time to time.
15. All material and/or equipment furnished under this order shall be guaranteed by the Seller against defects, and Seller agrees to replace without charge to Purchaser said material and equipment, or remedy any defects, latent or patent, not due to ordinary wear and tear, or not due to improper use or maintenance, which defects may develop within one year from date of acceptance by Owner, or within the guarantee period set forth in applicable plans and specifications, whichever period is longer.
16. All material and equipment furnished under this order shall be subject to the approval of the architect, engineer, or any other party designated, and Seller shall furnish the required submittal data and/or number of samples for said approval. In the event such approval is not obtained, the order is cancelled, with no liability on the part of either Purchaser or Seller, unless the order is placed with the understanding that the material and/or equipment is to be supplied of the type and in such a manner as to meet requirements of plans and specifications. In the latter case Seller shall comply without further cost to Purchaser.
17. All material and equipment furnished hereunder shall be in strict accordance with plans, specifications and general conditions applicable to the contract of Purchaser with the Owner or another contractor, and Seller shall be bound thereby in the furnishing of material and equipment under this Purchase Order.
18. Seller shall guarantee equipment covered under this purchase order to produce capacities or meet design specifications and function: (1) as called for in the plans, specifications or addenda; and (2) as herein set forth; and (3) as published or warranted by the manufacturer for the equipment involved. In the event the equipment does not meet the foregoing requirements, Seller shall immediately on notice replace same, or remedy any deficiency, without expense to the Purchaser; and further, Seller shall pay to Purchaser all consequential loss or damage resulting therefrom.
19. The Seller hereby agrees to indemnify and save harmless the Purchaser from and against all claims, liability, loss, damage or expense, including attorneys fees, by reason of any actual or alleged infringement of letters patent, or of any litigation based thereon covering any article purchased hereunder.
20. Seller shall furnish all necessary lien waivers, affidavits or other documents, required to keep the Owner's premises free from liens or claims for liens, arising out of the furnishing of the material or equipment herein, as payments are made from time to time under this purchase order.
21. All prior representations, conversations, or preliminary negotiations shall be deemed to be merged in this order, and no changes will be considered approved unless this purchase order is modified by an authorized representative of Purchaser in writing.
22. In the event of default of any of the terms or conditions set forth herein, the Seller agrees to pay all costs resulting therefrom, including but not limited to, reasonable attorneys' fees.
23. This purchase order, when accepted by Seller, shall constitute a valid and binding contract.

"YOUR COMPANY"

PURCHASE ORDER

To:

Date _____

ATTN:

Job # _____ Code # _____

Job Name _____

Ship via: _____ Flatbed, _____ Van, _____ Open top

Delivery address:

Shipper 24 hour notification REQUIRED

Tagging: _____ P. O. #

_____ Job #

_____ Other (floor, pallet, shipment)

Description	\$ Amount

"Your Company" values highly the confidence and good will of its customers and suppliers. We offer our products only on their merit, and we expect our customers to judge and purchase our products and services solely on the basis of quality, price, delivery and service. Likewise, "Your Company" buys only on merit, and we judge and purchase solely on the basis of quality, price, delivery and service. This "Your Company" corporate policy applies in all relationships with our customers and suppliers. **Acceptance of this order shall constitute acceptance of the terms and conditions on the reverse side.**

Company _____

"Your Company"

Signature _____

Signature _____

Title _____

Title _____

Subject to the TERMS AND CONDITIONS STATED ON THE FACE AND REVERSE SIDE OF ORIGINAL AND ACKNOWLEDGEMENT COPIES HEREOF

TERMS AND CONDITIONS

1. Freight charges must be prepaid when material is purchased f.o.b. Destination. All charges for transportation to have original receipted bill attached.
2. Shipping instructions, if not shown on order, will be furnished later. Seller is liable for excess charges resulting from failure to route cheapest way or as instructed.
3. CASH DISCOUNT. Please show cash discount on invoice. Discount period will be computed from the date invoice is received by us.
4. Separate invoices must be rendered for each shipment.
5. PATENT PROTECTION. Seller warrants that the use or sale by the Purchaser of material specified herein will not constitute an infringement of any patent or patent application, and Seller agrees to indemnify and hold Purchaser harmless against any and all patent infringement claims resulting from such use and/or sale.
6. Material delivered in error or in excess of the quantity called for will be returned at Seller's expense.
7. Unsatisfactory delivery schedule or service will be sufficient cause for cancellation of this order at no expense to Purchaser.
8. All equipment or materials furnished on this order shall be new and of first quality, and Seller warrants all such equipment and materials to be sound and merchantable and to be fit and suitable for the particular purpose for which it is purchased. Seller guarantees that all materials or services furnished under this agreement shall be in strict accordance with the contract documents, and for that period of time as called for by the contract documents after acceptance of the materials by the owner, or, if no time is specified, within one year from date of substantial completion of the project, shall be free from defects in workmanship and materials, and shall develop ratings, capacities, and characteristics specified. Seller will test and, if necessary, shall remove, replace and/or repair at his own expense and at the convenience of the Owner, and the Purchaser, any such nonconforming or defective material.
9. Payment hereunder by Purchaser shall not be due until five (5) days after receipt of payment by Purchaser from the Owner or General Contractor for whom the material or service specified herein is being used, and payment to Seller shall be subject to and upon the same terms of the payment by such Owner or General Contractor to Purchaser.
10. By acceptance of this order, Seller covenants and agrees:

If this purchase order results in no services, inspections or visitations by any employee of Seller or its agents or subcontractors, then Seller agrees to indemnify and hold Purchaser and its officers and employees harmless from any and all claims, liabilities, losses and causes of action of every kind and nature for injury to and death of persons and damage to or destruction of property, including Purchaser's and Seller's property, resulting from any and all negligent acts or product liability claims arising out of or connected with materials supplied under the terms of this order.

If this purchase order results in services, inspections or visitations by any employee of Seller or its agents or subcontractors, then Seller agrees in addition to the above:

- a. To indemnify and hold Purchaser and its officers and employees harmless from any and all claims, liabilities, losses and causes of action of every kind and nature for injury to and death of any persons, including employees of Purchaser and Seller, and damage to or destruction of property, including property of Purchaser and Seller, resulting from any and all negligent acts of Seller or the employees of Seller or its agents or subcontractors in connection with the services and materials of Seller covered by this order;
- b. To perform the services as an independent contractor and not as an employee of Purchaser, and to pay and satisfy all claims for labor employed and material purchased by it in connection with the services performed and material furnished under this order for Purchaser, and to permit no claims of any kind to be fixed upon or against the property or plant by laborers, mechanics or material men employed by Seller in connection with the services, and agrees to indemnify, protect and save Purchaser harmless against all such claims and liens;
- c. To comply with all applicable State and Federal labor laws in the performances of services and to obtain and maintain in effect workmen's compensation insurance or employer's liability insurance in those states which do not have a workmen's compensation law, general liability, automobile and, when applicable, marine insurance, with limits in the amounts set out on the face of this order, and Seller shall furnish Purchaser certificates showing that such insurance is being carried and that it will not be changed, terminated or cancelled without ten day's prior written notice to Purchaser.

11. ACCEPTANCE. This purchase order constitutes Purchaser's offer. It becomes a binding contract on the terms set forth herein, either upon receipt by Purchaser of the acknowledgement copy duly executed by Seller, or by performance. No modification of this contract shall be effective unless agreed to in writing signed by an authorized representative of the Purchaser. Purchaser recognizes that Seller may for operating convenience, desire to utilize its own form of acknowledgement for confirmation of sale in accepting this order in such case it is agreed that any provision, term or condition in such form of acceptance which modifies, conflicts with, contradicts or adds to any provision, term or condition of this order shall be deemed to be waived (unless the same are expressly accepted in writing signed by Purchaser) and the provisions, terms and conditions of this order by such acceptance shall constitute the whole contract between the parties.

"YOUR COMPANY"

Purchase Order

To: _____

Attention Of: _____

Date: _____ Job # _____

Ship To: _____

Date Required: _____

Terms: _____

TAXABLE

TAX EXEMPT

	QUANTITY		Please Supply Items Listed Below DESCRIPTION	Unit Price	Total	
	Ordered	Received				
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						

Special Instructions: _____

Important - our order number must appear on invoices, packages and correspondence. Acknowledge if unable to deliver by date required.

AUTHORIZED BY: _____

ORIGINAL

Purchase Order



Bulletin No. BF 2
File: Business Forms

Bulletin

Forms for Temporary Heat or Cooling

Foreword

Frequent cause for concern is based on architect or general contractor's use of installed equipment on a job not yet accepted by the owner; commonly referred to as temporary heat or cooling. Have a prepared agreement for this type of operation. The following forms are samples that may help you. Remember: you should modify them for use in your area. Consult your accountant or attorney.

REQUEST FOR TEMPORARY OPERATION OF MECHANICAL SYSTEM

Chicago, Illinois, _____
Date

TO: _____
Mechanical Contractor

In the building at _____, where you have the contract to furnish and install _____, we wish to have the privilege of the use of the _____ system prior to final completion. We authorize you to provide necessary labor to operate and maintain said system.

We will provide necessary fuel, oil, electricity and all other consumable items required for operation.

For the furnishing of this labor for operation and maintenance, we will pay you in accordance with the following schedule:

- a) Where labor is provided beyond a period of seven consecutive days, at the rate of \$_____ per day including Saturdays and Sundays, excepting holidays, provided further, that not less than two full time shifts of eight hours each in each twenty-four hour day are furnished. Where labor is thus provided on legal holidays (New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day) it will be furnished at the rate of \$_____ per day.
- b) Where labor is provided for a period of less than seven consecutive days, at the rate of \$_____ Mondays, \$_____ per day, Tuesdays through Fridays, \$_____ Saturdays, and \$_____ per day for Sundays and legal holidays.
- c) The operation and maintenance will be furnished without charge to us during the hours you have mechanics regularly employed in the fulfillment of your contract, and the daily rates for all other times will then be as follows:

For a period beyond seven days, \$_____ per day, Mondays through Fridays, \$_____ on Saturdays and Sundays, and \$_____ on legal holidays;

For a period of less than seven days, \$_____ Mondays, \$_____ per day, Tuesdays through Fridays, \$_____ on Saturdays, and \$_____ Sundays and legal holidays.

This authorization may be cancelled (1) by our acceptance of the installation, (2) prior to that time by utilizing our own regular operating force at such time as we are permitted by you to do so, or (3) at our discretion, provided we authorize you to place the plant in such condition that it will not be subject to damage due to non-use at rates set forth in (b) above.

It is understood that you will not be liable for ordinary wear, tear, or deterioration of the system occasioned by its temporary use.

It is further understood that all warranties or guarantees which you assume under your contract shall remain in force, but the period of such shall commence as of the date of this temporary operation, and likewise provisions, if any, contained in any contract between you and the General Contractor shall be modified accordingly.

By _____
Title

APPROVED:

Contractor

By _____
Title

It is agreed that the guarantee and warranty provisions contained in the contract between _____ and _____, dated _____, are hereby modified as stipulated above.

General Contractor

By _____
Title

REQUEST FOR TEMPORARY USE OF MECHANICAL SYSTEM

Chicago, Illinois, _____ Date

TO: _____ Mechanical Contractor

In the building located at _____, where you have the contract for furnishing the _____ system, the undersigned owner of said building, requests the privilege of temporary use of the _____ system at this time, before final completion or acceptance.

The undersigned agrees to the following terms and conditions:

- a) To use its (or his) own regular operating force in the operation of said plant and equipment.
b) To pay all costs which may be incurred by you to put the plant and equipment in operation, not within the scope of the contract.
c) To pay all costs of operation of said plant, including fuel and power costs.

It is expressly understood and agreed that the undersigned owner assumes all responsibility for any damage to the system due to improper operation and maintenance during the period of the temporary use thereof, and further agrees to indemnify and hold you harmless of and from all claims, causes of action or suits of whatsoever nature for personal injury and all claims for damage to persons or property or for any loss whatsoever, including costs and attorney's fees sustained by you as a result of improper operation and maintenance of the system by the undersigned owner.

It is further understood that you will not be liable for ordinary wear, tear, or deterioration of the system occasioned by its temporary use.

It is further agreed that the period of your guarantee or warranty with respect to the plant and equipment shall commence as of the date it is placed into operation, notwithstanding any provisions in your contract to the contrary, and such provisions, if any, contained in any contract between you and the General Contractor shall be modified accordingly.

By _____ Owner
Title

APPROVED:

Contractor

By _____
Title

It is agreed that the guarantee and warranty provisions contained in the contract between _____ and _____, dated _____, are hereby modified as stipulated above.

General Contractor
By _____
Title



Bulletin No. CO 1 Revised
(Replaces 1976, 1987 and 2005 versions)
File: Change Orders

Bulletin

How to Identify and Manage Change Orders

Introduction

Changes on a construction project should be anticipated and can have a significant effect on a contractor's performance, productivity, and profitability. Although changes are common, misunderstanding and disagreement can occur when it comes to identifying whether a change has occurred, pricing a change, and determining the time impact of a change. Detailed documentation of events related to changes can significantly reduce disputes and overall project risks. Changes also may result in a claim under the contract's disputes clause if the owner and contractor, or the general contractor and subcontractor, do not agree as to entitlement to and/or the dollar amount of the change. However, a significant number of claims and disputes can be avoided by following the changes provisions, or changes clauses, in the contract; preparing detailed documentation during the course of the project; and maintaining active communication among the various parties involved in a capital project.

This bulletin suggests approaches to the effective management of change orders with the objective of increasing contemporaneous agreements between owners and contractors that resolve the price and time associated with a change and avoid change order

disputes. These approaches also apply to changes between general contractors and subcontractors, as well as owner-caused changes that flow down to subcontractors. For brevity, most of the narrative is in the context of a project owner and general contractor, but most of the same principles apply to contracts between general contractors and subcontractors. References to "contractor" apply to general contractors and specialty trade subcontractors. General guidance is provided related to common change order circumstances, however, specific contract laws, working conditions, and practices can vary among jurisdictions and geographic locations. Contractors and owners are encouraged to seek advice from their in-house contracts manager and/or legal counsel as to their respective rights and obligations associated with the contracts they sign, including change orders which are contract modifications. Construction professionals such as other in-house personnel, construction consultants, and legal counsel with cost and time impact experience may be helpful in evaluating the cost and time impacts associated with change orders.

Types of Events Leading to a Change

A variety of events may result in changes to a contractor's actual work from what was planned and set forth in the contract documents, regardless of the project delivery methods used.

Some of the issues and events that may cause changes include:

- Owner-driven scope changes that cause an increase or decrease in the amount of work from the scope of work outlined in the original contract;
- Changes in the methods of performance or the materials or equipment to be installed;
- Changes that modify the planned sequence in which the work was to be performed;
- Differing site conditions not anticipated in the original contract price;
- Constructability issues;
- Changes in performance specifications;
- Changes to correct errors, omissions, or inconsistencies in the specifications or drawings;
- Changes in the time for performance;
- Changes resulting from extraordinary, unexpected natural events; and
- Changes due to the actions or inactions of other trades working on the project.

The changes described above fall within two general categories: directed changes and constructive changes. Directed changes are usually easier to recognize and resolve. In this kind of change, the owner specifically directs the contractor to make a change. A directed change can add to or reduce the contract price and it also may

involve a change in the construction sequence or schedule. Owners typically have the contractual right to initiate any change. Owner changes often impact the contractor's scope of work. However, changes in a project's size, configuration, or space requirements also can create a schedule impact and/or change the sequence of work, thus impacting the productivity of the base contract work.

In contrast, constructive changes occur from any events that are not owner directed or that have the effect of implicitly requiring the contractor to modify the scope set forth in the original contract. Constructive changes are often more difficult to identify because they are actions or inactions of an owner without the explicit acknowledgment of any change by an owner. Whether the contract in question is a private or a government contract, verbal communication among owner, general contractor, and subcontractors can sometimes be viewed as a change. Contractors are encouraged to follow up in writing if they believe a constructive change has occurred. Some of the common types of constructive changes are:

- Defective contract documents;
- Over-inspection;
- Changes in methods of performance;
- Changes in construction sequence;
- Misinterpretation of specifications;
- Incomplete owner or architect/engineer responses to contractor information requests; and
- Differing site conditions.

Defective specifications are often cited as a cause of constructive changes. The term “defective specifications” covers a multitude of latent change-causing circumstances that result from inaccurate or incomplete specifications. Examples of defective specifications are discussed in the following paragraphs:

Incomplete specifications. Incomplete specifications exist when the contract documents do not provide adequate information necessary to execute the work as planned. These types of changes often occur when the plans and specifications fail to coordinate construction details between different design disciplines, such as architectural and mechanical, resulting in conflicts that require resolution.

Facility space constraints. Conflicts occur when the project design provides insufficient space for all of the elements in an area. For mechanical work, there can be conflicts in shaft and in-wall installation, with above-ceiling mechanical, and with structural, electrical, and plumbing elements that require resolution. Some of these conflicts can be resolved during the coordination process; others may be so significant as to require a re-routing of work or an adjustment in the size of the space in order to properly install the work.

Design discrepancies. Design discrepancies occur due to differences between the plans and specifications, differences between details, dimensional errors, or differences between planned equipment details and actual equipment cut sheets. A design discrepancy may also be found when the same item is specified in different sections of the contract documents with different requirements in each section. Additionally, a design discrepancy can occur when details are omitted from the

contract documents or when there are inconsistencies among the construction drawings associated with different trades.

Latent conditions. This term refers to existing differing site or subsurface conditions, unknown at the time of bidding, that affect the contractor’s performance. Change orders for latent conditions usually result from either subsurface soil conditions or conditions within the existing site or facility that are materially different from what was shown on the contract documents or materially differ from conditions that are clearly evident and observable.

Nondisclosure. Nondisclosure can be either intentional or unintentional. In either case, a change occurs when the contractor is not given all of the critical design or construction information necessary to facilitate proper project performance.

Changes required by regulatory agencies/using agency. The owner’s design team normally has the responsibility to ensure that the project design meets all applicable building code and regulatory requirements. Added work or changes required to meet code or regulatory requirements should result in a change order.

Value engineering. In what is sometimes referred to as value engineering, a contractor may point out changes when superior methods or materials become apparent, or when the same design result can be achieved at a lower cost. Contracts frequently allow for shared savings associated with such improvement, however the cost of reengineering can offset any savings while potentially delaying progress. When improved methods or materials are necessary to overcome an owner-caused problem, such as to mitigate a delay impact, the contractor should be

compensated for such changes.

Tools to mitigate or avoid changes.

Use of tools that can be utilized to mitigate or avoid costly change conditions in the field is becoming more widespread. For example, tools such as 4D Building Information Modeling (BIM) and Integrated Project Delivery (IPD) processes help coordinate the development of design drawings, and can reduce the number of instances of conflicts in drawings and incomplete specifications. With 4D BIM, the Critical Path Method (CPM) schedule is integrated into a 3D model of the drawings so that the project can be visualized from both a constructability sense and a project execution perspective before the project is started. Updates are provided throughout construction to reflect as-built conditions as a reference point for planning and analyzing the work still to be completed. The time and costs associated with implementing tools such as BIM on a specific project can be tracked and treated as a direct cost of the work in both the initial contract and any changes.

What To Do When a Change is Identified

When a change is identified, one of the first things a contractor should do is provide notice to the owner. Notice provisions are common contract provisions and the parties should follow the applicable contract guidelines for providing change notices. For mechanical contractors and other subcontractors, not only is notification to the general contractor important, but knowledge of any flowdown provisions from the owner to the general contractor and, in turn, to the subcontractors are important. Subcontractors should be aware of any notice requirements that may be part of such flowdown provisions that are incorporated by

reference in the subcontract. For example, the notice provision in the changes clause of the ConsensusDocs 200 form contract between owner and contractor states that except for certain delay circumstances covered in a different contract provision, the contractor shall give the owner written notice within fourteen (14) days after the occurrence giving rise to the claim or within fourteen (14) days after the contractor first recognizes the condition giving rise to the claim, whichever is later. This provision continues that the contractor shall submit notice before proceeding with the work, except in the case of an emergency, and shall have twenty-one (21) days after giving notice to submit claim documentation, and then the owner must provide a written acceptance or denial within fourteen (14) days after receipt of the contractor's documentation.

When a change is identified, detailed documentation of the change should be prepared. Typical documentation includes a description of the reason for the change or description of events causing the need for a change order. Documentation should also include a narrative description of the schedule impacts after completing a time impact analysis of the work scope that has changed.

Since constructive changes do not emanate from a directed owner change, it is particularly important for contractors to identify that a change has occurred, document the details of the changed condition(s), and notify the owner of the changed condition in a timely manner. Some contract forms do not include provisions for constructive changes, so a contractor needs to be clear with the owner about proceeding with any work related to a constructive change and documenting such work in a written change order. If a contractor is directed

to proceed with the work before a change order is agreed to and signed, the contractor needs to carefully document the costs and time associated with the change and take the following steps to facilitate the resolution of the change with the owner:

- Research the contract documents thoroughly to confirm that a changed condition exists.
- Prepare and submit a change order request proposal, giving the owner a clear and detailed description of the change.
- Be alert to any notice requirements and respond properly.
- Issue notice of intent to file a claim if the change order is denied.
- Inform the owner of any applicable schedule impacts.
- If the change is not resolved, follow the dispute resolution procedures in the contract.

While the owner-directed change is easiest to identify, the contractor must consider schedule and productivity impacts in the analysis and pricing of the change. Time and productivity impacts often are not the subject of initial negotiations regarding the scope, but these topics should be incorporated into the negotiation process. Failure to consider these impacts at the time of the change can result in a waiver of a contractor's ability to recover additional time and money. Contractors should consider their need to reserve rights associated with impacts if they are not quantified and included in a change order price at the time of each change order negotiation.

Schedule time impact analysis arising from change orders. Each change order should be carefully evaluated to determine whether an extension of time is warranted. The bulletin entitled "Time Impact Analysis—Measuring Project Delay" (CO 3) contains a detailed description of the manner in which a time extension analysis should be performed using the contemporaneous project schedules and procedures set forth therein. This bulletin should be consulted whenever the contractor identifies an impact that could affect any aspect of the schedule. As noted in bulletin CO 3, the contractor should pay particular attention to the contract requirements for submitting requests for extensions of time, as well as the scheduling requirements for the project. Failure to adhere to these requirements could affect the contractor's ability to obtain a time extension.

Separate cost coding. The contractor should determine whether it is practical to document the costs of a change using separate project job cost coding. In some instances, it may not be possible to separately track impacted costs or costs associated with an individual changed condition contemporaneously as the impacted work progresses. This could occur if the impacted work is an integral part of the base contract work, such that the base contract work is more difficult to perform and/or takes longer. In other situations it may be feasible to separately track the costs associated with a change via separate cost coding from the base contract cost coding in the contractor's job cost reporting system. When it is impractical to separately track costs associated with the change due to effects on the base contract scope and/or cumulative impacts associated with multiple changes, it is helpful to document the impacts and costs through additional contemporaneous notes in the daily

project logs, timesheets, or other daily reports so that the portions of the work that are impacted can be more clearly identified in the absence of separate cost coding. However, when possible, it is recommended that contractors use separate job cost coding to track changed work.

Impacts Arising From Change Orders—Losses Of Productivity

In addition to the direct costs associated with a change, the contractor should be aware of various factors that can have an adverse effect on labor productivity, both in the performance of the changed work and as an impact on the base contract scope of work, depending on the scope of the change and depending on the activities being performed. In order to recover such costs, a contractor must establish the cause and effect between the event and a quantified loss of productivity. Some causes include the following:

1. Worker overtime. Unscheduled overtime may lower both work output and efficiency, depending on the amount of overtime being incurred and the duration of the overtime. Evaluating the extent to which a loss of productivity has occurred resulting from sustained overtime, along with the premium costs, is a factor that contractors should consider when pricing change orders.

2. Manpower availability to perform the changed work. High volume of construction activity in a concentrated geographic area may create a shortage of skilled workers which, in turn, can affect labor costs depending on the type of skilled work that is required and the level of worker training. The additional costs of such labor, such as hourly or daily premiums to attract skilled workers from other locations, including the cost of travel and lodging, should be considered in change order pricing.

3. Other considerations that may affect productivity. Other conditions and circumstances should be considered when evaluating the cost of performing changed work. These circumstances could include things such as:

- Excessive heat, cold, precipitation, or other forms of severe weather (especially unexpected intermittent changes)
- Performing work in a different season, i.e., summer work shifted to winter work
- Contaminated air
- Constructability problems with plans and specifications
- Unusual and unplanned changes in the sequencing of the work
- Unplanned protection of existing facilities, completed portions of construction, furniture, fixtures, machinery, stock, or finished surfaces
- Unplanned daily clean-up of tools and work area
- Unexpected interference by owners, employees, or other trades
- Accessibility to material stores, changes in laydown areas or tool lockers
- Unexpected poor lighting
- Work in tight spaces with unsure footing, interfering tie wires, piping, ducts, hangers, etc. not originally planned

- Frequent repair work from trade damage
- Acceleration

Consideration of the above factors should enable the contractor to more discretely price and explain any added costs of performing changed work when preparing change order requests.

Pricing Change Orders

It is important to identify whether the pricing of a change is to be developed on a forward pricing lump-sum estimate or if the pricing should be partially or completely based on actual costs plus applicable mark-ups. In the situation of forward pricing change orders, estimating the amount of the change order typically is conducted in the same way that a contractor prepares other lump sum estimates. However, the manhours required to complete a change order may be similar to or different from the productivity and manhours incurred under normal unimpacted conditions. Adjustments must be considered for abnormal or less-than-optimal conditions at the jobsite. Some additional factors to be considered are whether the schedule has been or will be delayed, or if schedule acceleration efforts are underway, for example. These factors may call for consideration of labor productivity impacts when pricing a change.

A common step when evaluating the impact of changed work and evaluating the planned versus actual financial performance of a contract, is to analyze cost underruns and overruns by comparing the actual costs to the project budget. Budget variances can be analyzed by comparing the actual costs to-date to the current contract budget adjusted for the percent complete on the project, or by comparing the forecasted

costs at completion to the total contract budget. The contractor's fee should be subtracted from the overall contract budget when analyzing underruns and overruns on a cost-to-cost basis.

Analysis of budget variances can be used effectively to evaluate the impact of changed work. For example, analyzing the amount of planned versus actual labor overtime on a project and then isolating when the overtime was incurred and what caused the overtime to be incurred can provide very useful information when evaluating the impact of changed conditions. The usefulness of budget variance analyses are dependent on the quality and level of detail in the original estimate. Contractors are advised to maintain good documentation of how budgets are derived and to prepare budgets in sufficient detail, along with the corresponding job cost coding work breakdown structure, so that variances can be used to effectively quantify project impacts.

In government contracting, costs must also be "reasonable," "allocable," and "allowable." Although an exhaustive analysis of change order pricing on government contracts is beyond the scope of this publication, briefly, as stated in *Federal Acquisition Regulation (FAR)* 31.201-3, "A cost is reasonable if, in its nature and amount, it does not exceed that which would be incurred by a prudent person in the conduct of a competitive business." Factors to consider when evaluating the reasonableness of costs include: whether the costs are ordinary and customary, whether the costs are based on an arm's-length transaction rather than a related-party transaction, and whether the costs reflect what a prudent person would be expected to incur. *FAR* 31.201-4 states, "A cost is allocable if it is assignable or chargeable to one or more cost objectives on the basis of relative benefits received or other

equitable relationship.” This *FAR* provision further states that a cost is allocable if it, “(A) Is incurred specifically for the contract; (b) Benefits both the contract and other work, and can be distributed to them in reasonable proportion to the benefits received; or (C) Is necessary to the overall operation of the business, although a direct relationship to any particular cost objective cannot be shown.” *FAR* 31.201-2 states in part, “The factors to be considered in determining whether a cost is allowable include the following: (1) Reasonableness. (2) Allocability. (3) Standards promulgated by the CAS Board, if applicable; otherwise generally accepted accounting principles and practices appropriate to the particular circumstances. (4) Terms of the contract. (5) Any limitations set forth in this subpart.” Contractors must be very careful when preparing a change order involving a government contract to avoid myriad pitfalls. Pricing data, per the *FAR*, must be “current, accurate and complete” as of the date of the agreement on price. Contractors and owners are encouraged to reach advance agreements on items of cost and mark-ups that will be allowable in change orders and specify these agreements in detail in the contract documents. For example, labor rates to be used for change order pricing can be established at the time of negotiating and signing the contract rather than treating labor as a cost reimbursable item which can be the subject of costly auditing and disagreement. For a summary guide to the allowable versus unallowable costs described in *FAR* 31.205, please refer to Exhibit 18 at the end of this bulletin.

Direct Costs Arising From Change Orders. Direct costs are any costs that support one cost objective, meaning that they are directly related to a specific, identifiable task. Materials, equipment, and subcontract costs are usually

identifiable to specific tasks and are generally treated as direct costs. However, some costs may appear to be indirect because they are allocable to multiple activities, but are still direct costs related to the performance of the base work or changed work. For example, fuel, oil, and grease are necessary to support the use of equipment to perform direct construction activities, but seldom would these types of costs be separately tracked and coded to individual work tasks or job cost codes. It is common for fuel, oil, and grease to be accumulated in one code, even though they support multiple work activities on a project, or even across multiple projects or contracts. Small tools, consumables, QA/QC activities, localized labor supervision, detailing, BIM, and scheduling activities are all examples of direct costs when contractors track them to a particular project. These types of costs are frequently tracked in general conditions, but sometimes are tracked in one consolidated direct job cost code and sometimes are allocated to jobs as a percentage of labor or some other allocation basis. These examples demonstrate that some direct costs like trade labor are almost universally accepted and defined as a direct cost, but some costs can be coded as either a direct or indirect cost and need to be analyzed to determine their proper categorization. Although general conditions costs are sometimes also referred to as “field overhead,” which may imply an indirect nature to this cost grouping, in reality, these costs are direct costs of the work. General conditions costs support various aspects of the project and therefore are often allocated at the project level in a change order situation, or treated as a daily cost in a delay or suspension situation, but the costs are still directly related to a given contract. Such definition and categorization can also be important when it comes to drafting contracts so

that the pricing terms are clearly defined for the benefit of the parties and to avoid costly disputes after the contract is signed. For example, there can be challenges with determining the actual cost of using owned equipment so frequently owners and contractors will agree on stipulated rates for the use of equipment in the contract.

Common Categories of Change Order Pricing Elements

The common categories of construction and change order pricing elements are:

- Direct and indirect job costs,
- General and administrative overhead, and
- Profit.

Direct and Indirect Job Costs

The elements of direct and indirect job costs vary depending on the type of building construction and can also vary depending on the size of the contractor. Care must be taken to treat projects consistently within a contractor's organization so that certain cost areas (e.g., superintendents, yard costs, machine shops, etc.) are treated as either direct or indirect and not subject to double charging. This is especially true for contracts being performed in the federal government contracting arena. Direct costs are the costs of labor, materials, supplies, equipment, and subcontracted work that go into, and which can be clearly identified with, a particular segment, phase, or unit of a project. Indirect costs are those costs that cannot be attributed to a single item or unit of a project. Indirect costs are generally divided into two categories— jobsite overhead and general and administrative overhead. General conditions is another term commonly used to describe jobsite overhead. Examples of direct and indirect costs

include:

1. Labor, including:
 - a. Wages
 - b. Overtime premium pay
 - c. Union health and welfare benefits
 - d. Apprenticeship training
 - e. Journeyman training fund
 - f. Retirement fund
 - g. Vacation
 - h. Jury duty, sick pay, or other leave allowances
 - i. *Per diem* allowances
 - j. Travel expenses
 - k. Worker's compensation
 - l. Payroll taxes
 - m. Other agreed-upon payments similar to those above
 - n. On-site Supervision
2. Small Tools and Consumables
3. Permanent Materials
4. Project Equipment and Systems incorporated into the project (elevators, HVAC systems, etc.)
5. Construction Equipment
6. Subcontractor Costs
7. Other Project Costs, such as:
 - a. Job insurance
 - b. Equipment rental

- c. Job supplies and facilities (ice water, ice, portable toilets, etc.)
- d. Cell phones and radios
- e. On-site office equipment (telephones, computers, copiers, fax machines, etc.)
- f. Sales taxes
- g. Construction and performance bonds
- h. Permits
- i. Temporary services and facilities
- j. Miscellaneous costs (instruction manuals, tags, move on/move off expenses, certification, etc.)
- k. Safety
- l. Costs of developing a change order
- m. Drug testing
- n. Material handling and re-stocking costs
- o. Clean-up, dumpsters, and garbage hauling
- p. Surveying and layout
- q. QA/QC
- r. Crane and hoisting equipment
- s. Scheduling
- t. Document control clerk
- u. Expeditors
- v. Site security
- w. Temporary jobsite electricity/lighting
- x. Shop drawings, blueprints, reprographics, and photography
- y. Mobilization and demobilization
- z. Temporary heating and temporary weather protection

General and Administrative Overhead

General and administrative (G&A) costs, sometimes called home office overhead, are not charged directly to a job cost report; they are corporate indirect costs that typically support more than one contract at a time. G&A costs commonly contain essential functions that are necessary for a company to conduct operations, fulfill specific contract obligations, and even perform change order work. Sometimes the allowable percentage for G&A is stipulated in the contract documents. It is often a useful practice to negotiate a G&A overhead rate for change orders at the beginning of a project and incorporate the rate in the contract. In the context of federal government contracts, *FAR* Part 31 provides guidance on the types of G&A costs that are allowable in a change order.

Profit

Profit should be applied as a separate percentage figure. It should be applied after all costs are included, with the appropriate addition for G&A overhead. Sometimes the percentage for profit is stipulated in the contract documents. Like G&A, disputes can be avoided by stipulating a profit rate for change orders in the contract. In other instances, a “fee” percentage is specified which is intended to cover both home office overhead and profit.

Other Considerations in the Pricing of Change Orders Additions and/or deductions:

1. Where additions only are involved, the contractor is entitled to an addition to the contract sum in the amount of direct and indirect job costs, plus home office overhead and profit. If requested, the contractor may be obligated to provide a detailed breakdown to verify the quotation or, depending on the contract provisions, the contractor may be subject to an audit.
2. Where deductions only are involved, the contractor should calculate the reduction to the contract sum only in the amount of the reduction in direct and indirect job costs unless other, more specific guidelines are provided in the contract.
3. When both additions and deductions are involved, each should be calculated as separate change orders in accordance with 1 and 2 above. If both omitted work and added work is involved in the same change order, the total amount of the change order will be equal to the difference between the additions and the deductions in accordance with 1 and 2 above, unless more specific guidance is provided in the contract. Sometimes the contract stipulates that overhead and profit, especially when it is a fixed-fee project, will not be reduced for deductive changes; this should be considered when pricing a combination of additive and deductive changes.

Unaccepted change orders: If the schedule and associated pricing of an owner-initiated change order is not accepted and authorized, the contractor may wish to seek reimbursement for all costs incurred in the preparation of the quote. The contractor should have a prior understanding in the contract with the owner regarding the reimbursement and allowability of such costs.

Comparison of contract forms and change order provisions: Multiple references are made in this bulletin to change order provisions in the contracts governing the work. Much of the specific change order pricing approach and contractor submittal process is determined by the change order provisions in a subject contract. There are several commonly used form contracts that frequently serve as the basis or starting point for negotiating contracts between owners and contractors. An overview of the similarities and differences among the change order provisions in these commonly used contracts is provided in this bulletin. The contract forms that are compared in this bulletin are the ConsensusDocs, which is endorsed by MCAA and other trade contractors among others; the American Institute of Architects (AIA) 2007 form contracts; the Engineers Joint Contract Documents Committee (EJCDC) forms; and the Construction Management Association of America (CMAA) forms. All of these form contracts are similar in that they provide for a change to be initiated by the owner in the form of a directed change or identified by the contractor by notifying the owner. However, each of these form contracts have nuances as to the prescribed approach for determining the price and time associated with the change. The following paragraphs address the pricing methodologies among these contracts, but do not address all of the procedural differences. The parties to the contract are strongly encouraged to read and understand all contract and change order language before signing these documents and to seek professional legal assistance when necessary. For example, the ConsensusDocs, AIA, EJCDC, and CMAA forms all include notice provisions, however the number of specific days varies from contract to contract, as do the specified days for submittal of changes and owner

response times. The following table provides a summary comparison of the pricing provisions in these four different form contracts, with further discussion about the pricing provisions in the paragraphs that follow.

Change Order Pricing Alternatives			
	Unit Prices	Mutual Acceptance of a Lump Sum	Cost of the Work Plus a Fee
ConsensusDocs 200 (Article 8)	x	x	x
AIA (A201 2007)	x	x	x
EJCDC (Articles 10 - 12)	x	x	x
CMAA (General Conditions Article 11)	x	x	x

ConsensusDocs¹ – Article 8. The ConsensusDocs call for expeditious negotiation of time and price when the owner issues an interim directed change. This form contract does not provide detailed guidance on the determination of cost, overhead, or profit when pricing is based on cost of the work plus a fee, but rather leaves the determination of these pricing elements to the negotiating parties. In the event the parties cannot reach agreement, this contract generally provides for pricing to be determined based on “reasonable and actual expenses and savings.” If unit pricing is used, and the quantity or unit items are so different from the original unit prices to cause substantial inequity to owner or contractor, the unit prices are to be equitably adjusted. Also, in the event of a directed change, when pricing cannot be agreed upon, the contract provides that 50 percent of the estimated cost of the work shall be paid on an interim basis.

AIA² – Article 7. This form contract does not provide detailed guidance on the determination of cost, overhead, or profit when pricing is based on cost of the work plus a fee, but rather leaves the determination of these pricing elements to the negotiating parties, except when agreement cannot be reached, in which case Article 7.3.7 provides guidance on the elements of cost and guidelines for the determination of overhead and profit. If unit pricing is used, and the quantity or unit items are so different from the original unit prices to cause substantial inequity to owner or contractor, the unit prices are to be equitably adjusted.

EJCDC³ – Articles 10–12. This form of contract provides detailed guidance on the determination of cost, overhead, and profit and provides guidance on unit price determinations in the event owner and contractor are unable to reach agreement as to the change order price. Parties using this form of contract are encouraged to consult the specified provisions in Articles 10–12.

CMAA⁴ – Article 11. When the cost-plus-fee method of change order pricing is used, the CMAA change order pricing provisions provide distinct definitions for “cost of the work” with additional guidance for the quantification of labor, materials, subcontractors, and several other types of costs. The CMAA change order provisions also provide guidance on the quantification of the contractor’s fee, which consists of overhead and profit. The change provisions state that the contractor shall be entitled to a mutually acceptable fixed-fee amount. If that amount cannot be agreed upon, then the fee shall be 15 percent of payroll and materials plus 5 percent on subcontractor change work, subject to other detailed exceptions and procedures specified in the contract.

Change Order Procedures and Forms

Authorization procedures. It is incumbent on the contractor to ascertain in writing, either from a review of the contract documents or through a written request to the owner, the specific individuals who have the authority to accept and implement change orders. Often a contract will identify the authorized representatives for both the contractor and owner. When negotiating the cost, time, and any specific terms and conditions associated with a change order, it is recommended that the authorized representatives for both the contractor and owner thoroughly review the documentation associated with the change before signing the change order. Otherwise, the owner may contend that the individual who authorized the alleged changed work did not have authority to issue a change. If the contractor believes that the actions of a party within the owner's control, such as the architect/engineer, took action that constitutes a constructive change to its work, the contractor should give timely written notice to the owner that it considers such action a constructive change directive, and will perform the work as a change order and provide a cost accounting of the change when the work is complete. An example of such a written notice of change is:

Contractor has received the Engineer's Response to Request for Information (RFI) 213, which has rerouted the piping from that shown on Drawing M.402. We have assigned Proposed Change Order 5000 to this item. We will be charging costs for labor, material, services, and equipment to this change order cost code and will provide you with a complete accounting in a formal change order request when the work is complete.

Time for acceptance. Except as

specified in a contract, the time limitation for acceptance of a change order should be stipulated by the contractor in a change request. If not accepted within the stipulated time, it should be stated that the quoted price may be subject to escalation.

“Full accord and satisfaction” language. Contractors should be alert to any change order they are requested to execute that includes “full accord and satisfaction” language. Such language is designed to make the written change order a full and final agreement on the applicable cost and time associated with the subject change. A bilateral signing of a change order with this language could bar the recovery of any additional costs associated with the change order, such as loss of productivity, delay-related costs, and/or cumulative impacts. The actual wording will vary, but is likely to be similar in substance to the following:

The execution of this Change Order represents the Contractor's total and final costs for all impacts, both direct and indirect, arising from this Change Order. A time extension (if any) granted with this Change Order represents the total impact of all delays, both direct and indirect, to the project schedule.

Courts and boards have found that such language may bar the contractor from additional recovery. If there is concern that productivity impacts, cumulative impacts of multiple changes, and delay-related costs cannot be quantified for individual changes, the contractor should consider reserving its rights to make a claim for such impacts separate from individual change orders. An example of such reservation language follows:

The execution of this Change Order represents the Contractor's estimate of direct costs only. The Contractor expressly reserves the right to submit, at

a later date, added costs, applicable mark-ups and time extensions attendant to this change order arising from, but not limited to: extended field and home office overhead, labor inefficiency, disruptions, impacts to the critical path, schedule re-sequencing and/or acceleration.

Again, legal counsel should be consulted before signing a change order that contains either accord and satisfaction language or reservation of rights language.

Dispute resolution. In the event that a change order cannot be mutually agreed upon with a bilateral signing, some changed work may still proceed with a directed change or a unilaterally issued change order. In the event that the parties have exhausted all possible remedies under the changes provisions of a contract, they may need to turn to the dispute resolution provisions of the contract. Occasionally, change orders ultimately become resolved through the dispute resolution provisions of the contract. It is beyond the scope of this bulletin to discuss the details of resolving claims outside of the change order clauses in contracts.

Change Order Forms

Having outlined a variety of considerations when faced with changed work, the following forms are recommended for use in estimating and for tracking the costs of such changes. There are three typical types of change order pricing:

- Lump sum,
- Time-and-material, and
- Unit price.

In a lump-sum change, the contractor's original estimate for the change must include all items needed to do the work.

Lump-sum pricing is frequently used when pricing changes before the changed work has commenced, meaning that the change is "forward priced." Contractors bear the risk of overruns and receive the benefit of underruns.

In time-and-materials changes, such risks are eliminated and both the contractor and the owner get a clear picture of the profit that will be earned by the contractor. Time-and-materials changes require accurate tracking of all expenditures to allow verification of reimbursable costs. These costs may be invoiced periodically as the work commences, or, on shorter-duration changes, invoiced on completion of the work.

Unit-price contracts specify the unit prices associated with various types of work. In some instances, the parties may agree that, on changes above a specified percentage of the base work (for example, 25 percent), the contractor has the ability to charge on a time-and-materials basis. In these instances, the contractor may be allowed to charge actual costs rather than being limited to charging the unit prices that were established in the contract. Unit prices, in most instances, include direct costs, indirect costs, G&A, and profit.

The forms and procedures (Exhibits 1 through 18) are tools for documenting and tracking costs, determining time impacts, and pricing change orders.

Part 1 deals with lump-sum changes and Part 2 is for cost-plus changes. Included in Part 2 is a Field-Authorized Change Order Form. Designed primarily for field use, it provides a means not only for tracking costs but also for obtaining written authorization for additional work, when necessary. Before adopting the procedures presented here, evaluate them carefully and revise

them as necessary to meet the requirements of local conditions and your company's operating procedures.

Part 1: Lump-sum (fixed amount) changes.

Lump-sum changes are advantageous to the contractor for two reasons: (1.) they allow the contractor to estimate all costs and mark-ups before work begins. If the contractor includes all items necessary for the work as well as applicable and contractually allowed mark-ups, the probability of making a reasonable profit is enhanced. (2.) they require far less tracking and paperwork in the field than time-and-material changes. Despite these advantages, lump-sum changes must be handled properly to ensure that all cost and time impacts are properly estimated and included. The following procedures and forms will help make that handling accurate and efficient.

Recommended Procedures

1. The key document in controlling change order activity is the Change Order Status Sheet (Exhibit 1). The project manager should record any potential change on the Change Order Status Sheet as soon as the possibility of a change is identified. Formal changes should be numbered sequentially and recorded on the Change Order Status Sheet.
2. Prepare a Change Order Proposal (Exhibit 2) and use it as a cover letter when submitting your change order cost estimate to the project owner or general contractor. Be sure the proposal letter states that you reserve the right to modify your estimate if additional work not covered by the proposal is required. Also state a time limit for the owner's or general contractor's acceptance of the proposal if there are no time limits already specified in the contract.
3. Exhibit 3 is a Change Proposal Cost Summary Sheet. The sheet is used to summarize all estimated costs from the detailed cost estimate sheets in Exhibits 4 through 13. Keep a copy of all change order pricing sheets and related documentation readily available for review with the approving authority should questions arise.
4. Itemize estimated equipment and materials costs on an Equipment Cost Estimate Sheet (Exhibit 4) and a Materials Cost Estimate Sheet (Exhibit 5). Because changes usually involve relatively small amounts of materials, and therefore do not qualify for large volume discounts, it is suggested that all materials be estimated using standard over-the-counter discount prices. Restocking charges should be considered where credits might be involved. Be sure to estimate required quantities of all items and to calculate the materials cost subtotal using the figures in the total cost columns. Also consider lead times required for ordering materials and equipment and the potential need for expediting materials and equipment, which may involve additional costs. Add to subtotals all additional costs, such as sales taxes, drayage charges, warranties, start-ups, etc.
5. Estimate all miscellaneous direct job costs on an Other Direct Job Costs Estimate Sheet (Exhibit 6). Once computed, the labor cost estimates on this form should be transferred to the Labor Summary Sheet (Exhibit 9) and the materials costs to the Change Proposal Cost Summary Sheet (Exhibit 3).
6. Complete an Equipment and Tool Rental Estimate Sheet (Exhibit 7).
7. Complete a Vehicle Operating Cost

Estimate Sheet (Exhibit 8), including all gasoline and oil costs anticipated for each vehicle.

8. Itemize all labor costs on the Labor Summary Sheet (Exhibit 9). Rates, fringe benefits, payroll taxes, insurance, travel allowances, etc. for the various labor categories should be shown in the matrix at the top of Sheet #1 of the Labor Summary Sheets. Use items 13–22 (Exhibit 9) and 23–40 (Exhibit 10) to indicate any applicable increases or decreases to the labor estimate due to factors affecting productivity. Once you have itemized the various labor factors, calculate and total the estimated labor costs using items 41–52 on Exhibit 10.
9. List all subcontractors and subcontract quotes and total the estimated cost of subcontracts on a Subcontracts Summary Form (Exhibit 11).
10. On an Extended Overhead Cost Sheet (Exhibit 12), compute all overhead costs not included on the other estimate forms.
11. Use the Special Inclusions and Exclusions Form (Exhibit 13) to list any additional items that should be part of the change order, as well as specific items that should be excluded from the change order pricing. Be sure that items listed on this form are referenced in either the Change Order Proposal Form (Exhibit 2) or a special cover letter to the proper project authority.
12. The key to effective change order management is documentation. While contractors have been reacting to the present litigious atmosphere in construction with more attention to documentation, it is still not a tool that most

contractors use effectively. Good documentation of the events leading to and supporting a contractor's contention that a change has occurred can mean the difference between settling a change order and filing a claim. As a guide to proper documentation, a contractor should, at a minimum, include the following information on every change:

1. Date of discovery
2. Person and/or company making discovery
3. Detailed description of changed conditions
4. Documents supporting assertion that a change exists
5. Notification to owner (date and person)
6. Pertinent records and documents, such as:
 - Affected plans or sketches
 - Daily reports
 - Meeting minutes
 - Letters, notes, memos, and telephone
 - logs
 - Payroll records
 - Equipment reports
 - Material invoices
 - Photographs
 - Subcontractor/supplier cost and
 - schedule impacts
 - Impacted schedules
7. Notification to subcontractors/suppliers
8. Notification to bonding company (if required)

By using the above procedures and the exhibit forms, a contractor's estimate for a lump-sum change order should cover all the necessary items and maximize the contractor's ability to recover a reasonable profit while at the same time avoiding a loss in the performance of the additional work. In addition, the completed estimate forms provide a thorough and complete set of documentation to present to the contractor and/or owner during change order review and negotiations.

Part 2: Time and Material Change Orders.

A time-and-material change order requires that the contractor carefully track all expenditures on a change while doing the work. This requires the field personnel to keep accurate records. The following steps can help to enhance accurate recordkeeping:

1. Use a Field-Authorized Change Order Form (Exhibit 14) and Work Authorization Form (Exhibit 15) for all time-and-material changes to ensure that change work is properly authorized and costs are tracked.
2. Incorporate the Sample Instructions for Field-Authorized Changes (Exhibit 16) into your company's operations, modifying them as necessary.
3. Educate on-site supervisory personnel about time-and-material change orders and the proper use of the Field-Authorized Change Order Form. In particular, emphasis must be placed on the importance of controlling and recording all expenditures, and accountability for performing this task properly. There is no reason to lose money on time-and-material changes if your company has established policies for managing such changes and

procedures to ensure that your personnel follow those procedures.

4. Exhibit 17 provides a checklist of FAR allowability of costs to be used when pricing time-and-material change orders.
5. Exhibit 18 provides a template for the pricing of unit-price change orders.

¹ From ConsensusDocs 200 – Standard Agreement and General Conditions Between Owner & Contractor © 2007.

² From AIA A201 – 2007 General Conditions of the Contract for Construction © 2007.

³ From EJCDC C-700 Standard General Conditions of the Construction Contract © 2007.

⁴ From CMAA Form CMAR-3 General Conditions of the Construction Contract Between Construction Manager and Contractor © 2005.

Prepared by Paul Ficca, CPA, CMA, CFE, CFF of FTI Consulting, with contributions from Louie Wu, CPA, CFF, also of FTI Consulting. Peer review performed by: Robert Beck, Executive Vice President of John W. Danforth Company; Michael R. Cables, Executive Vice President of Kinetics Systems Inc.; James Durant, President and CEO of Trautman & Shreve; Richard Freeman, Executive Vice President of Stromberg Metal Works; William Goodrum, CFO of John J. Kirlin, LLC; Matthew Hahr, Senior Vice President of John J. Kirlin, LLC; Michael Loulakis, Esq., President/ CEO of Capital Project Strategies; Michael Mack, Vice Chairman of John J. Kirlin, LLC and Adam Snaveley, President and CEO of The Poole & Kent Corporation.

**EXHIBIT 2
SAMPLE CHANGE ORDER PROPOSAL FORM**

TO: GC/Owner's Name _____
RE: Job No. 101 _____
Job Name _____
Proposed Change No. _____

Gentlemen:

We enclose a breakdown of costs for the changes requested by _____
on _____, designated as Owner or A/E, Change No. _____

We were furnished the following drawings and specifications:
Number and Date

We propose to:

We do not include any of the following:
List exclusions specifically. Don't include work of other crafts.

The total net change to our contract is as follows:

Total adds per breakdown: _____
Total deducts per breakdown: _____
Net Change: _____

This change proposal covers only the direct costs associated with the change order work described above. We reserve the right to assess the impact of this change order at a later date and to submit these costs as they become known.

It is anticipated that all work required by this change will be done on a straight time basis. Overtime work, if required, will be billed as an additional item.

Sales tax is/is not included in this proposal.

This proposal is for acceptance within _____ days and is subject to escalation thereafter.

An extension of time of _____ calendar days is required.

We are proceeding with the changes listed above per your instructions.

-OR-

Please advise as soon as possible if we are to proceed.

Yours very truly,

Project Manager's Name

EXHIBIT 3 CHANGE PROPOSAL COST SUMMARY SHEET

Company No. _____
G.C. No. _____
Owner No. _____

Contract _____ No. _____ PM _____
Date Requested _____ Date Submitted _____ PM _____
Description of Change _____

DESCRIPTION OF COSTS	LABOR	MATERIALS	TOTALS
1. Equipment			
2. Material			
3. Subtotal: Item 1 + 2			
4. Freight, other delivery charges			
5. Subtotal: Item 3 + 4			
6. Material Return and Cancellation Costs			
7. Other Direct Costs			
8. Equipment Rental			
9. Gas & Oil			
10. Subtotal			
11. Labor Costs			
12. TOTAL COSTS BEFORE SUBCONTRACTS			
13. Subcontracts			
14. Home Office Overhead @ _____%			
15. Field Office Overhead @ _____%			
16. Profit @ _____ % on			
17. Profit @ _____ % on			
18. TOTAL COSTS AND PROFITS BEFORE BONDS, INSURANCE & OTHER COSTS			
19. Bonds, Subcontractors			
20. Bonds, Performance and Payment			
21. Financing Costs			
22. Special Insurance and Other Charges			
23. Extended Overhead			
24. TOTAL PRICE OF CHANGE PROPOSAL			
25. Extension of time because of this Change Order is _____ Workdays <input type="checkbox"/> deferred* to be applied in proper Schedule Sequence to each Category of Work			
26. This proposal is based on <input type="checkbox"/> Straight Time <input type="checkbox"/> Overtime <input type="checkbox"/> Shift Work			
27. This proposal is void unless a written Change Order or Written Notification to Proceed is received by _____ (45 calendar days if no date shown)			
28. Extended Overhead Cost: <input type="checkbox"/> Included <input type="checkbox"/> Deferred* <input type="checkbox"/> Not Applicable			

Submitted By: _____ Date: _____
Signature Title
Approved By: _____ Date: _____
Signature Title

*If deferred, cover letter should describe.

**EXHIBIT 6
OTHER DIRECT JOB COSTS ESTIMATE SHEET**

Date: _____

OTHER DIRECT COSTS	LABOR	MATERIALS
Resident Management and Expenses		
Superintendent and Expenses		
Other Nonmanual Labor Supervision Expenses		
Field Office Management and Expenses		
Estimating & Cost Analysis and Expenses		
Labor Planning (SLP) and Expenses for Update		
Field Engineering, Detailing, Reproduction, Supplies, Expenses		
Purchasing, Expediting, Traffic and Expenses		
Inventories, Management and Expenses		
Tools & Equipment Management and Expenses		
Payroll Management, Time Keepers, and Expenses		
Secretaries, Clerk Typists and Expenses		
Welding Qualification and Expenses		
Welding Inspection & Testing (NDE)		
Instruction of Owner's Personnel		
CPM Scheduling or Update		
Revising As-built Drawings		
Progress Photos		
Parking Expenses (other than on direct labor)		
Permits, Licenses, Fees, Dues		
QA/QC Expenses		
Extraordinary Estimating Expenses		
Engineering or Design Expenses		
Deliveries, Company		
Special Freight Charges		
Temporary Wiring		
Temporary Power		
Temporary Heat		
Temporary Water		
Temporary Toilets		
Temporary Air		
Temporary Weatherproofing		
Temporary Site Work		
Safety Officer and Related Expenses		
Safety Barricades, Gates, Other materials		
Ventilation		
Tags, Charts, Identification		
Office Furniture and Office Equipment		
EDP Cost		
Prefabrication Facilities		
Storage Facilities - On-site		
Storage Facilities - Off-site		
Office Heat and Electricity		
Office Telephones		
Copier Expense and Office Supplies		
Warranty Reserve		
Contingencies		
Sales Tax on Applicable Items Above		
	Total Costs	

EXHIBIT 9 LABOR SUMMARY SHEET

1. Project and No. _____ 2. Estimate No. _____
 3. Owner and/or Architect-Engineer _____
 Change Order Request Number _____ 4. Date _____

HOURLY RATES

5. Job Description	6. Base Rate	7. Fringes	8. Payroll Taxes & Insurance	9. Park/Travel Subsistence as Applicable	10. Wage Escal.	11. Zone Pay	12.	13. Total
Fitter/Plbr. Journeyman								
Fitter/Plbr. Foreman								
Fitter/Plbr. General Foreman								
Sheet Metal Journeyman								
Sheet Metal Foreman								
Sheet Metal General Foreman								
Laborer								
Labor Foreman								
Operator								
Teamster								
Millwright								
BIM/CAD								
Other								

JOURNEYMAN HOURS

- | | | |
|-----|---|-------------|
| 13. | Fitter/Plbr. Journeyman Hours | Hours _____ |
| 14. | Sheet Metal Journeyman Hours | Hours _____ |
| 15. | Material Handling _____ % of Lines 13 & 14 | Hours _____ |
| 16. | Non-Productive Labor (Relief Break, Tool Pick-up, etc.)
_____ % of Lines 13 & 14 | Hours _____ |
| 17. | Safety _____ % of Lines 13 & 14 | Hours _____ |
| 18. | Clean-up _____ % of Lines 13 & 14 | Hours _____ |
| 19. | EEO Implementation & Training _____ % of Lines 13 & 14 | Hours _____ |
| 20. | Equipment Repair _____ % of Lines 13 & 14 | Hours _____ |
| 21. | Height Factor | Hours _____ |
| 22. | Base Journeyman Hours | Hours _____ |

**EXHIBIT 10
LABOR SUMMARY SHEET
Labor Corrections**

Date: _____

23. Percentages are applied to the total affected manhours of the current contract, and to the labor of the proposed change	AFFECTED MHRS OF CURRENT CONTRACT		MANHOURS OF PROPOSED CHANGE	
	MHrs _____ As of _____		_____ (A)	
NEGATIVE PRODUCTION FACTORS	% of Loss	MHRS Lost	% of Loss	MHRS Lost
24. Fatigue				
25. Stack of Trades				
26. Morale and Attitude				
27. Reassignment of Manpower				
28. Crew Size Inefficiency				
29. Concurrent Operations				
30. Dilution of Supervision				
31. Learning Curve				
32. Errors and Omissions				
33. Beneficial Occupancy				
34. Joint Occupancy (Other Trades)				
35. Site Access				
36. Logistics				
37. Ripple				
38. Overtime Adjustment				
39.				
			(B)	(C)
40. B + C -MHrs = Adjusted direct MHrs				Move to Line 41

HOURS AND LABOR AMOUNT

41. Journeyman (with corrections)	_____	Hours @ _____	= \$ _____
42. Foreman (% of Journeyman hours)	_____	Hours @ _____	= \$ _____
43. Gen. Foreman (% of Journeyman hours)	_____	Hours @ _____	= \$ _____
44. Laborer (% of Journeyman hours)	_____	Hours @ _____	= \$ _____
45. Laborer Foreman	_____	Hours @ _____	= \$ _____
46. Operator	_____	Hours @ _____	= \$ _____
47. Teamster	_____	Hours @ _____	= \$ _____
48. Millwright	_____	Hours @ _____	= \$ _____
49. Other	_____	Hours @ _____	= \$ _____
	_____	Hours @ _____	= \$ _____
50. TOTAL DIRECT LABOR			
51. Total Replacement _____ % of Line 50			\$ _____
52. TOTAL LABOR COSTS			\$ _____
			\$ _____

**EXHIBIT 13
SPECIAL INCLUSIONS AND EXCLUSIONS FORM**

Date: _____

Special Inclusions and Exclusions

EXHIBIT 14 FIELD-AUTHORIZED CHANGE ORDER

Purchaser Change No. _____

Change No. _____

Purchaser _____ Date _____

_____ Job No. _____

Address _____ Job _____

_____ Work Complete _____ Sheet _____

QTY	MATERIAL	PRICE EA.	AMOUNT	DESCRIPTION OF WORK
				EQUIPMENT & TOOLS
				____ Shop Deliveries @ _____
				____ hrs Backhoe @ _____
				____ hrs Weld Machine @ _____
				____ hrs Truck @ _____
				____ Miles Travel @ ____/mile
				____ @ _____
				____ @ _____
				TOTAL EQUIPMENT & TOOLS
				LABOR & LABOR BURDEN
				____ hrs Supt. @ ____/hr
				____ hrs Foreman @ ____/hr
				____ hrs Mechanic @ ____/hr
				____ hrs Operator @ ____/hr
				____ hrs Laborer @ ____/hr
				____ hrs @ ____/hr
				____ hrs @ ____/hr
				TOTAL LABOR, FRINGES, TAXES
				TOTAL MATERIALS COST
				TOTAL EQUIPMENT COST
				TOTAL LABOR COST
				SUBTOTAL
				PLUS ____ % OVERHEAD
				TOTAL MATERIALS COST
				TOTAL COST
				PLUS ____ % TAXES
				PLUS ____ % PROFIT
				TOTAL MATERIALS & TAXES
				TOTAL BILLING

Supervisor who authorized the work.

Authorized By
PURCHASER'S REPRESENTATIVE

Company _____

EXHIBIT 16
INSTRUCTIONS FOR FIELD-AUTHORIZED CHANGES (FAC)

1. Call the office and get approval from your Project Manager before starting ANY FAC work.
2. When you call to get approval, be prepared to tell the Project Manager:
 - What work is to be done?
 - Who will pay for the work?
 - To whose attention should the bill be sent?
 - Who is authorizing the work?
 - How long will the job last?
 - What material will be needed?
 - Can you get a written purchase order? If not, will the buyer's representative sign your daily sheets?
3. The Project Manager will assign a number to the FAC work. If the number starts with 8 (example: 8125) **it is a completely separate job**. You must turn in a separate time sheet for an 8000 series job.
4. FAC sheets are like service tickets—EVERYTHING YOU USE MUST BE LISTED ON THE SHEET. This includes material from your truck stock, material already on your job, or special ordered items such as plumbing fixtures, or equipment. If you don't list an item on the sheet, we won't be paid for it. Don't forget consumables such as welding rod, solder, flux, oxygen, acetylene, etc. Be sure to list subcontractors, if any are used.
5. List the number of delivery trips from the shop.
6. List all the equipment and tools used, except hand tools.
Examples of chargeable equipment are:

Air Compressors	Fork Lift	Set Transit
Backhoe	Generator	Trench Jacks
Bantam	Grinders	Trucks
Boom Truck	Hilti Drill	Warning Barricades
Comealongs	Hole Dawg	Welding Machine
Copper Cleaning Mach.	Line Up Clamp	Whacker
Core Drill	Pavement Breakers	Zipall Gun
Cutoff Saw	Pipe Benders	
Cutting Rig	Railroad Jacks	
Ditch Pump	Rigid 300 Pipe Machine	
Ditch Witch	Roustabout Lift	
7. Describe the work done as specifically as you can under "Description of Work."
8. Under "Labor," don't fill in any rates unless the customer insists on having a price before signing. If you need a rate for labor, call your Project Manager. **THIS RATE IS NOT THE SCALE; IT INCLUDES TAXES, INSURANCE, FRINGES, ETC.** Enter the total number of hours worked for each classification. For example, if you have 4 men working 8 hours each, enter 32 hours.
List straight time and overtime hours on separate lines. Be sure to include your time spent surveying the job, calling the Project Manager, ordering the material—all the time spent on the FAC. Where applicable, include time for the General Superintendent.
9. Under Job Completed, enter "YES" or "NO."
10. Number the sheets consecutively.
11. Make three copies of the FAC form. MAIL THE ORIGINAL DAILY WITH YOUR TIME SHEETS. DO NOT WAIT UNTIL THE WORK IS FINISHED TO MAIL THE SHEETS IN.
Give the second copy to the customer.
Keep the third copy for your use.

EXHIBIT 17
SUMMARY OF FAR COST ALLOWABILITY

Job No. _____ Date _____
 Project _____ Change Order Request (COR) No. _____
 Location _____ Prepared by _____

FAR 31.205 REFERENCE	DESCRIPTION	ALLOWABLE OR UNALLOWABLE	APPLICABILITY TO SUBJECT COR	JOB COST REPORT CODE REFERENCE
1	Public relations & advertising	AR		
3	Bad debts	Un		
4	Bonding costs	A		
6	Compensation for personal services	AR		
7	Contingencies	AR		
8	Contributions or donations	UE		
10	Cost of money	A		
11	Depreciation	AR		
12	Economic planning costs	A		
13	Employee morale, health, welfare, food service	AR		
14	Entertainment costs	Un		
15	Fines, penalties, & mis-charging	UE		
16	Gains & loses on disposition of property	A		
17	Idle facilities	UE		
18	Research & development	AR		
18	Bid and proposal costs	AR		
18	Deferred research & development	UE		
19	Insurance & indemnification	AR		
20	Interest & other financial costs	UE		
21	Labor relations	A		
22	Lobbying costs	UE		
23	Losses on other contracts	Un		
25	Manufacturing & production engineering costs	A		
26	Material costs	A		
27	Organization costs	Un		
28	Select other business expenses	A		
29	Plant protection costs	A		
30	Patent costs	AR		
31	Plant reconversion costs	UE		
32	Precontract costs	A		
33	Professional & consultant service costs	AR		
34	Recruitment costs	A		
35	Relocation costs	AR		
36	Rental costs	AR		
37	Royalties & other costs for use of patents	A		
38	Selling costs	UE		
39	Service & warranty costs	A		
40	Special tooling & test equipment costs	A		
41	Taxes	A, Un		
42	Termination costs	AR		
43	Trade, business, tech & professional costs	A		
44	Training & education	AR		
46	Travel costs	AR		
47	Legal & other proceeding costs	A, Un		
49	Goodwill	Un		
51	Alcoholic beverages	Un		
52	Asset valuations from business combinations	AR		

KEY: A = Allowable; Un = Unallowable; AR = Allowable, but with certain restrictions; UE = Unallowable, but with certain exceptions
 Source: www.acquisition.gov/far

**EXHIBIT 18
UNIT PRICE CHANGE ORDER PRICING FORM**

Job No. _____ Date _____
 Project _____ Type of Work _____
 Location _____ Prepared by _____

DESCRIPTION	UNIT OF MEASURE	QUANTITY	X	UNIT PRICE	=	DOLLAR AMOUNT
TOTAL AMOUNT						\$ _____
						\$ _____



Bulletin No. CO 2 Revised
(Replaces 1973 Bulletin No. 32
and 2005 versions)
File: Change Orders

Bulletin

How to Organize and Submit a Claim

Introduction

What is a construction claim? This term is widely used to describe anything from a request for equitable adjustment (or change order request) to a formal lawsuit demanding relief from some court or governmental agency. However, “claim” has recognized definitions in our industry:

According to the *American Institute of Architects Glossary of Construction Industry Terms*:

A demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to terms of the Contract (Ref: AIA Document A201.)¹

As defined by the *Federal Acquisition Regulation (FAR) Subpart 2.1, 2.101 (b)(2)*:

Claim, means a written demand or written assertion...seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to the contract. However, a written demand or written assertion by the contractor seeking the payment of money exceeding \$100,000 is not a claim under the Contract

Disputes Act of 1978 until certified² as required by the Act.

Beyond these formal definitions, the term “claim” has taken on a meaning based on its common use in the construction industry. According to this meaning, a claim is a demand for relief, usually as to cost and/or time, by a contractor to another party, such as a general contractor or owner. In this sense, a claim is filed only after negotiations for a fixed-price change order fail, or after the reviewing party has formally denied the change order request. Thus, in the vernacular, a claim is equated to a dispute between the parties that remains after negotiations to modify the contract have failed. When an issue is resolved by a change order to the contract, usually no claim results.

Most change order requests do not require formal certification. However, claims of over \$100,000 on federal government projects must include a certification signed by the claimant with language consistent with the requirements of the Contract Disputes Act. Thus, for projects contracted under the *FAR*, a “claim” of over \$100,000 is differentiated from a change order request by the required certification. The issue of claim certification requires careful review and consideration by the claimant’s upper management and construction counsel and is not the subject of this chapter.

As noted above, a claim typically is filed when negotiations to execute a change order to the contract have not been fruitful. Many contract documents contain critical timing clauses that set forth the time frame within which a contractor must give formal written notice of a claim and further deadlines as to when a claim must be filed in order to be considered by the reviewing party, such as a government agency. Contractors should pay close attention to timing deadlines and content requirements. If they do not, claims may be dismissed or rejected out of hand by the reviewing party for failure to file the claim in a timely fashion or with the proper information and in the proper form.

The content of a mechanical contractor's claim typically will be dictated by the terms and conditions of the contract or by governing regulations, such as the *FAR*. The claimant should carefully review all submission requirements in the contract to ensure that the timing and content of the claim are in conformance with the contract terms.

Many mechanical contractors have the philosophy that claims must be avoided at all cost. While it is certainly desirable to avoid distracting and time-consuming disputes or costly litigation, the failure of a contractor to file a claim in a timely fashion may forever bar the contractor from relief (i.e., costs and/or time extensions) to which the contractor is otherwise entitled. Before a mechanical contractor makes a decision to delay or to avoid filing a claim, the company's upper management should evaluate thoroughly the potential risks and liabilities that would result from this decision.

Steps to Preserve the Contractor's Right to File a Claim

If a contractor determines that claims will inevitably be filed on a project, due perhaps to the exceptionally poor quality of the construction documents or the general contractor's or owner's improper scheduling or project management, certain steps should be considered to preserve the contractor's right to file a claim.

- 1) Many change order forms used by general contractors and owners contain broad "accord and satisfaction" language that seeks to bar the contractor from recovering time and/or costs for a change in scope over and above the remedies specifically prescribed within the change order itself. Such language has been strictly interpreted and as such, the contractor executing a change order with broad accord and satisfaction language may be held to the bargain defined by change order scope and pricing. In the event the contractor is faced with such language on the change order forms, the appropriate course of action should be formulated by upper management aided by construction counsel.
- 2) Monthly payment applications often contain broad waiver language that seeks to bar contractors from recovering unsettled claims that are not expressly listed as exceptions on the payment application form itself. Frequently, these forms are not processed by the contractor's field management and thus they are unaware of this waiver language. All outstanding claims and unapproved change orders should be expressly listed within the exceptions section of the payment application form every month. In the event the owner or general contractor do not provide an exceptions section on the

payment applications form, the mechanical contractor should insert its exceptions on the form prior to submitting it for payment.

- 3) In the event the project is nearing completion with claims still outstanding, the claimant should not accept final payment for the project or execute final releases until all claims are fully settled.

Differentiating a Notice from a Claim

A notice of an event involving a claim is not, in and of itself, a claim. Notices and claims are typically two different documents with varying content. Notice refers to the transmission by a contractor to another party (i.e., the general contractor or owner) of a document that asserts that a delay and/or added costs may be, or have been, encountered on a construction project. A notice is designed to alert the general contractor or owner to a condition that requires remediation or special attention. Most notice letters are written when the details of the impacting event are not fully known and the outcome in terms of delay and added costs, if any, is uncertain. Most contracts include provisions outlining the required components of a proper filing of notice. These requirements may include specific description(s) of the thing or things causing the time and/or cost impact, estimates of the time and/or cost impacts, and other specific requirements that may be set forth in the contract.

Notice letters do not typically contain the same elements that are included in a claim for relief. While a notice letter sets forth a set of conditions that have occurred or may occur, usually giving the other party an opportunity to remedy or mitigate the adverse effects of the condition, a claim letter usually includes the time and cost impacts of the events. The notice letter generally precedes the

preparation of a claim. The timing and content of notice letters and claim documents are often provided for in the contract and the claimant should refer to the contract prior to submitting either a notice or a claim document to ensure proper content and timing.

Typically, a claim is a demand for specific relief or remedy and is filed after the impacting event has occurred so that its effects are known; and after change order negotiations have failed to provide for an equitable adjustment. Since a formal claim document usually follows the quantification of the impact, one component of a claim should be specificity—a number of days of extended contract performance time, an amount of money for direct costs, an amount of money for indirect costs, and other components of contract changes that are being requested by the claimant. If the claim does not contain specific requests for contract modification, the claim may be denied based on a lack of specificity.

The Components of a Claim

Proof of entitlement and quantum normally lies with the contractor making the claim (the claimant), meaning it is the contractor's obligation to prove the elements of its claim. There are several common components in a contractor's claim. These may include, depending on the nature of the claim:

- A Critical Path Method (CPM) schedule impact analysis. Such analyses can include fragnets, or time impact analyses (TIA), a windows analysis, and/or as planned versus as-built schedule analysis to support any claim for a time extension.
- Craft-level analyses showing as-planned versus as-built craft curves.
- Inefficiency studies identifying and quantifying losses in labor productivity.

- An accounting of the direct costs arising from the claimed conditions.
- An accounting of the indirect costs arising from the claimed conditions.
- A narrative of the cause and effect nexus that can include a written description of the events, photographs, contract documents such as letters and electronic correspondence, requests for information (RFI), change directives, and other proofs that demonstrate the changed nature of the work, the resulting damage, and a summary of the desired relief.

The exact content and format of the claim should be thoroughly reviewed by the claimant's senior management and, if appropriate, by the firm's legal counsel and the chief financial officer or outside accountant. As noted, the timing, form, and content of a claim can be critical elements in the claim's acceptance or rejection by the reviewing party.

Read the Contract Before Filing a Claim

As noted above, various contract documents may contain language that seeks to limit a contractor's right to recover delay time and the costs arising from delay and inefficiency. Important time- and cost-related issues such as labor and material escalation, *force majeure* events such as unanticipated adverse weather, unanticipated added impacts arising from previously executed change orders, and other important concepts are frequently discussed in the contract terms. Other important factors such as waiver language on payment applications, "full accord and satisfaction" language regarding change orders, and "no damages for delay"³ clauses that attempt to limit time-related cost impacts for delays may be included in the

contract. Contractual time limits for providing notice and for submission of a claim are important elements to consider. The contract must be fully reviewed to ensure that a claim is in compliance with the contract terms or, if not, why the particulars of the contract may not apply to the claim being filed.

A thorough review of the contract terms, results of the schedule and labor productivity analyses, and damages calculations should be performed before finalizing the entitlement and damages portion of the claim narrative. The contract and applicable regulations should be carefully reviewed in order to ensure that the form of the claim is consistent with the requirements set forth therein, including timing, addressee, contents, and certification. Generally, the claim package should be transmitted to the reviewing party or agency by registered mail or by other means that result in a signed and dated proof of receipt.

Content and Order of the Claim

It is true that, to some extent, how seriously the claim is viewed by the party receiving it can be determined by the professional appearance and completeness of the claim document and its supporting exhibits. If the claim is poorly organized, incomplete, or contains a narrative that is vague or confusing and lacking in compelling facts to connect cause and effect, the claim has a greater chance of being dismissed out of hand. However, if the claim package is compelling in its narrative and comprehensive in its supporting documentation, then the chances of an equitable settlement are increased significantly.

The content and order of the claim should be designed to compel the reader, by the weight of the facts, to adopt the claimant's position and to

issue an equitable adjustment to the contract. Thus, the claimant should include in the claim package a comprehensive and comprehensible narrative that sets forth the bases of the requests for remedy that can include both an extension of time and added costs. If the reader cannot reasonably navigate through the claim or understand the basis of the demand, a rejection of the claim can be expected.

Addressing the claim to a specific person and/or entity may be of vital importance depending on the jurisdiction in which the claim is submitted. This consideration is in addition to the time restrictions for filing a claim that may be contained in the contract or other governing regulations. For instance, public works contracts in some jurisdictions require that, in order for a claim to be validly served, it must be addressed to a specific individual, within a specific department, within a specific time frame. Copies of the claim also may be sent to other project-related individuals, such as the project manager or resident engineer, but to be valid, the claim must be transmitted to the specific, named party listed in the contract documents. When a contractor is contemplating a claim, in addition to attention to the content of the claim itself, careful attention must be paid to the contractual and regulatory requirements of filing a valid claim.

Typically, a summary stating the basis of the claim is essential. This summary, or claim narrative, should lay out the contractual foundation for making the claim and for the resulting damage. It should directly connect the basis of the claim to the resulting damages—this is called the “cause and effect” nexus. A citation to contract and/or schedule requirements is usually appropriate in the summary or narrative. It is important to consider two general concepts when preparing the summary or claim

narrative: a chronological and sequential presentation of the events; and addressing the questions of who, what, where, when, why, how, and how much, as appropriate. Specificity is key to a properly constructed claim document.

The damages portion of a claim may include such components as:

- Days of delay and the attendant time extension request;
- Costs for added performance time due to delays (field and home office overhead costs)⁴;
- Direct acceleration costs (payroll differential costs for overtime, shift work, or added supervision and equipment attendant to an increased crew size);
- Indirect labor inefficiency costs such as overtime inefficiency, crew disruption, stacking of trades, or other labor productivity factors;
- Labor wage rate escalation;
- Material cost escalation;
- Extended warranties;
- Equipment “inefficiency”;
- Added detailing or drafting/building information modeling (BIM) and schedule update costs;
- Supervision or management added to mitigate labor inefficiencies or to process a large quantity of scope changes;
- Subcontractors’ claimed amounts;
- Finance charges;
- Bond costs; and

- Overhead (unless claimed separately) and profit.

Once the particulars of the issues have been introduced in a comprehensive and compelling manner so that the reviewer is prepared to assimilate the facts, then the documentation and calculations can be presented to support the claim narrative.

Sample Claim Narrative Summary

A claim narrative can be provided in summary form, as shown on the next page, as long as the summary denotes each major category of impact. The documentation supporting each category can be provided in accompanying exhibits. However, a more exhaustive and comprehensive written claim narrative is usually presented. A comprehensive claim narrative can provide a chronologically-ordered description of the impacting events with citations to the drawings, specifications, the contract or other pertinent documents such as letters, purchase orders, or site photographs. A well-written, comprehensive claim narrative can lead the way for expanded understanding of the claimant's position by the reviewer and can also result in an equitable adjustment to the contract. It is much more economical for the contractor to expend appropriate resources in the preparation of its claim narrative and supporting documentation than to later become involved in costly litigation because the claim was denied due to lack of supporting documentation.

Also note from the sample on the next page that the claim contains elements of compensable delay and loss of labor productivity. A compensable delay is one that entitles the claimant to compensation for each day of extended general condition costs. All delays are not necessarily compensable. Some

delays are excusable only, meaning that the claimant is relieved from liquidated damages but receives no compensation for the delay. Some delay may be a combination of nonexcusable, excusable, and compensable time.

A compensable schedule analysis is normally considerably more complex than a schedule analysis focusing only upon excusable delay. For an excusable delay analysis, the claimant must prove that it was not the sole cause of critical path delay. For example, if the claimant caused the project to finish late by 30 days through its own fault, and another party (e.g., the owner or the prime contractor) independently caused the project to finish 30 days later than allowed by the contract, the claimant would still be entitled to a 30-day excusable, non-compensable delay.

However, in order for a compensatory analysis to prevail, the claimant must demonstrate through a CPM scheduling analysis that its own delays, if any, were not controlling critical path delays and as such, did not independently or concurrently cause the project to finish late. A compensable delay can have many facets that must be analyzed and explained and is frequently a very complex analysis best assigned to scheduling experts. The contract terms, accepted practice in the industry, combined with a technically competent CPM schedule analysis generally determine whether project delay is compensable, excusable, or in some cases, non-excusable.

In addition to the claim narrative, supporting documentation can be provided as exhibits to assist the reviewer in reaching the desired conclusion. If a schedule analysis has been performed to support a claim for an excusable and/or compensable time extension,⁵ summaries of this analysis

**EXHIBIT 1
SAMPLE CLAIM NARRATIVE SUMMARY**

**Amalgamated Mechanical Contractors
1 Central Street
Any City, USA**

Mr. John Smith
Contracting Officer
Department of Construction Services
1 Public Works Square, Any City, USA

(Today's Date _____)

Reference: Public Office Building Project, Contact No. 100-00-100

Subject: Claim for Recovery of Added Costs and Contract Time Extension

Dear Mr. Smith:

Pursuant to the Contract, Amalgamated Mechanical Contractors ("AMC") herewith submits its claim for recovery of costs and for a time extension on the above captioned project. A summary of the claim, as supported by the enclosed exhibits, is as follows:

On May 1, 2xxx, AMC discovered a differing site condition involving unforeseen and unsuitable soils that prevented AMC from timely and efficiently installing its underground plumbing and mechanical piping systems. AMC provided timely and proper notice of this condition. Reference Exhibit A containing AMC's notices, site photographs, daily reports showing craft and equipment usage and other documentation. AMC claims \$_____ in direct costs for labor, materials and subcontractor costs to remove the unsuitable materials and replace those materials with the prescribed stone and backfill.

This differing site condition critically delayed the approved project schedule by seventy-five (75) calendar days. AMC requests a 75 calendar day compensable time extension to its contract. Reference Exhibit B containing AMC's CPM schedule time impact analysis demonstrating AMC's entitlement to a 75 calendar day extension of time. AMC's claimed costs for delay amount to \$_____.

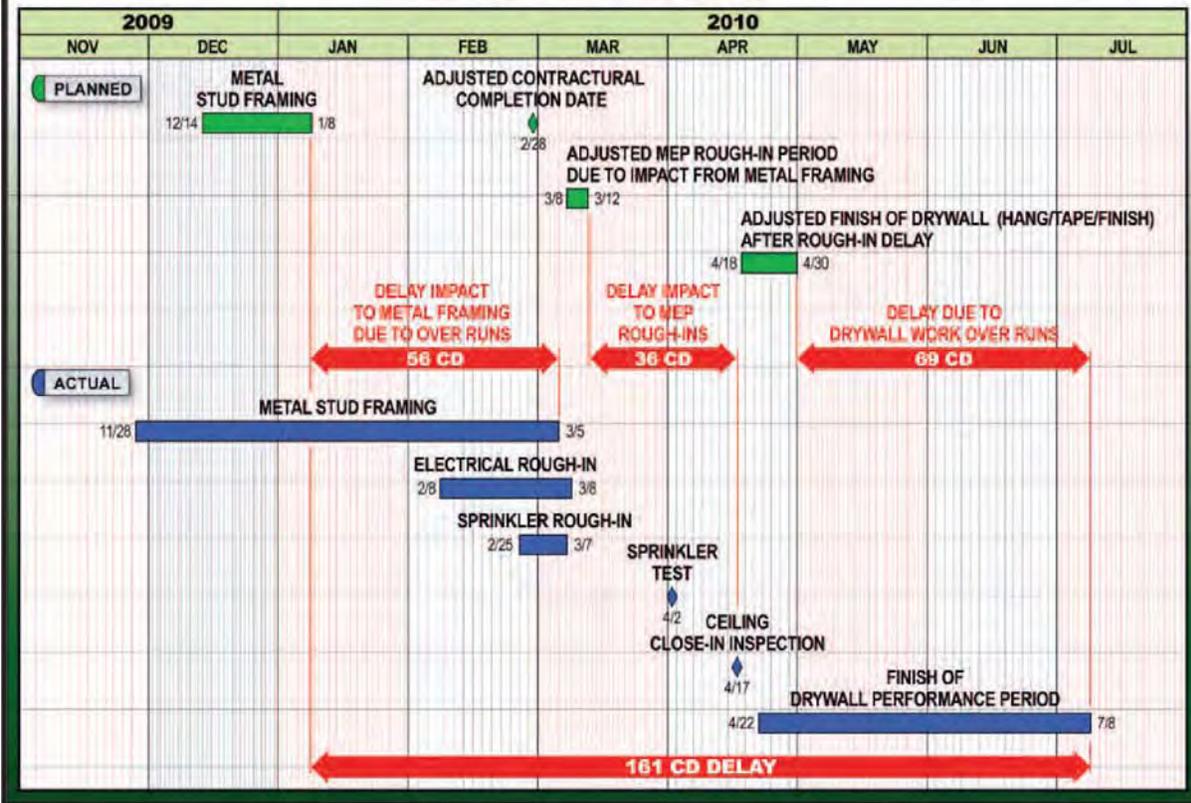
During the discovery period from March 1, 2xxx to June 1, 2xxx, AMC's crews were made inefficient by the piece-meal nature of the work during the period the Government was investigating the differing site conditions. Additionally, AMC was required to demobilize its crews during the remediation period and then remobilize its forces once remedial steps had been completed. Reference Exhibit C containing AMC's loss of labor productivity analysis. AMC's claimed costs for labor inefficiency amount to \$_____.

With appropriate support costs, profit, bond and other appropriate costs, AMC's claimed damages total \$_____ for which AMC herewith submits for payment. AMC's summary of damages is included herein at Exhibit D. AMC also requests a time extension of 75 calendar days. This reflects the identifiable cost and time impact associated with this claim. AMC expressly reserves the right to amend this claim as a result of the unforeseeable collateral impacts resulting from this differing site condition, as such impacts become known.

Yours truly,

Executive Vice President of Operations

CPM SCHEDULE ANALYSIS PLANNED v ACTUAL



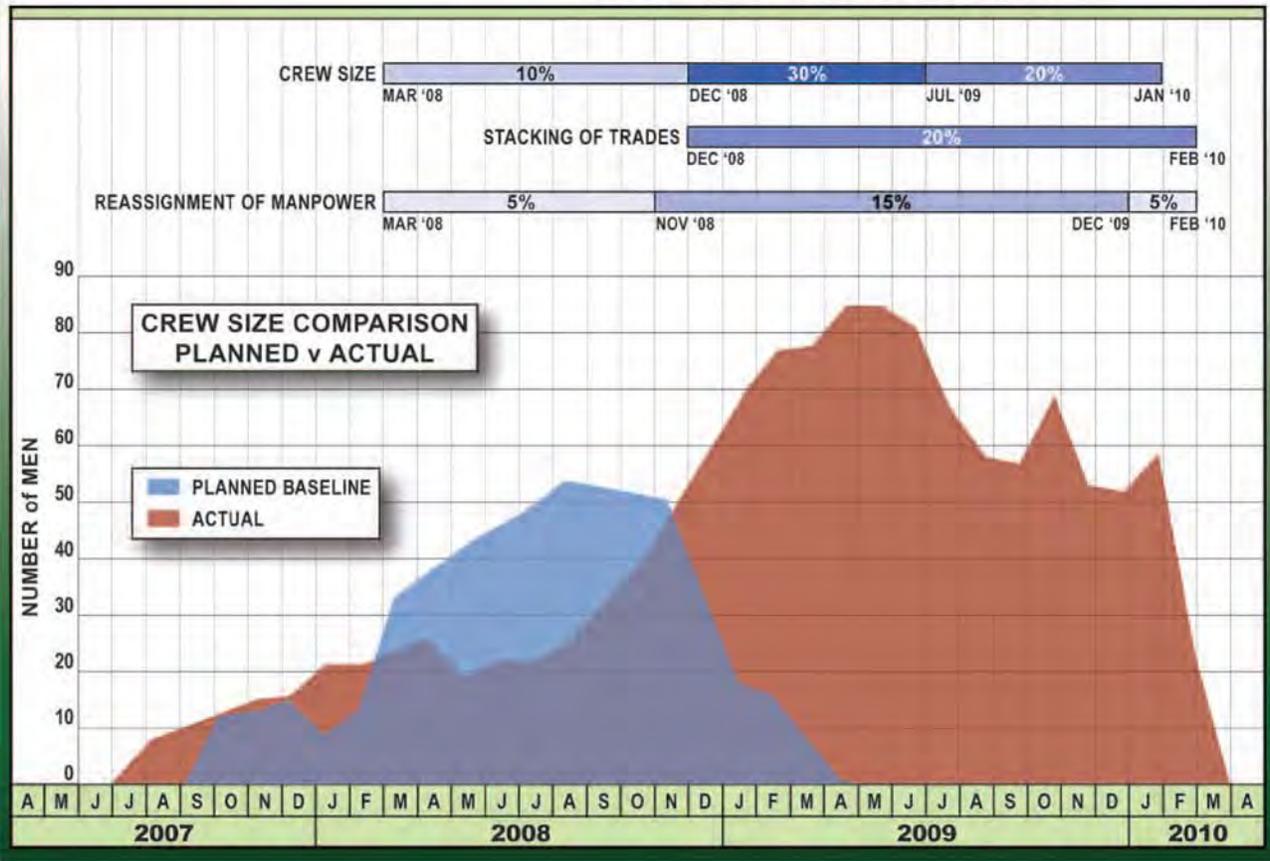
can be included in the claim, as shown above.

If the claimant has included a component of damages arising from labor inefficiencies caused by the impacting event, the computations for this component can be added as an exhibit to the claim. There are several methods of quantifying a contractor's loss of labor productivity. These include the: total cost or modified total cost method; measured mile method; and industry study method, such as by the use of the MCAA labor inefficiency factors. An example of an inefficiency exhibit supporting the claimant's loss of labor productivity component may appear as on page 9.

It is well acknowledged in the construction industry that proving labor

inefficiency is difficult. In computing a labor inefficiency claim, exactness is not a requirement. However, connecting the causes with the effects is generally a necessary element in any claim submission for loss of labor productivity. There are indicia of labor inefficiencies that many experts look for when preparing a labor inefficiency claim. These indicia can include: unexpectedly high crew sizes, fluctuations in crew sizes, disruption in the productive flow of crews, a high percentage of scope changes as a ratio of changes to base contract labor hours, unanticipated stacking of trades, unreasonable limitations to site access, and many other categories of impacts. Once the causes are established, then the claimant must estimate or calculate the resulting damages in terms of lost labor hours.

OFFICE BLDG PROJECT - MCAA INEFFICIENCY ANALYSIS & CREW SIZE COMPARISON



Field labor is not the only type of labor that may be susceptible to inefficiencies. The productivity of coordination, or the BIM⁶ process, can also be adversely affected by events on the project. Coordination, or BIM labor, can become inefficient if the plans and specifications are defective, leading to excessive clash identification and remediation. Often, the coordination process is adversely affected by an excessive number of requests for information that slows the progress of the BIM activities and makes such activities inefficient through the effects of piece-mealing of the coordination work and other disruptions. Coordination labor should be carefully analyzed by the claimant in order to

ensure that this component of construction is not improperly omitted from a delay and/or inefficiency claim.

Claims for loss of labor productivity can be quantified by several means as described above. A more exhaustive discussion regarding the identification and quantification of loss of labor productivity claims can be found in the chapter detailing "How to Use the MCAA Labor Factors."

Furthermore, many contractors recognize a phenomenon sometimes called "equipment inefficiency." Equipment, in and of itself, is not inefficient.⁷ The labor to use the equipment may be made inefficient by a host of causes. Presumably, the labor

required to operate a piece of equipment would be evaluated in a typical labor inefficiency claim. However, due to labor inefficiencies, the time required to use a piece of equipment may become elongated on the project. If it can be shown that a piece of equipment (either rented or owned by the claimant) was required to be on site longer than planned, or if equipment had to be added to the project due solely to the inefficiencies claimed for the labor portion of the project, the attendant costs can be recovered in the claim.

It is therefore important to record planned and actual equipment usage on the project to determine if inefficient conditions have caused an unplanned increase in the cost of equipment.

Damages calculations are an important component of a claim. As noted, the claim should contain a sum certain (i.e., a specific dollar amount for damages) that is being sought by the claimant as a result of the impact event(s) described in the narrative. Damages calculations must conform to accepted accounting practices and to the governing authorities such as the contract or the FAR, as applicable.⁸ The damages portion of a claim also may be the subject of a review by the contractor's counsel and its chief financial officer or accountant, particularly if a component for extended home office overhead is included. The claimant should anticipate that a claim will be the subject of a full audit and should prepare accordingly.

Home office overhead as a component of a delay claim may or may not be recoverable as a matter of contract provisions, or as a matter of the current trends in reported cases. At the time of this writing, the ability to recover unabsorbed home office overhead is limited to those situations where the contractor can demonstrate that:

Amalgamated Mechanical Contractors 1 Central Street Any City, U.S.A.	
<u>SUMMARY OF DAMAGES</u>	
Extended Field Office Overhead (75 CD x \$1,000/CD)	\$ 75,000
Extended Home Office Overhead (75 CD x \$350/CD)	\$ 26,250
Direct Costs for Remediation of the Differing Site Condition	\$ 947,500
Loss of Labor Productivity	\$ 97,450
Labor Escalation Resulting from the Delay	\$ 15,450
Extended Warranties	\$ 5,750
SUBTOTAL:	\$3,167,400
Profit @ 10%	\$ 116,740
Bond	\$ 11,674
TOTAL CLAIM AMOUNT:	\$3,295,814

- 1) The excusable delay period represents a suspension of the work, not just an elongation of the duration of work activities, effectively placing the claimant in a "stand-by" mode;
- 2) The "stand-by" period is of an uncertain duration; and
- 3) The claimant can demonstrate that it did not obtain, and could not have reasonably obtained, new work to absorb the home office overhead not being absorbed by the project on which the claim is being filed due to the suspension of work.

The use of allocation-related formulae, such as the Eichleay⁹ formula, is common in computing a contractor's home office overhead for the purposes of including those costs in a delay claim. The Eichleay formula allocates a contractor's corporate home office overhead to a particular project and then computes the daily home office overhead allocable to that project. The daily home office allocated rate times the number of days of compensable delay equals the home office overhead component of compensable delay claim.

Other methods of computing home office overhead have been utilized by

contractors with varying degrees of success. The recovery of home office overhead is challenging due to the limitations currently imposed by the courts and boards and the decision by the contractor whether or not to seek recovery of home office overhead costs should be aided by the advice of the contractor's counsel and accountant.

On public contracts, expect to be audited once the claim is submitted. Audits can be performed by such agencies as the Inspector General's Office, the Defense Contract Audit Agency, or other audit groups affiliated with the governmental department with which the contract was executed. A public contract audit of a contractor's claim is not a mere technicality. Many audits probe the contractor's financial and accounting records for possible discrepancies between the claimed amounts and the entries shown in the contractor's books and records. While simple entry or arithmetic errors can be corrected or explained, audits can have serious ramifications to the claimant should the audit uncover apparent improprieties in the claimant's books and records as they are compared with the claimed damages. Apart from an audit of the claimant's monetary damages, an audit can challenge methodologies utilized by the claimant in the preparation of the claim. Audits can be far reaching and have significant impact on how the claim is processed or if the claim is simply denied in its entirety for lack of support or proper record keeping.

Actual or Deemed (Constructive) Denial of a Claim

Regardless of how well a claim is prepared, some claims will be denied. When a claim is denied with a written or oral evaluation or rebuttal, it is incumbent upon the claimant to

carefully review the bases for denial and make a determination as to any corrections that may be needed to the original claim submission. It is possible that the reviewer may find disallowed costs or raise questions as to entitlement or the factual events described in the claim. The claimant should timely and constructively respond to those issues with corrections or explanations as to the issues raised by the reviewer. If a constructive dialogue can be established between the claimant and the reviewing party, the potential of an equitable settlement of the claim increases.

In some cases, a reviewer will dismiss the claim out of hand and without any reasoned basis for the rejection. Further, the rejection may not be accompanied by a written or oral rejoinder or rebuttal; simply the other party's deafening silence. The contractor should take written exception to this sort of "constructive" denial and, where appropriate, file an appeal in the manner prescribed by the contract. When a claim is formally denied, it would be prudent to have the claim and its denial reviewed by a construction attorney to ensure that the form of the original claim was correct (if this step was omitted prior to the original submission of the claim) and to prepare the appeal of the denial.

A "deemed" or "constructive" denial of a claim occurs when the party receiving the claim does not respond to the claim in any fashion, or in the prescribed or reasonable amount of time. As noted, in some cases the recipient of the claim may have no response at all. It is usually appropriate to expect a response within 30 to 90 calendar days of the date of submission of the claim. If, after a reasonable period, or the contractually prescribed period, of time has elapsed without a response to the claim, a second demand letter should be

transmitted requesting a response to the claim within a reasonable (i.e., 30 days) period of time. If no response is received, the claimant, aided by counsel, may decide to file a notice of deemed or constructive denial of the claim. In this fashion, the claimant has documented its reasonable assumption that the reviewing party has constructively denied the claim. If this course of action is taken, it may trigger contract terms and other issues may arise, such as having to constructively accelerate the work to overcome any claimed excusable delay.

The concept of a “deemed denial” of a contractor’s claim is principally a matter of federal contracts, such those executed by the General Services Administration or the U.S. Army Corps of Engineers. That does not mean that if a non-federal owner or prime contractor refuses to acknowledge a contractor’s claim, the general concept of constructive denial does not apply. However, the issue of “deemed denial” can be a complex legal issue and may be based on the terms and conditions of the contract, thus this matter is the subject of careful consideration by experienced construction counsel.

Conclusions

A mechanical contractor should carefully assess all options when considering whether or not to file a claim. However, the time restrictions contained in many public and private contracts do not allow the contractor significant latitude as to when a claim can be filed, thus the contractor is normally forced to make this decision promptly. Often, a contractor decides not to file a claim believing that, somehow, disputes will simply resolve themselves by working out the differences on the jobsite. This can lead to unanticipated results when the contractor comes to realize that the

only suitable resolution available is that prescribed in the contract documents. If the contractor has made a decision not to file a claim in accordance with the terms of the contract, its rights and remedies may have been irretrievably waived and thus, its ability to be equitably compensated may have passed by.

The proper and timely preparation and submission of a claim can be viewed simply as prudent management. A claim is an avenue to receive a remedy that is provided for in most contracts. The filing of a claim is not, on its face, an adversarial act. It is a business decision that is recognized as the contractor’s right under most contracts. It may, in fact, be a business obligation to ensure fair and equitable payment for work performed over and above the base contract scope of work or work performed in a most costly and unanticipated manner.

¹ “The Architect’s Handbook of Professional Practice” Volume 3, AIA Press.

² The issue of claim certification is not the subject of this chapter and is a topic that should be addressed by the claimant’s construction counsel.

³ Contract language that attempts to limit a contractor’s right to make a claim for a certain element of cost or time impact may not be applicable in all circumstances. By way of example, in some cases a “no damages for delay” clause may not have its intended efficacy, given actual circumstances on a project. However, such clauses cannot be ignored by the claimant and must be carefully considered when a claim is prepared. Review of the contract, in conjunction with the claim, by the contractor’s counsel is advised in order to ensure harmony between the requirements of the contract and the claim being submitted.

⁴ The components of a compensable delay claim (i.e., extended field office overhead)

are frequently large in number and can include the daily costs of on-site project management and supervision, the daily costs of office and storage trailers and warehouses, trucks, fuel, telephones, and other time-related costs. In certain instances, home office overhead may be recoverable. What may or may not be claimed as to delay costs is frequently prescribed in the contract, the FAR, generally accepted accounting procedures, or in other related documents. Refer to “How to Identify and Manage Change Orders” for more specific information on damages calculations.

⁵ For a more detailed review of the methods of schedule impact analysis, refer to the chapter on “Time Impact Analysis—Measuring Project Delay.”

⁶ Building Information Modeling, usually a three dimensional model of the project showing the elements of the work by the various trade contractors. The BIM process generally occurs at the early stages of the project and labor overruns may be not be properly included in an inefficiency analysis. The claimant should be careful to assess BIM labor overruns to determine if such overruns were occasioned by inefficiencies caused by defective plans and specifications or other non-contractor caused impacts.

⁷ It may be argued that a newer and more fully featured piece of equipment is more efficient or cost effective when compared with an older or less robust model of the same item. However, as it is used herein, efficiency is a function of output over input for a given piece of equipment.

⁸ For a more detailed review of the methods of quantifying impacts, refer to the chapters on “Time Impact Analysis—Measuring Project Delay,” “How to Identify and Manage Change Orders,” and “How to Use the MCAA Labor Factors.” The pricing format for a change order request and a claim are essentially identical.

⁹ Reference *Appeal of Eichleay Corporation*, ASBCA No.5183, 60-2 BCA ¶ 2688 (1960).

Prepared by Paul Stynchcomb, CCM, PSP, CFCC and Charles Choyce, PSP, PMP,

CFCC of FTI Consulting with peer review performed by: Robert Beck, Executive Vice President of John W. Danforth Company; Michael R. Cables, Executive Vice President of Kinetics Systems, Inc.; James Durant, President and CEO of Trautman & Shreve; Richard Freeman, Executive Vice President of Stromberg Metal Works; Matthew Hahr, Senior Vice President of John J. Kirlin, LLC; Michael Loulakis, Esq., President/CEO of Capital Project Strategies; Michael Mack, Vice Chairman of John J. Kirlin, LLC and Adam Snavely, President and CEO of The Poole & Kent Corporation.



Bulletin No. CO 3 Revised
(Replaces 2005 version)
File: Change Orders

Bulletin

Time Impact Analysis — Measuring Project Delay

Introduction

Schedule delays are a frequent occurrence on many construction projects and can have immense cost consequences. Without the remedy of a time extension, mechanical contractors are often forced to work overtime and may be required to increase crews and supervision to mitigate delays, even when caused by others. Mechanical contractors may also be assessed liquidated damages for delay, along with possibly having to defend against delay claims from the prime contractor or other trades. In some instances, a mechanical contractor is not made aware of delaying events until it is too late to remedy the delay without incurring added costs that can be substantial.

The purpose of this bulletin is to alert mechanical contractors to several of the key elements of schedule usage and the development of time impact analyses to identify and quantify project delays. An important first step in this process is the mechanical contractor's thorough review of the contract documents. The specifications generally contain the scheduling requirements for the project. Within this section of the specifications is often found the provisions governing timely notice and the requirements for a schedule impact analysis. Read the general conditions of your contract

specifications carefully before any work is performed on the project. It is not unusual to find terms and conditions such as:

Contractor's failure to submit its time impact analysis, with all supporting documentation and within the time period provided for in this contract, will constitute a full and final waiver of the contractor's right to an extension of time arising from the alleged changed condition. Absent the timely and complete submission of the contractor's time impact analysis as required by this contract, it is mutually agreed that the alleged changed condition has no effect on the critical path of the project schedule.

The method of delay impact analysis described in this bulletin is known as the "contemporaneous windows" method of analysis. The windows method measures delay at specific time windows throughout the project. The contemporaneous windows in time used for this type of analysis are usually the dates of the monthly update of the project schedule. While there are other methods of construction delay analysis, such as the "impacted as-planned," the "as-built," or the "collapsed as-built" methodologies, none offer the ability to evaluate the project at specific windows

of time throughout the duration of the work. Moreover, some methodologies, including the “impacted as-planned” technique, have been generally discredited or strongly critiqued by courts and boards in reported cases. Many modern contract specifications require the “contemporaneous windows” method of delay impact analysis. This bulletin will describe this method of analysis using the terms employed by contract specifications that are encountered on many public and private construction projects.

Terms and Concepts Used in Delay Analysis

Activity—the basic unit of work in a construction schedule. The activity is the unit of work¹ into which the overall project is divided for the purposes of tracking and managing time and labor during the construction process. The overall project is divided into activities during the job planning phase. Each activity is defined by specific geographic or contract boundaries such as phase, building, floor, and sectors; and by other designations, such as column lines, systems, rooms, crew codes, or other definitions that will allow specific identification of the work on the contract drawings. Each activity is given an estimated duration and is linked to other activities in the schedule by the use of logic restraints. Logic restraints (i.e., finish to start, start to start, finish to finish, and start to finish) define the relationship between activities in a construction schedule and are input by the scheduler to develop the overall Schedule Network.

Change Orders Critical Path Method (CPM) Scheduling—a formalized, and usually computerized, method of construction scheduling. This dynamic construction management tool requires the development of activities and interconnecting logic restraints. The

activities are analyzed to determine how each interrelates to other activities on the overall project with regard to performance dates. Logic restraints are created between the activities to create the CPM schedule network, which is the graphic representation of the overall schedule showing the activities and the interconnecting logic restraints. The CPM schedule should demonstrate the most efficient and profitable means of completing the project within the performance time set forth in the contract.

Critical Path—the longest connected chain (or chains, in the case of multiple critical paths) of activities in a CPM schedule that, if delayed, will have an equivalent impact on the end date of the project.

Total Float—the number of days an activity can be delayed from its earliest start date, or its earliest finish date, without causing delay to the completion of the project. Activities on the critical path have zero (0) total float.² Total float is a computation that is derived from the CPM schedule network and is dependent on the duration of the activities and the logic restraints that are input by the scheduler. Total float can change with each progress update or modification made to the original schedule.

Most contract specifications contain a “shared total float” clause. Such clauses state that total float is a commodity to be shared between the parties to the contract. In the case of a delaying event, a time extension will be granted only to the extent that the delay first consumes the entire available total float and, thereafter, causes a delay to the critical path. Impact events, which only consume positive float when analyzed in the CPM schedule, will usually not result in the granting of a time extension.

Time Impact Analysis (TIA)—a series of activities and logic restraints that define what is known about a changed condition,³ such as work added by a scope change or work occasioned by a differing site condition. As the conditions change, or as more information is known about the potential delay, the TIA must be modified (evolved). The TIA has become a term of art in the industry and is referenced in many contract specifications regarding project scheduling, notice, and delay analysis. TIAs are input into the CPM schedule as soon as the changed condition is recognized and are inserted into the CPM schedule update with a status, or “data date,” closest in time to the date of the initiation or discovery of the potential impact event.

Fragnet—another term of art in the construction industry having the same definition as the TIA. The fragnet is a fragmentary portion of an overall project CPM schedule network that depicts the activities and logic associated with a potential schedule impact. The **gapless evolving fragnet** is a term of art that describes a process of identifying, defining, and developing over time, the discrete activities that form a potential impact to the project schedule. Maintaining contemporaneous documentation supporting the details of each delay activity is important in developing and supporting the TIA, or gapless evolving fragnet. The terms “TIA” and “fragnet” will be used interchangeably herein.

The Project Schedule

While this bulletin does not cover the means and methods of CPM schedule development, updating, and maintenance, some commentary concerning the scheduling process is useful. If the mechanical contractor is also the prime contractor on the project, the development and control of the

schedule should not pose a problem. The prime mechanical contractor is usually tasked with the same type of overall scheduling responsibilities as would a typical general trades contractor or construction manager. In such cases, the prime mechanical contractor will be fully aware of the requirements of the project schedule and will know when TIAs are required to be developed and input into the overall project schedule.

The majority of mechanical contractors, however, are in the role of subcontractor to a prime contractor or construction manager. In such cases, the mechanical subcontractor may not have unfettered access to the prime contractor’s schedule. When that is the case, the mechanical subcontractor must take some affirmative steps regarding participation in the scheduling process. It is recommended that the following minimum steps be followed on every project:

- **Request the opportunity to participate in the development of the project schedule.**

It is essential that the mechanical subcontractor request that it be given a full and complete opportunity to participate in the development of the overall project schedule prepared by the prime contractor or construction manager. Furthermore, the mechanical subcontractor may, from time to time, be asked by the prime contractor to review, or to provide input into, the overall project schedule. The mechanical contractor should respond competently, comprehensively, and in a timely fashion to such requests.

- **Request electronic copies of the project schedule and all updates.**

It is often difficult, if not impossible, to conduct a meaningful schedule review using only a paper copy of the project

schedule or updates thereto. Thus, the mechanical subcontractor should request in writing a magnetic media copy⁴ of the prime contractor's baseline schedule and each progress update thereto. The mechanical subcontractor is then able to perform a much more detailed and thorough review of the prime contractor's schedule. On public projects, when requests for the electronic scheduling files are denied by the owner, construction manager, or prime contractor, such files can sometimes be obtained through a Freedom of Information Act (FOIA) or "public information act" request filed by counsel.

- **Timely submit any TIAs in accordance with the contract documents.**

With or without the prime contractor's assistance and cooperation, the mechanical subcontractor must submit its TIAs in accordance with the requirements of the specifications. The fact that a prime contractor may not utilize the TIA, or properly insert the TIA into the overall project schedule, does not relieve the mechanical subcontractor from fulfilling, to the fullest extent possible, its contractual obligations, if so specified, to develop and submit TIAs for events affecting the work of the mechanical contractor.

- **Utilize crew and equipment restraints to avoid "False Float" and possible stacking of trades or crew size inefficiencies.**

False float is an important concept to grasp for the mechanical contractor because the presence of false float may result in understated time impact analysis. Many contractors do not take into consideration the limitations of available crews or equipment items, such as cranes, and fail to insert crew and equipment restraints into the logic

of the CPM schedule. The absence of these vital logic restraints can create false float⁵ which, in the event of a delay, may improperly consume the impacts when a TIA is inserted into the project schedule. When mechanical crew and equipment restraints are missing, a delay impact may show no delay computation in the project schedule due to false float. In fact, because of the lack of crew and equipment restraints, the mechanical subcontractor's activities may become improperly "stacked" in the schedule in a manner that was totally unanticipated, in turn, leading to unplanned increases in crew or equipment requirements and their associated inefficiency and financial impact to the mechanical subcontractor.

Contractual Obligations to Submit the TIA

Most current contract specifications contain requirements that the contractors submit a TIA, or fragnet analysis, in order to demonstrate the impact of changes or delays to the project schedule. Since most prime contractors include "flow down" provisions⁶ in their subcontracts with mechanical subcontractors, the mechanical subcontractor bears the same, or even a greater,⁷ burden as does the prime contractor in order to demonstrate the impact of changes, delays, and other disruptions to its work. An illustrative example of the clauses that typically appear in many contract specifications is the following:

Contractor shall submit its time impact analysis within seven (7) calendar days after the initiation of the event that causes the alleged delay. The seven calendar day period shall begin at the point in time when the delaying event was known, or should have been known, to the contractor. The contractor shall

submit its time impact analysis in the form of a CPM schedule fragnet analysis that will be inserted into the approved schedule update closest to the initiation of the delaying event. Failure of the contractor to submit its time impact analysis within the time limits set forth herein will result in a waiver by the contractor of any entitlement to an extension of time to the contract. By failing to submit its time impact analysis in the format and within the time requirements described herein, the contractor agrees that no time extension is required by the alleged change in scope or event and forevermore waives its rights to claim for such delay or impact of any sort or type.

- **Notice requirements for TIAs should be strictly followed.**

The time element imposed by the contract is dependent upon the specific project—some specifications allow as little as three (3) calendar days, some as much as thirty (30) calendar days or more. Notwithstanding the relatively short period allowed by many specifications to provide written notice and a TIA, such clauses may be enforceable under the controlling laws and, thus, cannot be taken lightly by the mechanical subcontractor. To vault the dual hurdles of delay identification and timely notice is a formidable task for the mechanical contractor. It is foolhardy to rely upon assurances from the prime contractor or construction manager's employees that such requirements will not be enforced or that issues of delay and associated costs will "be dealt with" at the end of the job. In order to accommodate the rigid requirements of many current specifications, the mechanical subcontractor must strictly adhere to the CPM scheduling techniques described in the contract specifications.

- **Contract conditions, payment applications, and change orders should be reviewed by the contractor and/or its legal counsel to avoid waiving valuable rights.**

With more and more contract specifications being written with strict waiver clauses regarding notice and TIAs, it is a wise and prudent investment for the mechanical contractor and/or its construction counsel to review carefully the contract general conditions, payment application forms, and change order forms.⁸ Such a review at the outset of the project is critical to alerting the project management team as to its responsibilities and obligations regarding these crucial issues.

Development of the TIA

As described herein, many contract documents (usually a section in the scheduling specifications within the general conditions) require that fragnets, or TIAs, be inserted into the project schedule as delay events are known. These TIAs are to be placed into the update of the schedule closest in time to the notice to proceed of the changed condition, or in the update closest to the start of the impact of the changed condition. Since most TIAs are prepared and submitted before all of the potentially delaying events are known, the TIA must be evolved from update to update. The steps to prepare an evolving TIA are generally as follows:

- **Draw out the TIA logic, in detail, to include all discrete activities that are known at the time the potential impact is identified, or can be reasonably predicted as a result of the impact event.**

Such information may include the issuance of an RFI, the waiting period for a response, the analysis and pricing of the response and a forecast of

change order processing time, procurement of any materials and equipment required by the impact event, and the actual work to address the event. Each of these items should be designated as a separate activity in the TIA.

- **Ensure that there are no unidentified gaps in time within the fragnet.**

From the start date of the fragnet event until it finishes, or is forecast to finish, every significant period in time must be identified as an activity within the TIA. For instance, if the contractor must wait for five (5) weeks for the owner's response to an RFI, then the five (5) week period would be identified as an activity, such as "Contractor Waiting for Owner's Response to RFI No. 50." The TIA must be gapless—every day must be accounted for by an activity describing the events of each time period, whether "waiting" for a response, "negotiating" the change documents, or actually performing the changed work scope.

- **The actual start and finish dates for historical portions of the TIA (those activities that have been completed) should be verified against the project records and the source of all actual dates and durations should be noted for future reference.**
- **Starting with the first update in which the impact of the fragnet is identified, the TIA should include those portions of the fragnet that are known at the time of that update as historical data. All forecasted information (activities not yet accomplished that are part of the TIA) should be entered into the schedule update as new activities.**

- **The existing base contract activity(ies) that are, or may be, affected by the TIA must be identified. The TIA is then logically tied to the affected activity(ies) in the CPM schedule to determine what, if any, impact has been caused by the event.**

The mathematical analysis of the schedule update can be rerun and the scheduler can determine if the fragnet has changed the critical path by comparing the pre-impacted schedule with the impacted version.

- **Each succeeding month after the first update into which the TIA has been inserted, the TIA can be "evolved" with information as it becomes available regarding the scope and timing of the TIA Activities.**

Although the step of forecasting activities in the evolving TIA (also known as the **gapless evolving fragnet**) may be somewhat subjective, it is essential in meeting many of the specification requirements now being included in contracts. Contemporaneously, maintaining notations or other records that support these forecasts of future events that are depicted in the TIA can provide an important historical record. In addition, including the latest information regarding the TIA in the most current schedule update allows the mechanical contractor to manage the work to mitigate the impact of the delay.

- **As the contractor looks forward in the CPM schedule to the point at which the potential delay event will affect the base contract work, it is important to tie the ending activity of the TIA into the earliest base contract activity which could be affected by the TIA logic.**

This tie point from the TIA into the base

contract schedule is extremely important and should be established with care. With regard to new scopes of work arising from the TIA that must be defined as activities, it is essential that these new activities be sequenced within the existing logic of the schedule so as to maintain the contractor's planned crew restraints.

- **With each update, the scheduler can note the effects of the various TIAs on the overall Critical Path of the project schedule.**

The Critical Path impacts, if any, will evolve along with the input and updating of the TIA data. In fact, the impact of the TIA on the Critical Path may change from month to month as other job conditions also change.

- **If the impacts of the TIA are expected to include labor inefficiencies, these estimated inefficiencies can be forward priced using "Factors Affecting Labor Productivity" and "How to Use the MCAA Labor Factors."**

To the extent that the mechanical contractor must, or desires to, include all of the potential impacts in a forward looking TIA, the contractor must consider if the TIA will impact the productivity of the base contract work. If the contractor will be required to bring in new workers that may be unfamiliar with the project, work overtime, or work in an unanticipated manner concurrently with other trades, the scope change work and the base contract work could be adversely affected in terms of labor productivity. In such cases, the mechanical contractor should reference the bulletins on "Factors Affecting Labor Productivity" and "How to Use the MCAA Labor Factors" to estimate the potential loss of labor productivity to the scope change work and possibly to the

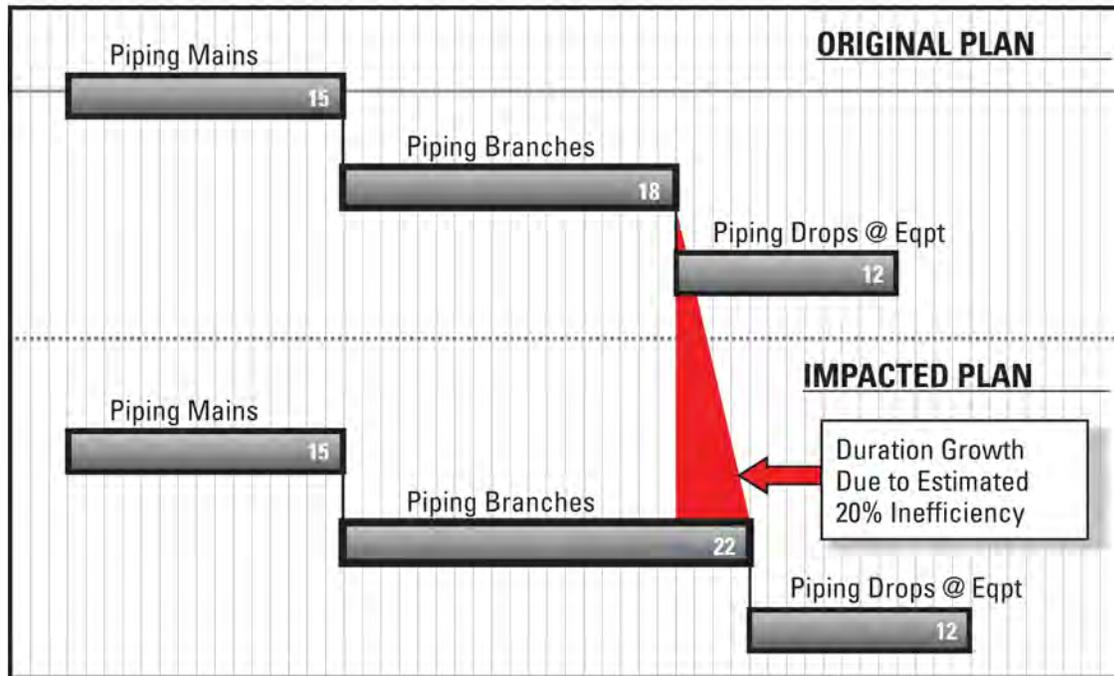
base contract work as well.⁹ This loss of productivity will be manifested in either added labor to overcome the effects of the inefficiencies, overtime, or longer activity durations that can result from inefficiency.

For example, if a base contract activity of 18 planned work days for the installation of piping branches is expected to sustain a loss of productivity of 20 percent caused by "stacking of trades" because it will be performed in a different working environment resulting from the time slippage demonstrated by a TIA, the duration of the activity can be increased to 22 work days (18 x 1.2). By including this consideration, where possible, in the overall TIA, the mechanical contractor may be more fully compensated for impacts arising from changes in scope. "How to Use the MCAA Labor Factors" explains how the estimated durations of schedule activities can be impacted using the inefficiency factors contained in "Factors Affecting Labor Productivity."

- **If a change order is executed regarding an evolving TIA (i.e., is executed before the delay impacts are actualized), the contractor should reserve its rights as to any future impacts of the evolving delay events.**

Assuming that the delay event is recognized as a change in scope to the mechanical contractor's contract, a formal change order may be executed. The change order form may contain "full accord and satisfaction" language that is designed to bar the contractor from receiving any further compensation (time and/or money) arising from the change. If the mechanical contractor is required, or decides, to execute such change order forms before the full effect of the TIA is known, it is essential that the estimates for future impacts of the

Labor Inefficiency Arising from Changed Conditions Can Adversely Affect the Project CPM Schedule (Exhibit A)



TIA to the schedule be very carefully assessed.¹⁰ Once the mechanical contractor executes a “full and final” change order, it may be difficult or impossible for the contractor to later make a claim for added costs arising from the change, such as longer than anticipated procurement times or for inefficiencies arising from a disruption to the crews performing the work. The aforementioned steps that describe the TIA process are graphically depicted in this bulletin and they are as follows:

- **Step 1:** The process starts with a properly developed CPM schedule (one which includes a reasonable level of detail, mechanical crew, and equipment restraints). A faulty CPM schedule¹¹ will serve little purpose in managing the project or in analyzing the effects of changes as they occur. The graphic in step 1 shows a portion of the base contract work in a mechanical equipment room depicted in a CPM schedule format.

Note that this example contains properly developed CPM schedule activities that describe discrete scopes of work within a definable geographic area of the project. The ability to identify the limits of a schedule activity by referring to the contract drawings is essential in the proper assignment of potential impacts arising from the insertion of the TIA. Unless the scope of work in the schedule activities is known, it will be difficult to identify where, in the CPM schedule logic, a potential impact event restrains specific base contract activities.

- **Step 2:** In this example, assume that the mechanical contractor discovers a differing condition or design deficiency. By way of example, assume that structural elements of the building conflict with the physical location of major mechanical equipment in a mechanical room. The mechanical contractor prepares

and submits an RFI upon discovering this condition and must await the owner's response. Note that, in the example shown in Step 2, the contractor has prepared a TIA starting with an activity that describes the submittal of the RFI, the period awaiting a response, and the date on which the response was received; all of which are historical dates in this example. However, from this point forward, the contractor may not know the scope of the change nor does the contractor have authority to proceed with a modified scope of work. Therefore, in this TIA example, the contractor has estimated a period of 20 work days for the owner to define the scope of the changed condition and agree upon a cost for the added work. Having complete and detailed information concerning all of the elements of a TIA is not a condition precedent to the development of an evolving TIA.

- **Step 3:** Within the next update period, the TIA is evolved by the mechanical contractor. By schedule update No. 2, as shown on the graphic, the mechanical contractor and owner have defined the modified scope of work and the contractor has received a notice to proceed to perform the scope change. The new activities are added to the TIA and now sufficient information is available for the mechanical contractor to understand what work must be accomplished in the field to carry out the scope change. As such, the contractor has added the forecast for the required equipment relocation for 10 days and has identified 10 days of work that must be added to the base contract work for the relocation of CHWS/R branch

pipng.

- **Step 4:** The TIA has been evolved to the extent that the mechanical contractor can tie the TIA logic into the base contract activity(ies) in the master CPM schedule. In Step 4, the TIA activity for equipment relocation for 10 days will be performed by a separate rigging crew and thus can begin as soon as the change order is approved. However, the additional 10 days of work associated with relocation of the branch piping will be performed by the mechanical contractor's existing piping crew. Therefore, the TIA activity that describes the added work for CHWS/R branch piping must be inserted **within** the existing crew flow¹² for the piping work.

In this manner, the schedule will maintain the planned flow of the crews and will not depict added crews that the contractor did not anticipate. The failure to integrate TIA activities into the existing logic with regard to crew flow may result in false float and no impact, or incorrectly attenuated impact, to the CPM schedule.

By inserting the TIA activity that is to be performed by the base contract crew (in this graphic example, the added work for relocation of the CHWS/R branch piping) within the existing crew flow, the dependent activity of CHWS/R piping drops to the chillers and pumps is impacted by 10 work days. To the extent that this base contract work was on the critical path of the CPM schedule, the mechanical contractor would be entitled to a time extension of 10 work days,

or 14 calendar days. This time extension could be both excusable and compensable.

Conclusion

While it would be desirable for all of the impact events to become historical (actualized) before a change order is initiated to cover the effects (costs and time) of a delay impact, the current specifications in wide use today attempt to provide a means for scope changes to be fully executed early in the life of a time impact so that all of the time and cost impacts are included in the change order. This goal, if achieved, can reduce the incidence of “after-the-fact” claims that are submitted at the conclusion of the project. If properly and cooperatively implemented, “real time” TIA analyses that lead to the settlement of delay events, such as changes in scope, can mutually benefit the contracting community and owners. Unfortunately, the contemporaneous settlement of “real time” TIAs is the exception, not the rule, in the construction industry.

In order for this potential benefit of “real time” impact settlements to be realized however, the subcontractors, prime contractor, and construction managers/owners must make the CPM schedule a mutually shared commodity. If the prime contractor holds the scheduling information under lock and key and does not encourage, or allow, the mechanical contractor to participate in the development of the baseline schedule and in the maintenance and updating of the schedule as the project moves forward, the goal of obtaining “real time” impact settlements will remain elusive.

In most instances, the terms and conditions of the contract will dictate what the mechanical contractor must do with regard to development and submission of TIAs. Unfortunately, in

some cases this means that the mechanical contractor may have to prepare its TIAs without the assistance or cooperation of the prime contractor. That notwithstanding, in today’s litigious environment, the mechanical contractor cannot afford to ignore any of the requirements contained within the general conditions of the contract and must take every reasonable step to preserve its right to be fairly compensated for impacts and delays.

¹ A “unit of work” includes all elements of field installation as well as submittal preparation, engineer’s submittal review, and prefabrication.

² It is possible for the most critical path to have positive float, a concept which is not discussed herein.

³ TIAs are generally created at the outset of a potential delay and, as such, will not contain a complete delay analysis because the entire scope of the TIA will not be apparent. Therefore, the TIA must be evolved from month to month to show the development of the potential delay. This evolution requires the addition of new activities to the TIA, such as responses to RFIs, approval of a change order, direction to proceed, and definition of the actual work involved in the change.

⁴ All scheduling software systems, such as Primavera[®], allow the electronic schedule files to be written onto transferable media such as compact discs. The electronic scheduling files can also be easily transmitted by e-mail.

⁵ “False Float” is relative float (relative to the float on the controlling critical path) that is improperly shown in a CPM schedule, usually arising from the absence of proper crew and equipment restraints. In many cases, False Float incorrectly absorbs the time impacts of fragnets inserted into the schedule, resulting in no measurable delaying effect on the project end date. False float can deprive a contractor of its entitlement to an otherwise excusable delay event.

⁶ A “flow down” provision contains language that places the same requirements and obligations on the subcontractor as the prime contractor has with the owner or construction manager.

⁷ In many subcontracts, the mechanical subcontractor is required to provide its notice of delay, or TIA, in such a manner that the prime contractor can meet its timing obligations for notice and quantification with the owner in its contract. Essentially, this requirement means that the mechanical contractor must submit its TIA or notice in less time than the prime contractor is provided in its contract with the owner or construction manager to submit its TIA or notice.

⁸ The regular monthly payment application form provided to the mechanical contractor by the prime contractor, construction manager, or owner may contain waiver language that must be addressed with each and every monthly payment application in order to preserve the contractor’s rights for compensation for such things as unsettled change orders and impact events that are known, but not covered, by a formal change in scope. Some prime contractors’ monthly payment application forms contain full or partial release language that attempts to bar the subcontractor’s recovery of unexecuted changes in scope or delay and impact claims. Similarly, the change order form used on the project may contain “full accord and satisfaction” language that may severely limit or restrict the contractor’s rights to seek additional relief beyond what is explicitly set forth in the change order.

⁹ The concept of impacts of multiple changes to the base contract work is known as a “cumulative impact claim” and care must be taken to price comprehensively the effects of changes to the base contract hours. The contractor should provide exculpatory language on the change proposal in the event that comprehensive pricing is not possible. It is recommended that “How to Use the MCAA Labor Factors” be consulted for a more detailed explanation of this condition.

¹⁰ If the mechanical contractor is required to execute “full accord and satisfaction” change

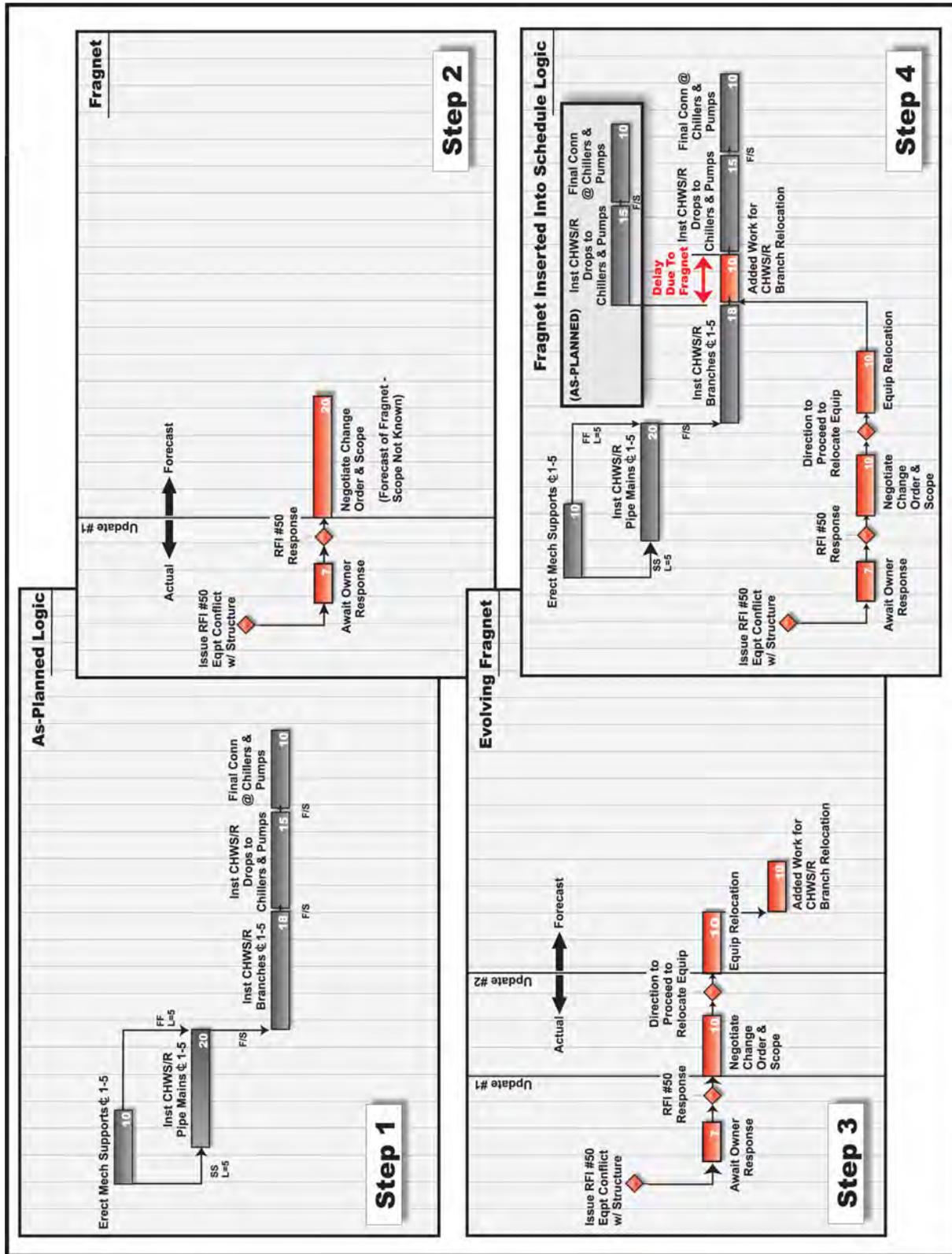
orders before delay impacts are actualized by, among other things, the threat of non-payment for the change work, it is prudent for the contractor to consult with legal counsel as to options that may limit or qualify the “full accord” language.

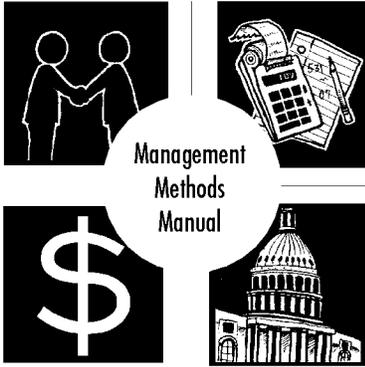
¹¹ If the mechanical contractor has reason to believe that the prime contractor’s CPM schedule is defective, written notice of this determination should be transmitted to the prime contractor with regard to the baseline (original as-planned schedule) and each successive update thereto.

¹² This operation assumes that the mechanical contractor plans to execute the scope change work with the crews already on site. In the event that the contractor mobilizes new or separate crews to perform scope change work, it may not be necessary to consider the disruption of the TIA Activities to the existing crew flow.

Prepared by Paul Stynchcomb, CCM, PSP, CFCC of FTI Consulting, with peer review performed by: Ronald Pearson, President/CEO of The NewMech Companies; Matthew Hahr, V.P. of John J. Kirilin, Inc.; Richard Freeman, Exec. V.P. of Stromberg Metal Works, Inc.; Robert Cox, Esq. of Watt, Tieder, Hoffar & Fitzgerald; and Roger Jones, Esq. of Huddles & Jones, P.C.

Four Step Fragnet Example (Exhibit B)





Bulletin

Construction Contract Proposal for Cost of Work Plus a Fee

This Bulletin has been developed to serve as a guide.

Please Note:

This contract proposal form is designed to inform you of the subjects that should be covered in negotiating a contract—its use, of course, is not required. You must determine each term without consultation with any competitor because agreeing on any term or condition of sale constitutes a violation of the Federal antitrust laws.

Article I The Contract Documents

1.1 The Contract Documents consist of this Agreement, the Conditions of the Contract (General, Supplemental and other Conditions), the Drawings, the Specifications, all Addenda issued prior to and all Modifications issued after execution of this Agreement. These form the Contract, and all are as fully a part of the Contract as if attached to the Agreement or repeated herein. An enumeration of the Contract Documents appears in Article XVII. If anything in the Contract Documents is inconsistent with this Agreement, the Agreement shall govern. (Note: Numbering and wording of this Agreement parallels AIA Document A111.)

Article II The Work

- 2.1 The Project:
- 2.2 Location of Work:
- 2.3 The Owner:
- 2.4 The Architect/Engineer:

Article III The Contractor's Duties, Obligation and Warranty

3.1 The Contractor accepts the relationships of trust and confidence established between him and the Owner by this Agreement. He covenants with the Owner to furnish his best skill and judgment and to cooperate with the Architect/Engineer and other



Contractors in furthering the interests of the Owner. He agrees to furnish efficient business administration and superintendence and to use his best efforts to furnish at all times an adequate supply of workmen and materials, and to perform the Work in the best way and in the most expeditious and economical manner consistent with the interests of the Owner.

3.2 LIMITED WARRANTY: All materials, equipment and workmanship furnished under this Contract shall be guaranteed by the Contractor against defects and Contractor agrees to replace or repair any defective material or equipment, and any defective workmanship not caused by ordinary wear and tear or to improper use of maintenance within _____ from date of substantial completion of the Contract. In no event shall Contractor be liable for consequential damages. This Warranty shall apply to the cost of materials only. Unless specifically agreed elsewhere in this Contract that a service reserve or labor warranty be included, the cost of labor shall be paid for by the Owner per the other conditions of this contract.

3.3 The Work to be completed under this Contract shall be guaranteed by the Contractor to produce capacities, meet design limitations and to function (1) As called for in the Plans, Specifications and Addenda, (2) As hereof set forth or (3) As published by the manufacturer for the equipment involved. In the event the foregoing requirements are not met, the Contractor's liability shall be limited to remedying any deficiencies without expense to the Owner. This guarantee shall not apply in any case in which the Owner specifies the type of equipment to be used.

3.4 The Contractor shall not be held responsible or liable for any loss, damage,

detention or delay caused by accidents, strikes, lockouts, weather, or by any other cause which is unavoidable or beyond the Contractor's control.

3.5 Unless specifically agreed ahead of time, the selection of personnel and manning the project shall be the responsibility of the Contractor.

Article IV Time of Acceptance, Commencement and Substantial Completion

4.1 This Proposal is subject to acceptance within _ days from the date hereof by the Owner, otherwise at the Contractor's option it becomes null and void. This proposal is also subject to change, without notice, before actual receipt of acceptance.

4.2 The Work to be performed under this Contract shall be commenced _____ and, subject to authorized adjustments, Substantial Completion shall be achieved not later than _____.

Article V Cost of Work and Guaranteed Maximum Cost

5.1 The Owner agrees to reimburse the Contractor for the Cost of Work as defined in Article VIII. Such reimbursement shall be in addition to the Contractor's Fee stipulated in Article VI.

5.2 The maximum cost to the Owner, including the cost of the Work and the Contractor's Fee, is guaranteed not to exceed the sum of _____ Dollars (\$_____). Such Guaranteed Maximum Cost shall be increased or decreased for Changes in the Work as provided in Article VII.



Article VI Contractor's Fee

6.1 In consideration of the performance of the Work, the Owner agrees to pay the Contractor a Fee to cover overhead and profit.

6.1.1 TIME AND MATERIAL OPTION: The Contractor will receive a Fee of _____% of the Cost of the Work as herein defined.

6.1.2 FIXED FEE OPTION: The Contractor will receive a Fixed Fee of \$_____ in consideration of the performance of the Work.

6.2.1 For Changes in the Work under the Time and Material Option, the Contractor's Fee shall equally apply to changes in the Work that both increase and decrease the Guaranteed Maximum Cost of the Work.

6.2.2 For Changes in the Work under the Fixed Fee Option, the Fee will only be adjusted upward. If Changes in the Work, when all totalled, increase the Guaranteed Maximum Cost of the Work more than _____%, then the Fixed Fee will be increased the same percentile amount that the Cost of the Work was increased.

6.3 The Contractor shall be paid _____% of the proportional amount of his Fee with each progress payment, and the balance of the Fee shall be paid at the time of final payment.

Article VII Changes in the Work

7.1 The Owner may make changes in the Work in accordance with the other provisions of this Agreement. The Contractor shall be reimbursed for Changes in the Work on the Basis of the Cost of the Work as defined elsewhere in this Contract.

7.2 The Contractor's Fee for Changes in the Work shall be as set forth in Paragraph 6.2, or in the absence of specific provisions therein shall be adjusted by negotiation on the basis of the Fee established for the original Work.

7.3 All Changes, alterations or omissions to be made in the Work as specified, shall be performed in accordance with a written agreement between the Owner and the Contractor executed prior to the the performance of those changes, alterations or omissions. The written Change Order shall define the amount of any increase or credit in price adjustment.

7.4 Neither party to this Contract shall assign the Contract or monies due hereunder without the prior written consent of the other.

7.5 Unless otherwise specifically agreed, the Work shall be performed during regular working days consisting of eight hours per day and five days per week. Should the Owner request overtime, then the Contract shall be increased to compensate for that additional overtime wage expense, including Labor Burden, and the loss of efficiency. (Refer to MCAA's Overtime and Productivity sections.)

Article VIII Costs to be Reimbursed

8.1 The term Cost of the Work shall mean costs necessarily incurred in the proper performance of the work and paid by the Contractor. Such costs shall be at rates not higher than the standard paid in the locality of the Work, except with prior consent of the Owner, and shall include the items set forth below in this Article VIII.

8.1.1 Wages and travel pay paid for labor in the direct employ of the Contractor in



the performance of the Work under applicable collective bargaining agreements, or under a salary or wage schedule agreed upon by the Owner and Contractor, and including such Labor Burden as herein after provided. For informational purposes, the current collective bargaining agreements provide for a gross hourly wage rate as below listed and such gross wage rate is subject to Labor Burden as provided in Paragraph 8.1.3.

8.1.2 Salaries and travel pay of Contractor's personnel when stationed at the field office, in whatever capacity employed. Personnel engaged, at shops or on the road, in expediting the production or transportation of materials or equipment, shall be considered as stationed at the field office and their salaries paid for that portion of their time spent on this Work.

8.1.3 A sum called "Labor Burden" in the amount of _____% of the cost of wages, salaries, travel pay, or other remuneration included in the cost of the Work under Paragraph 8.1.1 and Paragraph 8.1.2 above to cover the cost of such items as workman's compensation, occupational diseases and injuries and sick pay, public liability, property damage, State Unemployment, Federal Unemployment, FICA, health and welfare benefits as applicable, pension and old age benefits as applicable, education, apprenticeship, association dues, industry fund payments and small tool expense.

8.1.4 The portion of reasonable travel and subsistence expenses of the Contractor or his officers or employees incurred while traveling in discharge of duties connected with the Work.

8.1.5 The cost of all materials, supplies and equipment incorporated in the Work, including costs of freight and delivery charges, cartage, demurrage expenses, and any storage or warehouse expenses connected with the Work. The Cost of all materials, such as pipe, conduit, fittings, valves, boxes, devices, plates, hangers, fasteners, etc. will be assumed to be the net wholesale price listed in standard industry pricing guides and will not be based on individual invoices. The Cost of all items of major equipment will be based on invoices from suppliers.

8.1.6 Payments made by the Contractor to Subcontractors for Work performed pursuant to *subcontracts* under this Agreement.

8.1.7 The Cost, including transportation and maintenance, of all materials, supplies, equipment, temporary facilities and hand tools not owned by the workmen, which are consumed in the performance of the *work*, and costless salvage value on such items used but not consumed which remain the property of the Contractor. This includes such items as oxygen, acetylene, LP gas, nitrogen, welding rod, demurrage on cylinders, etc., for

Trade	Straight Time Rate	Overtime Rate	Effective Dates
Plumbers	\$	\$	
Steamfitters and Welders	\$	\$	
Sprinkler Fitters	\$	\$	
Sheet Metal Workers	\$	\$	
Electricians	\$	\$	



welding, soldering, testing, etc. This includes such items as electric power, water, gasoline, diesel fuel and oil for Contractor's equipment. This also includes such items as saw blades, drill bits, chisels, torch tips, fish lines, marking devices, etc.

8.1.8 Rental charges of all necessary machinery and equipment, exclusive of hand tools, used in the performance of the work, whether rented from the Contractor or others, including installation, minor repairs and replacements, dismantling, removal, transportation and delivery cost thereof. Rates for Contractor's equipment and tools are as listed in Contractor's Equipment Rental Rate List dated _____ or if not listed, but owned by Contractor, rates will parallel those listed in the MCAA or NECA Equipment Rental Rate Guide Manuals. Rates will be hourly, daily, weekly or monthly whichever is most economical for the Owner. Contractors vehicles used primarily for transportation will be charged out at \$_____ per day plus _____ cents per mile. Trucks used on the jobsite primarily for moving material and equipment will be charged out as equipment per the Equipment Rental Rate List.

8.1.9 Cost of premiums for all bonds and special insurance which the Contractor is required by this Agreement to purchase and maintain The Contractor's standard insurance, the cost of which is included in the Fee, is:

- Workmen's Compensation – Statutory
- General Liability, Bodily Injury and Property Damager – \$500,000/\$250,000
- Automobile Liability – \$500,000
- Umbrella Coverage – \$2,000,000

8.1.10 Sales, use or similar taxes related to the Work and for which the Contractor

is liable imposed by any governmental authority.

8.1.11 Permit fees, royalties, damages for infringement of patents and costs of defending suits therefore, and deposits lost for causes other than the Contractor's negligence.

8.1.12 Losses and expenses, not compensated by insurance or otherwise, sustained by the Contractor in connection with the Work provided that have resulted from causes other than the fault or neglect of the Contractor. Such losses shall include settlements made with the written consent and approval of the Owner. No such losses and expenses shall be included in the Cost of Work for the purpose of determining the Contractor's Fee. If, however, such loss requires reconstruction and the Contractor is placed in charge thereof, he shall be paid for his services a Fee proportionate to that stated in Paragraph 6.1.

8.1.13 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage, and similar petty cash items in connection with the Work.

8.1.14 Cost of removal of all debris.

8.1.15 Costs incurred due to an emergency affecting the safety of persons and property and the costs of any safety measures required to be taken to meet compliance with OSHA or any other safety regulations.

8.1.16 Costs of certification, testing and inspection expenses for any special work, such as certified ASME welding, including expense of certification of necessary personnel, such as welders.

8.1.17 Cost of all design, engineering and drafting expenses, of plan approval by



applicable authorities, printing, and blue-printing expense, expense of engineers and designers incurred while performing required field supervision, all in proportion to that incurred in the discharge of duties connected with the Work.

8.1.18 Cost of shop and as-built drawings, and operation, maintenance and spare parts manuals as may be required by the Work.

8.1.19 Cost of testing, balancing and adjusting systems, tagging and labeling system components, and instructing Owner's personnel in the operation of the systems and equipment.

8.1.20 Service reserve or warranty expense if specifically requested by the Owner—not normally included in this type of contract. Expense of warranty on systems and equipment components is included in the cost of those systems and equipment and is for the cost of those components only and does not normally include any labor expense allowance.

8.1.21 Other costs incurred in the performance of the Work if and to the extent approved in advance by the Owner.

Article IX Costs not to be Reimbursed

9.1 The term Cost of the Work shall not include any of the items set forth below in this Article IX.

9.1.1 Salaries or other compensation of the Contractor's personnel at the Contractor's principal office and branch offices.

9.1.2 Expenses of the Contractor's principal and branch offices other than the field office.

9.1.3 Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the Work.

9.1.4 Except as specifically provided for in Subparagraph 8.1.8 or in modifications thereto, rental costs of machinery and equipment.

9.1.5 Overhead or general expenses of any kind, except as may be expressly included in Article VIII.

9.1.6 Costs due to the negligence of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or for whose acts any of them may be liable, including, but not limited to, the correction of defective or non-conforming Work, disposal of materials and equipment wrongly supplied, or making good any damage to property.

9.1.7 The cost of any item not specifically and expressly included in the items described in Article VIII.

9.1.8 Costs in excess of the Guaranteed Maximum Cost, if any, as set forth in Article V and adjusted pursuant to Article VII.

Article X Discounts, Rebates and Refunds

10.1 All cash discounts shall accrue to the Contractor unless the Owner deposits funds with the Contractor with which to make payments, in which case the cash discounts shall accrue to the Owner. All trade discounts, rebates and refunds, and all returns from sale of surplus materials and equipment shall accrue to the Owner, and the Contractor shall make provisions so that they can be secured.



Article XI Subcontracts and Other Agreements

11.1 All portions of the Work that the Contractor's organization does not perform shall be performed under Subcontracts or by other appropriate agreements with the Contractor. The Contractor shall request bids from Subcontractors and shall deliver such bids to the Owner. The Owner will then determine, with the advice of the Contractor and subject to the reasonable objection of the Architect/Engineer, which bids will be accepted.

11.2 All Subcontracts shall conform to the requirements of the Contract Documents. Subcontracts awarded on the basis of the cost of such work plus a fee shall also be subject to the provisions of this Agreement insofar as applicable.

Article XII Accounting Records

12.1 The Contractor shall check all materials, equipment and labor entering into the Work and shall keep such full and detailed accounts as may be necessary for proper financial management under this Agreement, and the system shall be satisfactory to the Owner. The Owner shall be afforded access to all the Contractor's records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda and similar data relating to this Contract, and the Contract shall preserve all such records for a period of three years, or for such longer period as may be required by law, after the final payment.

12.2 The Contractor will furnish, if requested, all necessary lien waivers, affidavits and other documents required to keep the Owner's premises free from liens or claims or liens of all materialmen, *subcontractors* or laborers as payments are made under this Contract.

Article XIII Applications for Payment

13.1 The Contractor shall, at least ten days before each payment falls due, deliver to the Owner, or as may be directed, the Architect/Engineer, an itemized statement, notarized if required, showing in complete detail all monies paid out or costs incurred by the Contractor on account of the Costs of the Work during the previous period for which the Contractor is to be reimbursed under Article V and the amount of the Contractor's Fee due as provided in Article VI, together with payrolls for labor and such other data supporting the Contractor's right to payment for Subcontracts or materials as the Owner or the Architect/Engineer may require.

13.2 Unless otherwise provided in this Agreement, payments will be made on account of materials or equipment not incorporated in the Work, but delivered and suitably stored at the jobsite. In the event that materials and equipment are ready for delivery, but the Owner is unable to receive same, the Contractor shall have the right to bill the Owner for the amount of this material and equipment, and in addition, the Owner agrees to pay the Contractor any additional costs incurred for storage, insurance, redelivery expenses and other expenses to the extent that such additional expenses incurred by this problem.

Article XIV Payments to the Contractor

14.1 The Contractor will make _____ billings for work as it progresses and materials are suitably stored on the jobsite or stored at some other location as agreed to by the parties to this Agreement.

14.2 The Owner, or the Architect/Engineer if acting as an agent for the Owner, shall review the Contractor's Applications for Payment and shall promptly take appropriate



action thereon as provided in this Agreement. Such amount as is recommended for payment shall be payable by the Owner not later than _____ after the billing date.

14.3 In the event that the amount requested by the Contractor is not to be paid in full, for whatever reason, the Contractor shall be notified within the ten-day period specified in Section 13.1 as to the reason for failing to approve the full amount requested. If such failure to approve is merely because of the absence of some supporting documents or data, the Contractor shall have the opportunity to provide such necessary documents and the payment time table, as set forth elsewhere in this Agreement, shall not be lengthened.

14.4 An amount of _____% of each progress payment will be retained by the Owner until _____ completion of the Work with a maximum retention on the Work of _____. At appropriate times in the progress of the Work, the total amount retained by the Owner and due to the Contractor shall be reduced down to an amount equal to _____ of the value of the Work left to complete. Full payment of all amounts due to the Contractor shall be made to the Contractor within _____ after completion of the Work. Uncompleted minor punch list items or warranty repair items shall not be grounds for delay in final payment to the Contractor.

14.5 In the event that the actual Cost of the Work plus the Contractor's Fee is less than the Guaranteed Maximum Cost, the Owner will pay the Contractor _____% of the difference between the Guaranteed Maximum Cost and the actual cost, in addition to the Costs as defined herein, as an additional incentive.

14.6 A Finance Charge of _____% per month (annual percentage rate of _____%) will be added to each monthly billing for amounts not promptly paid on previous billings per other conditions of this Agreement.

Article XV Termination of Contract

15.1 The Contract may be terminated by the Contractor as provided in the Contract Documents.

15.2 If the Owner terminates the Contract as provided in the Contract Documents, he shall reimburse the Contractor for any unpaid Cost of the Work due him under Article V, plus (1) the unpaid balance of the Fee computed upon the cost of the Work to the date of termination at the rate of the percentage named in Article VI, or (2) if the Contractor's Fee be stated as a fixed sum, such an amount as will increase the payments on account of his Fee to a sum which bears the same ratio to the said fixed sum as the Cost of the Work at the time of termination bears to the adjusted Guaranteed Maximum Cost, if any, otherwise to a reasonable estimated Cost of the Work when completed. The Owner shall also pay to the Contractor fair compensation, either by purchase or rental at the election of the Owner, for any equipment retained. In case of such termination of the Contract, the Owner shall further assume and become liable for obligations, commitments and unsettled claims that the Contractor has previously undertaken or incurred in good faith in connection with said Work. The Contractor shall, as a condition of receiving the payments referred to in this Article XV, execute and deliver all such papers and take all such steps, including the legal assignment of his contractual



rights, as the Owner may require for the purpose of fully vesting in himself the rights and benefits of the Contractor under such obligations or commitment.

Article XVI Owner's Obligation and Duties

16.1 The Owner agrees to promptly pay the Contractor all amounts due on his payment requests per the other conditions of this Contract or, if not so promptly paid, to pay the financing charge as outlined elsewhere in this Contract as additional compensation to the Contractor to cover his additional financing expenses.

16.2 The Owner shall be obligated to reimburse the Contractor for all expenses the Contractor incurs while protecting the Contractor's rights under this Agreement. This shall include any appropriate legal or administrative action that the Contractor must take to protect the Contractor's interests, such as, but not limited to, attorney and accounting fees, court reporter fees, filing fees, the actual cost of effecting service of papers or providing witnesses, and expenses incurred by the Contractor.

16.3 The Owner shall be responsible for identifying and disclosing to the Contractor all concealed piping, ductwork, wiring, fixtures or other equipment or conditions which might be damaged, cause damage, or otherwise effect or be effected by the Work. In the event of damage, or a claim of damage without disclosure being given, the Owner shall waive and hold the Contractor harmless against all claims, suits, judgments and awards resulting therefrom.

16.4 The Owner shall be responsible for the structural ability of the premises to

contain the equipment in the manner and location specified in the Contract or shown on drawings, and Contractor shall not be liable for any failure, or damage resulting from such failure, of premises, due to such structural deficiency.

16.5 The Owner shall provide adequate fire insurance to protect the interest of the Contractor against loss or damage to equipment, materials and tools on the jobsite.

Article XVII Special Conditions and Arbitration

17.1 This proposal, when signed and accepted by the Owner, and approved by an authorized representative of the Contractor, shall constitute exclusively the *Contract* between the parties, which shall be governed and construed according to the laws of the State of _____, and all prior representations or agreements, whether written or verbal, not incorporated herein, as superseded.

17.2 All claims, disputes and other matters in question arising out of, or relating to, this Contract or the breach thereof, shall be decided by arbitration in accordance with the construction industry arbitration rules of the Construction Industry Arbitration Association then pertaining unless the parties mutually agree otherwise. This agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award by the arbitrators shall be final, and judgement may be entered upon it in accordance with applicable law in any court having jurisdiction thereof. Notice of the demand for arbitration shall be filed in writing within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such



claim, dispute or other matter in question would be barred by the applicable statute of limitations.

17.3 The Contract Documents, which constitute the entire agreement between the Owner and the Contractor, are listed in Article I and, except for Modifications issued after execution of this Agreement, are enumerated as follows.

- Agreement
- Conditions of the Contract—General, Supplemental, Other
- Drawings
- Specifications
- Addenda
- Modifications

This Agreement executed the day and year indicated below.

Respectfully submitted,

OWNER _____
 BY _____
 DATE _____

CONTRACTOR
 NAME _____
 BY _____
 DATE _____



Bulletin

Contract Terms and Conditions

This is a Bulletin on General Conditions which you can use regardless of the type of contract. The provisions set forth below are only suggestions as to format and content. You should independently of other contractors develop your own terms that you want to offer in the marketplace by way of **YOUR CONTRACT FORM. Be sure that your attorney and accountant tailor these general conditions to your particular needs and jurisdiction.**

The following **Terms and Conditions** may be appropriate for inclusion in contracts.

1. Seller guarantees the equipment and workmanship of the apparatus furnished under this contract, and will replace or repair any defects, not due to ordinary wear and tear, or to improper use or maintenance, which may develop within one year from date of completion. Seller further agrees to replace any refrigerant lost during that period, caused by defects in the installation, and not due to improper use or maintenance.
2. Seller shall have no liability for any defect in the design or manufacturer of any material or equipment, whether in connection with warranty or otherwise. Seller's liability with respect to the failure or malfunction of any material or equipment shall be limited to the cost of correcting any defects in installation, as further provided herein. At the option of Seller, in lieu of correcting any defects in installation, Seller may remove equipment installed and refund to Buyer all money paid for

said equipment and installation thereof, in which event the contract shall be deemed terminated and neither party shall have any liability whatsoever to the other. In no event shall Seller be liable for any consequential damages.

3. Unless otherwise agreed, it is understood that work will be performed during regular working hours. If overtime work is mutually agreed upon and performed, the additional price, at Seller's usual rates for such work, shall be added to the contract price.

4. Buyer shall provide Seller's workmen a safe place in which to work, and Seller shall have the right to discontinue work when, in Seller's opinion, Buyer has failed to comply with this requirement. Seller shall not be liable for any delay, loss, or damage caused by delay resulting from discontinuance of work under this provision. Buyer shall hold the Seller harmless for any loss, injury or other claim resulting from the Buyer's sole or partial negligence.

5. On delivery of equipment by Seller, or any part thereof, to the premises of Buyer, Buyer shall assume risk of loss or damage to such equipment and shall cause same to be insured in all respects against loss or damage in an amount to protect interest of Seller. Cost of insurance is to be paid by Buyer.

6. In the event that the material incorporated in this contract is ready for delivery and installation, and Buyer is unable to receive same, Seller shall have the right to bill Buyer for the amount of the material in accordance with the terms of the contract and also to provide suitable storage and insurance at the Buyer's risk and expense.

7. Seller shall not be held responsible or liable for any loss, damage, detention, or delay caused by accidents, strikes, lockouts, or by any other cause which is unavoidable or beyond Seller's control.

8. Title to the equipment remains in Seller until payment of the entire purchase price and all sums due Seller under this contract are fully made. All equipment, whether affixed to the realty or not, shall remain personal property and be deemed severable without injury to the freehold. Buyer shall do whatever may be required to maintain Seller's title.

9. In the event of default of payment of any installment or failure to perform any terms or conditions of this contract, or in the event that a proceeding in bankruptcy or insolvency be instituted by or against Buyer, or if equipment is misused, illegally used, or imperiled, then at Seller's option the entire unpaid balance due Seller shall become immediately due and payable without notice or demand and in such case Seller may enter the premises and retake, remove and hold or resell the equipment or any part thereof at either

private or public sale. If the unpaid balance plus interest is not satisfied by the proceeds of such sale after deducting the expenses of retaking, repairs necessary to place the equipment in saleable condition, storing, taxes, liens, attorneys' and collection agency's fees and other expenses in connection therewith, Buyer shall pay any deficiency as liquidated damages for breach of this contract. Seller shall retain all lien rights upon premises on which the installation is made, to the extent of the unpaid balance, until final payment is made.

10. Should Seller be delayed in performance by reason of any default on the part of Buyer of the terms and conditions of this contract, the entire contract price, less payments theretofore made, shall become due, and shall bear interest at the full legal rate from the date of billing.

11. Buyer shall be responsible for structural capability of the premises to accommodate the equipment in the manner and location specified in the contract or shown on drawings, and Seller shall not be liable for any failure, or damage resulting from such failure, of premises, due to such structural deficiency.

12. Buyer shall keep equipment free of tax liens and other encumbrances, shall not remove said equipment from the premises without written permission of Seller, and shall not transfer any interest in said equipment or in this contract without written consent of Seller until all payments due hereunder have been made.

13. Any price or prices herein set forth shall be increased in an amount or amounts equal to the tax or taxes which may be assessed on the equipment supplied hereunder, or which may be

due or become due from Seller, or which Seller may be required to pay with respect to this contract as a result of any excise, sales, use, occupation, or similar tax not now in effect but hereafter imposed or made effective by the United States Government or any state or local government.

14. Buyer acknowledges the potential for unforeseen material cost escalations that are beyond the control of the Seller. Seller shall provide Buyer with notice of material escalation greater than ___% within ___ days of occurrence. Seller shall provide Buyer a baseline of the published costs as of the proposal date (or contract date). Buyer shall reimburse Seller for the increased material costs over and above the baseline published costs.

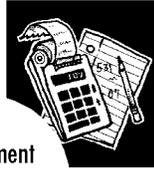
15. Upon completion of the installation, Seller shall fully instruct Buyer as to the operation and maintenance of equipment installed. If within a period of one year after the equipment supplied hereunder was installed, Seller has not received from Buyer in writing a claim that said equipment as supplied and installed does not fulfill the terms and conditions of this contract, specifying in what particulars it fails to do so, Buyer shall be deemed as having acknowledged that said equipment as supplied and installed does fulfill said terms and conditions.

NOTE: This provision must be consistent with any more-detailed warranty provisions as referenced in paragraph 2 above.

16. Buyer shall not assign this contract or any rights thereunder without Seller's written consent.

17. This proposal, when signed and accepted by the Buyer, and approved by an authorized representative of _____, shall constitute exclusively the entire contract between the parties, and all prior representations or agreements, whether written or oral, not incorporated herein, are not part of this contract and are expressly superseded.

18. This contract is not valid unless approved by a duly authorized representative of _____.



Management
Methods
Manual



Bulletin

Bulletin No. CT 3
File: Contracts

Payments Clause

One of the most important clauses in any subcontract is the Payments clause. General contractors are trying to hedge more and more on their obligation to pay you in a timely manner by making your payment dependent upon payment by the owner of the general contractor's entire billing.

Here is a typical Payments clause in a general contractor's "form" subcontract:

"The Contractor shall pay the Subcontractor monthly payments within seven (7) days of the receipt by the Contractor from the Owner of payment for work performed by the Subcontractor. The amount of each such monthly payment shall be equal to the percentage of completion of the work of this subcontract applied to the subcontract sum, plus any amounts allowed the Contractor for materials and equipment suitably stored by the Subcontractor. Payment to the Subcontractor under this Subcontract will be made to the Subcontractor only to the degree

payments are made by the Owner to the Contractor." (See Note 1 at end of this bulletin.)

The underscored sentence is the kind of language for which subcontractors should be on guard.

Many variations of the conditional payment language contained in the underscored sentence can be found in subcontract agreements proposed by general contractors, any of which can put *you* on the hook. This sort of language makes payment to you dependent not only upon your satisfactory accomplishment of the work which you have contracted to do (often within a particular period of time) but also dependent in large degree upon the relationship between the owner and the general contractor. If the general contractor runs into difficulty, justified or unjustified, with the owner or fails to be aggressive in collecting from a slow paying or defaulting owner, and conditional payment language is in your subcontract, the general contractor may be able to refuse to pay you. (See Note 2.)



The general rule in some states is that if your subcontract contains language similar to the underscored sentence quoted above, the general contractor need not pay you until he has been paid. This can even lead the contractor to fail intentionally to collect from the owner, particularly at the time of final payment, if the general contractor is withholding a higher rate of retainage from the subcontractors than the owner is retaining from his payments. The contractor can then profit by investing the extra retainage he is withholding from you until he has to make your final payment after he receives his final payment.

Some general contractors have seemingly attempted to be more equitable and provide language in the pertinent portion of the Payments clause somewhat like the following;

“Except where non-payment is the direct result of the fault of the General Contractor, it is understood and agreed that the Subcontractor hereunder will be paid for work performed only in the proportionate amount as the Contractor is paid by the Owner for said work.”

Such a provision as the underscored portion above usually proves to be meaningless as far as practical result is concerned. You do not have to use much imagination to understand that for you to prove that the withholding of a payment by the owner “is the direct result of the fault of the general contractor” is extremely difficult, and a lawsuit where you need to prove this fact before you can be paid could be almost as costly as the amount you are owed.

So do not be trapped by this type of exception. Whether a provision of the kind just discussed is contained or whether the subcontract simply states that your payments are

dependent upon receipt of payment for such work from the owner, the practical result is often the same.

A far better alternative is to insert the following clause:

“provided, however, these provisions shall not be applicable if payment is withheld by the Owner by Reasons of Acts of, or nonperformance by, the Contractor or any other Subcontractor.”

We understand that your ability to change the form presented to you by the general contractor as his “form” or “standard” subcontract is, to a great degree, dependent upon the relative bargaining power you have with the general contractor. In a number of instances, however, we have found that where there is a close relationship between the subcontractor and the contractor, the subcontractor may be able to persuade the general contractor to eliminate these types of contingent conditions over which the subcontractor has absolutely no control.

If you encounter difficulty getting a general contractor to eliminate these types of conditions, suggest the use of language similar to that contained in the American Institute of Architects (AIA) subcontract form, which is known as AIA Document A401. Here is language giving the subcontractor the benefits of Articles 11 and 12 of the 12th edition, 1987, of A401:

“The Contractor shall pay the Subcontractor each progress payment and the final payment within three working days of receipt of payment from the Owner for the Subcontractor’s Work. If the Contractor does not receive



payment for any reason which is not the fault of the Subcontractor, the Contractor shall pay the Subcontractor on demand a payment calculated as below. The amount of each payment to the Subcontractor shall be the amount to which the Subcontractor is entitled, reflecting the percentage of completion of the Subcontractor's work applied to the Subcontract Sum, plus materials and equipment which have been delivered and suitably stored by the Subcontractor for subsequent incorporation in the Work, plus undisputed amounts for changes in the Work which have been executed by the Subcontractor, less withheld retainage at a rate no higher than provided for in this Subcontract and at no greater percentage than that actually withheld by the Owner from payments to the Contractor on the Work of the Subcontractor, less the aggregate of previous payments to the Subcontractor."

A401 also contains auxiliary payment provisions which should be contained in every subcontract. Paragraph 3.2.3 of the 1987 edition permits the subcontractor to obtain directly from the architect information on percentage of completion and amount certified by the architect for the subcontractor's work. Paragraph 4.7.1 gives the subcontractor the right to stop the work until paid in a timely manner and recover his reasonable costs of shutdown, delay and start-up. Under paragraph 7.1.1 of the 1987 version, you may terminate the subcontract if not paid amounts due for 60 days or longer, and you are then entitled to recover from the contractor payment for work executed and for

losses with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages. Another clause that might give you additional protection in the event of your stopping work or terminating the subcontract is one that specifies your right to recover all coordinated drawings, shop drawings, "as-built" drawings, and tools and materials supplied by you but not incorporated into the work and not yet paid for by the contractor.

Please refer to the AGC/ASA/ASC Standard Form Construction Subcontract. Developed through the joint efforts of the Associated General Contractors of America, the American Subcontractors Association and the Associated Specialty Contractors, this document is intended to be generally compatible with A201, the American Institute of Architects' General Conditions of the Contract for Construction, 1987 Edition. Published in 1994, it contains 19 pages with general instructions.

Conclusion

The ultimate purpose of any contract is to assure that you get paid if you perform according to your contract. Carefully drafted language in a Payments clause should assure this result; and, at the least, provide you with as many remedies as possible if you do not get paid as agreed.

Notes:

1. Frequently, the Retention clause is mentioned at this point in a Payments clause. We have not included it here, so as not to complicate this discussion of the Payments clause.
2. On U.S. Government construction contracts, general contractors are required to furnish a "labor and material pay-



Contracts

ments bond." These bonds are intended to assure payment of subcontractors for all labor expended and materials furnished by them in performing their work under the contract. These are known as Miller Act bonds (named after the Congressman who sponsored the bill enacted by Congress requiring such bonds to be furnished on U.S. Government construction contracts). Most federal courts have held that regardless of the language of the payments clause in a subcontract between a general contractor and the subcontractor on a U.S. Government construction con-

tract, if the subcontractor has performed work and furnished materials for such contract, he can bring a "Miller Act" suit against the general contractor for payment for such work performed and materials furnished, regardless of whether the general contractor has been paid by the U.S. Government. The procedure to be followed establishing the basis for such a claim and the method of filing suit, although not strictly a matter of contract clause, is an important issue and you should contact legal counsel for assistance.



Bulletin

Disputes and Arbitration Clauses

Because disputes in the performance of construction contracts are common, it is important for subcontracts to contain a disputes clause or a clause providing for arbitration of disputes. The failure of your subcontract to include a specific clause governing the handling of disputes renders you subject to general language such as "work to be performed to the satisfaction of the general contractor" or "decisions of the architect are final", or language of similar import which is characteristic of many general contractors' subcontract forms. If your subcontract does not contain a disputes and arbitration clause, your control over the acceptability of your work is materially diminished, since the general contractor, owner or architect has sweeping latitude to determine what work is included in the contract and what constitutes acceptable performance of your contractual obligations.

Without a disputes and arbitration clause, disputes which cannot be solved by negotiations between you and the general contractor must be resolved by time consuming and expensive litigation. Even if you win

at the end, the victory may be of little solace when viewed in the context of the time and money you spent to assert your claim successfully.

The mere presence in your subcontract of a disputes clause and an arbitration clause to govern the settlement of disputes may not be sufficient to provide any significant protection to you; they must be properly drafted and must have teeth. Clauses which simply recite that disputes can arise during performance of the work, but which fail to establish any specific methods or procedures for defining and handling such disputes, can be worse than no clause since they can foster a false sense of security.

In order to protect you adequately, the contractual clause governing disputes must provide specifically for your rights and remedies. From your viewpoint, it is no better to have a disputes clause which does not establish with clarity the precise types of disputes covered by the provision, or to have an arbitration clause which fails to specify with



particularity the procedure to be followed in the resolution of such disputes, than it is to have no disputes or arbitration provisions at all; the likely result in either case will be protracted and costly litigation.

Thus, to protect yourself, you should be sure that your subcontract contains a disputes clause which defines what types of disputes are included within the clause and an arbitration clause which clearly outlines your remedies and the procedures available for establishing your claim. It is not necessary that there be two separate and distinct clauses governing disputes on the one hand and arbitration on the other. Provisions relative to disputes and arbitration often appear in the same paragraph or subparagraph of the contract. You should be able to determine the scope of disputes covered by the disputes clause by simply reading the provision. Similarly, the procedure for resolving the disputes should be clearly and completely spelled out in the clause. How is notice of a demand for arbitration to be given? How are arbitrators to be selected? What happens in the event the parties are unable to agree upon an impartial arbitrator? Is the decision of the arbitrators binding and final? Who is to bear the cost of the arbitration? A comprehensive arbitration clause should contain the answers to each of these questions. Here is an example of an arbitration and disputes clause which has been used in some subcontracts and specifies with reasonable particularity the rights and remedies of the parties to a subcontract:

“In the event of any disagreement arising under this Subcontract, upon written notice by either party to the other, the Subcontract shall be submitted to three arbitrators for decision. Each party shall choose one

arbitrator within ten (10) days after receipt of such notice, the third to be chosen within ten (10) days by the two thus selected. However, if within the time stipulated the two arbitrators appointed by the parties do not agree upon a third, or a party who has been notified of a disagreement fails to appoint an arbitrator within the aforesaid period of ten (10) days, then a third arbitrator or an arbitrator to represent the party in default, or both such arbitrators, upon petition of the nondefaulting party, shall be appointed by a judge of a Court of general jurisdiction where the work is being performed. The decision of a majority of said arbitrators shall be final and binding upon both parties to this Subcontract and judgment thereon may be entered by any Court of competent jurisdiction. Such arbitrators' decision shall be delivered to each party in writing on or before thirty (30) days after the submission of the matter to them for their decision. Each party shall pay the cost and expense of the arbitrator it selects, but the cost and expense of the third arbitrator and the remainder of the expense of the arbitration shall be borne equally by the parties hereto.”

That clause answers all the questions posed in the preceding paragraph and furnishes you as the subcontractor with sufficient knowledge of the rights and remedies available to you in the event a dispute arises. Some persons do not like involving the courts even to the extent of naming the neutral arbitrator. They prefer use of the American Arbitration Association selection mechanism as follows:



Appointment from Panel

If the parties have not appointed an arbitrator and have not provided any method of appointment, the arbitrator shall be appointed in the following manner:

Immediately after the filing of the Demand or Submission, the AAA shall submit simultaneously to each party to the dispute an identical list of names from the Panel. Each party to the dispute shall have seven days from the mailing date in which to cross off any names to which it objects, number the remaining names to indicate the order of preference, and return the list to the AAA. If a party does not return the list within the time specified, all persons names therein shall be deemed acceptable. From among the persons who have been approved on both lists, and in accordance with the designated order of mutual preference, the AAA shall invite the acceptance of an arbitrator to serve. If the parties fail to agree upon any of the persons names, if acceptable arbitrators are unable to act, or if for any other reason the appointment cannot be made from the submitted lists, the AAA shall have the owner to make the appointment from among other members of the Panel without the submission of any additional list.

Direct Appointment by Parties

If the agreement of the parties names an arbitrator or specifies a

method of appointing an arbitrator, that designation or method shall be followed. The notice of appointment, with the name and address of the appointing party, shall be filed with the AAA by the appointing party. Upon the request of any such appointing party, the AAA shall submit a list of members of the Panel from which the party may make the appointment.

If the agreement specifies a period of time within which an arbitrator shall be appointed and any party fails to make such appointment within that period, the AAA shall make the appointment.

If no period of time is specified in the agreement, the AAA shall notify the parties to make the appointment and if within seven days mailing of such notice such arbitrator has not been so appointed, the AAA shall make the appointment.

Appointment of Arbitrator by Party-Appointed Arbitrators

If the parties have appointed their party-appointed arbitrators or if either or both of them have been appointed as stated above, and have authorized such arbitrators to appoint an arbitrator within a specified time and no appointment is made within that time or any agreed extension thereof, the AAA shall appoint the arbitrator who shall act as chairperson.

If no period of time is specified for appointment of the third arbitra-



tor and the party-appointed arbitrators do not make the appointment within seven days from the date of the appointment of the last party-appointed arbitrator, the AAA shall appoint the arbitrator who shall act as chairperson.

If the parties have agreed that their party-appointed arbitrators shall appoint the neutral arbitrator from the Panel, the AAA shall furnish to the party-appointed arbitrators, in the manner prescribed above, a list selected from the Panel and the appointment of the arbitrator shall be made as prescribed in that section.

Arbitration of disputes through such mechanisms is being increasingly utilized by the construction industry. The procedures are generally less formal than court proceedings and disputes are resolved much more rapidly. Two notes of caution should be sounded, however.

First, arbitration is not necessarily inexpensive. Many good arbitrators charge \$100

or more an hour for their services—and these charges include study time before and after a case is submitted. Under AAA procedures, however, the first day of each arbitrator's time may be provided at no charge except for out-of-pocket expenses.

Second, arbitrators rarely give reasons for their ultimate findings but simply make an award in money or issue a directive to the losing party to take specified actions. The absence of detailed findings is frequently frustrating to the losing party but, all in all, it contributes substantially to the rapid resolution of claims. In most cases, the arbitrators' award terminates the claim procedures. The courts will not permit a losing party to re-try his case if he had a fair hearing through arbitration.

Finally, even though the procedures are less formal, we recommend that you use capable trial counsel in the presentation of an arbitration case. A lawyer is generally better equipped to present such matters than is the layman and a well-coordinated presentation may determine the outcome in a close case.



Management
Methods
Manual

Bulletin

Bulletin No. CT 5
File: Contracts

AIA A201 General Conditions of the Contract for Construction

Containing the contractual provisions on administration of the contract, relationships of the various parties, and legal rights and obligations, the general conditions of construction contracts equal the drawings and specifications in importance and may well determine whether or not the project is profitable. When standard documents are used, contractors, subcontractors, owners, architects and their lawyers can become familiar with the language and do not have to scrutinize every paragraph each time a project is bid or a notice is given.

Document A201, General Conditions of the Contract for Construction, published by the American Institute of Architects is the most commonly used standard general conditions document on private and much non-federal construction and surpasses all other AIA documents in sales—totalling well over 100,000 copies annually. It is used in conjunction with brief owner-contractor agreements, such as A101 or the owner's own form, supplementary

conditions prepared by the architect and owner to cover unique conditions not adequately covered by the standard document, and, of course, drawings and specifications. AIA also publishes a short form owner-contractor agreement, A107, that combines in a single form the most essential parts of A101 and A201. Its language on all subjects covered is copied from A201 and A101.

A201 and every other set of general conditions are as important to mechanical as to general contractors. Most subcontracts adopt by reference the provisions of the general conditions in the prime contract. In addition, mechanical contractors often serve as separate prime contractors of the owner so the general conditions become an intrinsic part of their contracts.

The AIA strives to make A201 a consensus document and consults with representatives of various affected parties in revising the document, which is now done approximately



every 10 years. First published in 1911, the 1987 edition is the 14th Edition of A201 and was in revision for several years, as was the 1976 version.

Although there are clauses in this as in any document that are not everything a subcontractor or prime contractor might wish, the 1987 A201 is a fair and workable document that allocates risks reasonably and should help in the orderly management of construction projects. Set forth below are major provisions of A201, some of which were not significantly changed. Their contents have been summarized for your convenience.

Important Provisions of A201-1987

(Note: Numbers refer to paragraph or article numbers of A201. Paragraphs that were changed substantively in 1987, or are new, are indicated with *.)

Copies

1.3.1 Contract documents reproduced by contractors and subcontractors for use in executing the work must bear the copyright notice and be used for no other purpose.

Owner's Ability to Pay

*Paragraph 2.1.2 requires the owner to furnish the information needed to perfect contractor's lien rights, and 2.2.1 requires evidence that financial arrangements have been made to fulfil the owner's obligations under the contract. (You would be wise to ask the general contractor for this information before signing a subcontract agreement.)

Contractor's and Subcontractors' Responsibilities

*3.2.1 Failure to report to the architect any errors or omissions you have noted in the

contract documents may subject you to shared liability, especially if you start performing any of the work involved.

Warranty

*3.5 You warrant that your work will be free from faults not inherent in the quality required or permitted by the specifications and agree that unauthorized substitutions may be considered defective. A new provision requested by ASC excludes contractor warranty liability for damage or defect caused by abuse, modification not executed by the contractor, improper or insufficient maintenance, improper operation, or wear and tear in normal usage. (This new protection, which is also in the 1987 edition of A401, the AIA subcontract agreement, is of special value to mechanical contractors.)

Codes

3.7 It is not your responsibility to determine that contract documents conform to laws and codes, but if you observe any variance, notify the architect in writing and perform no such work without notice to the architect and owner.

Approval of Submittals

3.12 You cannot proceed with work requiring submittal of shop drawings, product data and samples until the submittal has been approved by the architect, which he is to do promptly, but taking sufficient time to make an adequate review. Approval of a submittal including a deviation from the contract documents will not relieve you of responsibility for the deviation unless you specifically notified the architect in writing (through the general contractor if you are a subcontractor) that the deviation is included.



Indemnification

*3.18 After long effort by ASC and ASA, the indemnification (hold harmless) clause has been modified to the mildest form of indemnity, in which you hold others harmless for damages resulting from your performance only to the extent the damage was caused by negligent acts or omissions of anyone for whose acts you are liable. This should result in reduction of your contractual liability insurance premiums.

Contract Administration

*4.2 Requested interpretations are to be given by the architect within 15 days after written request by a prime contractor. Such interpretations are to be consistent with the contract documents and reasonably inferable from them.

Claims

*4.3 This section on claims has been completely rewritten but does not substantially change past practices. All claims must be submitted to the owner or prime contractor in writing within 21 days after occurrence of the event giving rise to the claim or after the claimant first recognizes the condition.

(Note: Since prime contractors must give 21 days' notice to recover from claimable conditions, it is imperative that subcontractors give notice to prime contractors several days before that deadline.)

Concealed or unknown conditions giving rise to claims for an increase in compensation or time shall not be disturbed until written notice by the architect, nor may any other work for which adjustments are claimed be performed without written instructions except in emergencies. All claims must be made promptly in writing.

Arbitration

*4.5 If either party is unwilling to accept the architect's ruling on a dispute or claim, an arbitration case may be filed with the American Arbitration Association.

This can also be done if the architect has not rendered a decision within 45 days. Normally you can file for arbitration up to the date when legal proceedings are barred by a statute of limitations, but if the written decision of the architect states his decision is final but subject to arbitration, demand for which must be made within 30 days after the architect's decision is received, you will forfeit your chance to arbitrate if you do not file within the deadline. (As in the case of other notices, subcontractors must act within a shorter period to give the prime contractor time to comply with A201.) The 30-day procedure is not often used but it can expedite settlement of disputes that threaten to delay jobs or require later demolition of work placed over nonconforming work.

Construction by the Owner or by Separate Contractors

If you sometimes hold A201 contracts as a separate prime contractor, you need to be aware that Article 6 requires each separate contractor to participate with the others and the owner in reviewing and changing schedules to fit everyone's requirements. You must also report to the architect any discrepancies or defects in the work of other contractors or the owner that would make it unsuitable for your follow-on work.

Changes

*Article 7 establishes a new document called a Change Directive, which replaces unilateral change orders for which prices have



not been agreed upon. After agreement of the contractor is accomplished, a Change Directive may be converted to a Change Order. As before, the contractor must perform as ordered whether price has been agreed upon or not. A Change Directive states the owner's and architect's proposal for adjusting price and time, and the contractor must tell the architect whether he agrees or disagrees with the proposal. You may include undisputed charges for either Change Order or Change Directive work in progress billings.

Payments and Completion

*Article 9 AIA intends in this and other documents pertaining to requisitioning procedures, such as Division 1 and A511, Guide to Supplementary Conditions, to tighten general contractors' obligations to give evidence of payment of subcontractors. A201 alludes to this in stating the payment applications are to be supported by such data as copies of requisitions from subcontractors (which would indicate delinquency for past periods). ASC and ASA were successful in getting Subparagraph 9.3.1.2 added; it prohibits contractors' applications for payment from including any amounts the contractors do not intend to pay subcontractors because of disputes or other reasons. 9.3.3 was changed also at ASC and ASA's suggestion; it now requires that the contractor warrant when applying for payment that all work for which payment has previously been received is free from liens or encumbrances in favor of subcontractors. If a contractor bills under this provision without having paid subcontractors from previous payments, he will be committing fraud.

Stored Materials

9.3.2 says payment shall be made on account of materials and equipment delivered

and suitably stored on-site for future use and may be made for materials stored off-site at an approved location if approved in advance by owner. You can initiate a request for such owner approval through the contractor and architect.

Certificate for Payment

9.4 The architect is to issue a certificate for payment within seven days after receiving the contractor's application or notify the contractor of his reasons for withholding the certificate. He does not have to notify subcontractors, but 9.6.3 authorizes subcontractors to request from the architect information on what the contractor has applied for in connection with their part of the work and what disposition the architect and owner have made of the application.

Subcontractor Payments

9.6.2 The contractor shall promptly pay each subcontractor, upon receipt of payment from the owner, out of the amount paid to the contractor on account of such subcontractor's work, the amount to which the subcontractor is entitled, reflecting percentages actually retained from payments to the contractor on account of such subcontractor's work. Contractors are to require each subcontractor to pay sub-subcontractors in the same way.

Stop Work

9.7.1 permits the contractor to stop work after certain notices if the architect does not certify payment or the owner does not pay within seven days after the due date. In such event, the contract time is to be extended and the contractor paid reasonable cost for shut-



down, delay and start-up. Subcontractors should receive their share of such damages, of course.

Substantial Completion

9.8 When work is complete enough for the owner to occupy or use it for its intended purpose, the architect will issue a certificate of substantial completion and specify responsibilities of the owner and contractor for security, maintenance, heat, utilities, damage to the work, and insurance. (Most such responsibilities transfer to the owner.) Warranties commence on the date of substantial completion. As long sought by ASC and ASA, line item substantial completion is possible; a portion of the total project can be designated substantially complete if the owner has agreed to accept that portion separately. If the contract provides for reduction of retainage or release of most retainage on the date of substantial completion, this adjustment should be made for the accepted portion. The owner, architect, contractor and subcontractor also agree on punch list items to be completed or corrected to complete the job in accordance with the contract documents.

*9.9 Partial Occupany. This new clause permits the owner to occupy or use any completed or partially completed portion of the work at any time under the same conditions as substantial completion for that portion, with the owner and contractor agreeing in writing to the period for correction of the work and commencement of warranties.

Final Completion

9.10 If final completion is materially delayed through no fault of the contractor after substantial completion or because of change

orders, final payment is to be made, including release of retainage, for fully completed and accepted portions. Such partial final payment does not result in a waiver of claims by the owner as a regular final payment does.

Waiver of Claims

By accepting final payment, the contractor or a subcontractor waives all claims except those previously made in writing and indicated as unsettled at the time of final payment application. (As a subcontractor, you should repeat in writing all unsettled claims against either the owner or general contractor when billing for final payment, repeating again before the contractor's application for final payment if that occurs some time after yours.)

Hazardous Substances

*10.1.2 Proposed by ASC, this important new clause is timely in these days of "Right-to-Know" regulations and laws and great attention to chemical hazards. Identical provisions are made in A401. If asbestos or PCB is reasonably believed to be on the jobsite, the contractor is to stop work and report the condition. Work may not resume until the owner and contractor have agreed in writing if the material is asbestos or PCB and has not been rendered harmless. The contractor shall not be required to perform work relating to these hazards, and the owner shall indemnify the contractor and others against damage from PCB or asbestos that has not been rendered harmless.

Insurance and Bonds

*Article 11 The contractor must be covered for workers' compensation, employee and public liability, personal injury liability, motor vehicle and contractual liability without



interruption from the date of commencement until the date of final payment and beyond that until termination of any coverage required to be maintained after final payment, whether policies are written on a claims-made or occurrence basis. The owner must maintain all-risk property insurance in the amount of the contract plus change orders, including the interest of the contractor, subcontractors and sub-subcontractors. If the property insurance requires minimum deductibles, the contractor must pay costs not covered because of the deductibles, but the owner will pay for costs not covered because of voluntary deductibles. The owner waives rights of action against the contractor for loss of use of the owner's property, including consequential losses due to fire or other hazards, whether insured or not.

*11.4.2 Payment Bonds. The contractor is to furnish promptly to any requesting subcontractor who is a potential beneficiary a copy of any payment bond furnished to the owner, or allow a copy to be made. (ASC and ASA were instrumental in getting this important provision, and you should make the request immediately after, or even before, you have signed a subcontract on a bonded A201 job. Unless you have a copy in your file, giving times and places to file claims, you may be unable at a future time of non-payment by the general contractor to make a claim on the bond. By then the contractor may not be available or willing to give you the copy.)

Uncovering and Correction of the Work

Article 12 provides that the contractor may be required at his expense and with no time extension to uncover work for inspection if it was covered contrary to the architect's request or to requirements in the contract doc-

uments to leave it uncovered for observation. Other portions are to be uncovered at the architect's request, also, but if such work is found to be in conformance with the contract documents, the owner must pay the cost of uncovering and replacement. The contractor must pay the cost of correcting all work rejected by the architect for failing to comply with the contract documents whether rejected before or after substantial completion, including the costs of additional testing and inspections and compensation for the architect's services and expenses made necessary thereby.

*12.2.2 One-Year Correction Period.

The contractor must correct nonconforming work discovered within one year after substantial completion. Under 1987 changes, the one-year period extends from the time of performance of work first performed after substantial completion of the job or a portion. This time period relates only to the contractor's obligation to correct the work and is unrelated to the legal obligation to comply with the contract documents which may be enforced under statutes of limitations.

Notices

13.3.1 To make sure the notices you must give for various purposes are legally recognized, see to it that they are delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which they are intended, or send them by registered or certified mail to the last business address known to you. Oral notices or notes to others, such as employees of the architect, contractor, or owner may not hold up.

Test and Inspections

Under 13.5, the contractor is to notify the architect when and where tests and inspec-



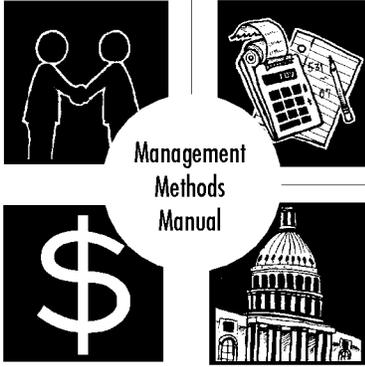
tions are to be made by public inspectors. The contractor pays for tests and inspections required by the contract documents, but the owner pays for any which were not required until after bidding. When additional inspection or tests are ordered by the architect, owner or a public authority and such tests reveal failure of the work to conform to the contract documents, the contractor must pay the cost of correcting, including repeated procedures and compensation for the architect's additional services and expenses.

Termination or Suspension of the Contract

Article 14 The contractor may terminate the contract if the work is stopped for 30 days or more through no act or fault of the contractor or a subcontractor, including lack of timely payment, delays and interruptions by the owner, or failure of the owner to furnish evidence of its ability to finance the balance of the job. Upon termination, the contractor is entitled to payment for work completed and proven losses, including rea-

sonable overhead, profit and damages. The owner may terminate the contract for persistent failure of the contractor to supply enough properly skilled workers or materials, failure to pay subcontractors, disregard of laws or codes, or other contract breaches. The owner has the right to take possession of the site and of all materials, equipment, tools, construction equipment and machinery owned by the contractor, accept assignment of subcontracts, and finish the work by whatever means the owner deems expedient. If costs exceed the unpaid balance, the contractor owes the balance.

*14.3 Suspension. This new clause gives owners similar rights to those of government agencies in ordering the contractor to suspend, delay, or interrupt the work for whatever period the owner chooses. Unlike Federal work, however, the contractor pressing a claim for compensation under the A201 clause may include profit as well as adjustment for the increased cost of performance. No adjustment shall be made if performance was or would have been delayed by the contractor.



Bulletin

Warranty

Note: All warranty provisions must be negotiated between the individual contractor and any other party to a particular contract. It is unlawful for contractors to agree among themselves to employ any particular form or terms of warranty since, like prices or bids, warranty provisions are competitively important terms of sale.

Most construction industry contract specifications include an express requirement that the contractor provide a written statement of warranty for mechanical work that is usually in force for one year from the date of acceptance by the owner or his authorized representative. Of course, depending on the customer, the normal period of warranty is sometimes extended for special reasons. In some instances, it is advisable for the contractor's warranty period to begin as of the date the owner or user has beneficial use of the mechanical system, in whole or in part.

In the event that a mechanical system or a separate apparatus, or component is put to beneficial use by any party, other than the installing contractor, with the authorization of the owner or his agent, the warranty period should commence upon the beneficial use of such system, equipment or component.

Separate letters of warranty should be submitted to the owner or his agent, documenting clearly items turned over and their respective warranty dates. Of course, all warranty provisions must be negotiated between the individual contractor and other parties in each transaction. It is unlawful for contractors to agree among themselves to employ any particular form of warranty since, like price, a warranty provision is a competitively important term of sale.

Mechanical construction industry products and equipment usually carry written manufacturer's warranties that are in force for a period of one year from the date of shipment and do not cover damages in shipment or abuse by other trades occurring before acceptance by the contractor. Matters such as contract specification requirements, project duration and project conditions should be



taken into account in negotiating terms and possible extension of the warranty period with suppliers of materials and equipment at the time of bid preparation and/or order placement. When equipment is ordered early for storage on site, the normal manufacturer's warranty will usually expire before the equipment is started for testing. In that event, an extended warranty should be negotiated or purchased from the manufacturer. This is generally no problem if the manufacturer performs start-up service on the equipment.

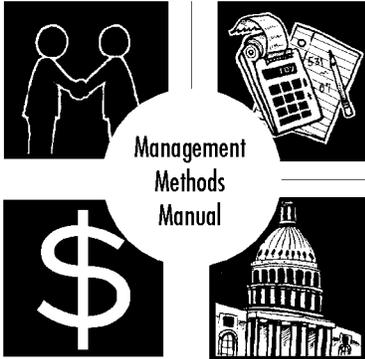
Important maintenance or operation by an owner has frequently presented problems and should be excepted, in writing, in a warranty provision.

In this regard, the General Conditions of the Contract for Construction prepared by the American Institute of Architects (AIA Document A201, 1987 edition) expressly excludes "remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage."

Unless the documents clearly state otherwise, there is also usually an implied

warranty in every transaction or contract that requires the product or goods to be reasonably fit and sufficient for the purpose for which they are to be used. For example, when a manufacturer supplies a product which he has recommended for a specific use or need, in response to performance specification, there is an implied warranty that the product will perform for that purpose. When an owner requires a contractor to build in accordance with plans or specifications supplied or prepared by an architect/engineer, the owner implicitly warrants that those plans and specifications will be sufficient to achieve the desired result, and the contractor's letter of warranty is based on this premise.

To obtain the maximum advantage of the implied warranty of fitness, the supplier should be notified of the specific use to be made of the goods, and he should understand that his recommendations are being relied upon. If the buyer (owner or his agent) asks for a precise item by manufacturer and model number for a particular brand of goods, or goods having a patent, there is no implied warranty of fitness from the contractor since the buyer is not relying on the contractor's judgment, but on the supplier's own.



Bulletin

Cautions for Contractors: Asbestos Hazards

MCAA members are cautioned to investigate the possibilities of encountering asbestos before entering into contracts for retrofit or renovation work, particularly in buildings constructed prior to 1975. The OSHA requirements apply to any work with asbestos, regardless of the amount encountered or likely to be encountered.

It is suggested that MCAA contractors provide themselves additional protection by including appropriate clauses in contracts for work where asbestos is likely to be encountered. A "model" wording for such clauses is shown below.

A contractor who finds asbestos at a work site, or has reason to believe asbestos is present, should notify the owner or owner's representative verbally immediately, and follow with prompt notification in writing. If an "asbestos clause" is in the contract, the contractor should cite pertinent provisions in the contract including who has responsibility for asbestos removal. The building owner (or representative) normally is responsible for having the job site surveyed by a firm that specializes in such work, and then arranging for safe removal and disposal of any asbestos encountered.

Asbestos Clause:

1. The work provided for in this contract shall not include the detection,

abatement, encapsulation or removal of asbestos or products or materials or equipment containing asbestos.

2. This clause shall supersede any conflicting or inconsistent clause of the General Contract, general conditions of the contract, special conditions, technical conditions, plans or specifications.

3. In the event that the contractor encounters any asbestos products or material in the course of performing its work, the contractor shall have the right to discontinue its work and remove its employees from the project, or that portion of the project wherein such product or materials was encountered, until such products or materials, and any hazards connected therewith are abated, encapsulated, or removed, and/or it is determined that no hazard exists; further, contractor shall receive an extension of time to complete its work and compensation for delays encountered and compensation for any change in the sequence or method of its work occasioned as a consequence of said encounter.



Bulletin

Understanding Manufacturers' Warranties

Introduction

"You shall warrant all materials and workmanship for a period of not less than one year from the date of substantial completion...."

The above is a standard clause in most subcontracts. However, when the standard terms and conditions of most manufacturers' warranties are evaluated, more often than not, the perceived coverage from the manufacturer is often lacking.

The ABC Company, for example, warrants its equipment for either 12 months from startup or 18 months from shipment, whichever occurs first. DEF Corporation warrants its equipment for only 12 months from the date of shipment. When manufacturers are asked about their warranty info, most responses will lie somewhere in between these two examples. One response never heard is "we will warrant all materials and workmanship for a period of not less than one year from the date of substantial completion...."

What's a mechanical contractor to do?

Issues Affecting Warranty Claims

Obviously, negotiating warranty terms up front is the answer, but how many times do we feel the issue is resolved when we send our Purchase Order with our "ironclad"

terms and conditions? The answer is only as good as your relationship with the manufacturer.

More often than not, however, the manufacturer is providing its standard coverage when the contractor thinks his risks are covered which results in a myriad of problems, depending on the situation. If the project is delayed past its original completion date (due to no fault of the contractor), then a delay claim with applicable warranty extensions present the obvious path to resolution. If the owner is the source of the delay, and the general contractor is in your corner, then life is easy.

What happens when things are not so clear? On one recent project, a mechanical contractor installed some large horsepower ventilation fans in the garage basement of a high rise condominium project. Due to accessibility, the fans were installed in month 10 of a 30-month project. The project actually finished two months ahead of schedule, but when the contractor turned on the power in month 26, one of the 75 horsepower motors was malfunctioned. The fan manufacturer claimed the fans were out of warranty, even though the project was still incomplete. The manufacturer cited his standard warranty terms of 12 months from shipment. The contractor's purchase order

was specific on the fans, but did not address warranty terms other than “provide standard one year warranty.” The general contractor did not support the subcontractor’s request for a change order, and the subcontractor was forced to pay for the repairs that he thought were covered in the purchase order. The contractor’s claim that the unit had never been turned on fell on deaf ears as the manufacturer claimed the warranty was tied to the shipping date.

Another issue that could affect warranty start dates is early commissioning of the equipment for temporary construction cooling. More often than not, general contractors have this covered in their contract language, but subcontractors fail to pass it on to the manufacturer. On most projects, major equipment is started up two to six months prior to substantial completion. Depending on the complexity and size of the project, this period could be longer. Yet the result is always the same; the owner and the general contractor expect their warranty to start when the building is accepted and not before.

So back to the original question; what’s a mechanical contractor to do?

Negotiate Up Front

The answer is to negotiate with your vendors and general contractors up front. When equipment is purchased, specify the delivery date and the projected dates for startup and substantial completion so that the vendor has this covered. These matters should be discussed prior to the original estimate so these monies can be budgeted. Otherwise, the vendors will add the monies when terms are discussed.

Should the vendor not address these matters, considering adding additional costs to your bid to cover unanticipated warranty issues.

Either way, one thing is certain. Most

manufacturers will ***not*** offer extended warranties ***after*** the equipment has been started. At that point, the contractor’s risk has increased dramatically.

Involve the General Contractor

Also, be sure to include the general contractors in the negotiations as well. One prominent subcontractor routinely includes in his proposal letter up to 90 days of use and maintenance after equipment start-up prior to the start of all warranties or the date of substantial completion, whichever comes first. This subcontractor succeeds in have this language written into his contract because the general contractor does not have to argue over “construction cooling” when negotiating the terms of the contract. This assumes that the owner’s equipment is allowed to be used for the purposes of construction cooling. When the period between startup and substantial completion exceeds 90 days, which it often does, the subcontractor has an easier time getting paid for additional costs due to negotiations up front.

Conclusion

Like any other insurance, make sure you know the terms of the manufacturer’s warranty for the equipment you purchase.

- Ask thorough questions up front to ensure your lowest exposure.
- Include the general contractor in your negotiations and plan for extensions up front because they may not be available later.
- Hold those responsible for project delays accountable for warranty extensions. You might decide not to pursue “additional costs” with a general contractor when a project finishes four months late only to find out 12 months later that you face a large, unexpected exposure with no recourse.



Bulletin

Managing Killer Contract Clauses

INTRODUCTION

This bulletin will identify “Killer Clauses” commonly found in standard, preprinted contract forms of general contractors and construction managers. This is not a discussion of scope issues, but of the terms and conditions most typically found in boilerplate contract agreements.

The bulletin is divided into five sections, (1) The Work, (2) The Schedule, (3) Indemnity and Insurance, (4) Payments and (5) Miscellaneous. Within each of the sections mentioned above, there are examples of killer clauses. Each killer clause is followed by suggestions as to how to modify this language so as to eliminate unnecessary risk to the subcontractor without significantly altering the general contractor’s risk.

This bulletin is not published by MCAA as specific legal advice; it should not be relied upon for that purpose. MCAA publishes these bulletins as a general discussion of topics of interest, and is not responsible for its content or accuracy, which is the responsibility of the author. As with all legal matters covered in this and other MCAA bulletins, readers are advised to consult with their attorney for specific legal advice.

Before commencing a discussion on specific contract clauses, two items must be reviewed: (1) bids, and (2) incorporation by reference of other documents. When bidding a project you should either have the intended subcontract form available and submit with your bid a list of exceptions to the form or, include with your bid a statement similar to the following: “If we are the successful bidder on this project, we reserve the right to negotiate the Subcontract so it more closely reflects the AIA documents [or ConsensusDocs] and our normal business practices.”

When you finally receive and read the GC’s proposed subcontract, carefully review the definition of the Contract Documents. It will likely include not only the subcontract, but other documents which are “incorporated by reference” into your subcontract. This language means that even though the referenced documents are not physically attached to your subcontract, you are nonetheless bound by their additional terms and conditions. Therefore, it is your obligation to acquire the incorporated documents from the GC and read them just as carefully as the subcontract itself before signing the subcontract. Most often the referenced documents include the contract between the Owner and the GC, as well as

certain GC forms. When reviewing the Contract Documents, be aware of the following killer clauses.

THE WORK

Scope of the Work

- KILLER

The Work of Subcontractor includes all work specifically set forth in the Subcontract, together with any and all work necessary to properly complete the Subcontract and which is necessary to have a properly functioning and totally acceptable project for the purpose intended.

- YOU CAN LIVE WITH...

The work of Subcontractor includes all work specifically set forth in the Subcontract, together with any and all work reasonably inferable from the Contract Documents as being necessary to properly complete the Subcontract ~~and which is necessary to have a properly functioning and totally acceptable project for the purpose intended.~~

- COMMENTS

Be sure not to become the Owner or GC's design professional by signing a killer clause like this. Your obligation should be limited to provide what is shown in the plans and specifications and anything reasonably inferable there from.

Owner, GC and Design Professional Decisions

- KILLER

The Work shall be performed to the satisfaction of the Owner, the Design Professional and the GC, and the decision of the Owner, Design Professional or the GC as to the construction and meaning of the Subcontract Documents shall be final.

- YOU CAN LIVE WITH...

~~The Work shall be performed to the satisfaction of the Owners, the Design Professional and the GC, and the decision of the Owner, Design Professional or the GC as to the construction and meaning of the Subcontract Documents shall be final~~ in accordance with Contract Documents.

- COMMENTS

It is unreasonable for any of the parties to have unilateral decision authority either over approval of the project or interpretation as to the intent of the documents. Regardless of the type of project (design build or plan and spec), the mechanical contractor's responsibility is to build and install the project in accordance with the documents.

Code Compliance

- KILLER

Subcontractor will furnish all labor, materials, supervision and items required for the proper and complete performance of the work in compliance with all applicable local, state and federal laws, codes and ordinances.

- YOU CAN LIVE WITH...

Subcontractor will furnish all labor, materials supervision and items required for the proper and complete performance of the work and the performance of its work shall be in compliance with all applicable local, state and federal laws, codes and ordinances.

- COMMENTS

Unless you expressly agree to be a design-builder, you must be careful not to assume a design responsibility by agreeing to comply with building codes, especially if you do not carry errors and omissions insurance. The subcontractor should build the work in accordance with

the Contract Documents. It is fairly safe to agree that your “performance”, i.e. the method of installation will comply with applicable laws and codes like OSHA, etc. If you become aware that the design is not in compliance with code, you should notify the GC in writing and proceed with any corrective measures only under the change order clause. Arguably, under the killer clause, the Subcontractor has assumed the cost of the corrective action to meet code.

Coordination

- **KILLER**

Subcontractor shall be responsible for coordinating the Work included in this Agreement with all other trades.

- **YOU CAN LIVE WITH...** Subcontractor shall ~~be responsible for to~~ assist the GC in coordinating the Work included in this Agreement with all other trades.

- **COMMENTS**

The primary responsibility for coordinating the various trades should remain with the GC. However the Subcontractor can assist the GC's efforts. Note, refer to the joint position statement from MCAA, SMACNA and NECA on spatial coordination for further clarification.

Inspection of Site and Preceding Work

- **KILLER**

Subcontractor, prior to beginning the Work, shall notify Contractor of any claimed ambiguities or errors in the Subcontract Documents affecting its work. It shall be the obligation and responsibility of the Subcontractor to take such measurements as shall insure the proper matching and fitting of the Work with contiguous work. The Subcontractor shall carefully examine existing conditions and the work of others to determine whether it is fit, ready, and suitable condition for the proper and accurate performance of the

Work, use all means necessary to discover any defects in such other work, and before proceeding with the Work report promptly any such improper conditions and defects to the Contractor in writing, and allow the Contractor a reasonable time to have such improper conditions and defects remedied.

- **YOU CAN LIVE WITH...**

Subcontractor, prior to beginning the Work, shall notify Contractor of any claimed ambiguities or errors in the Subcontract Documents affecting its work of which Subcontractor is or should be aware. It shall be the obligation and responsibility of the Subcontractor to ~~take such~~ measurements so as shall insure to verify the proper matching and fitting of the Work with contiguous work. The Subcontractor shall carefully examine existing conditions and the work of others to determine whether it is fit, ready, and suitable condition for the proper and accurate performance of the Work, use all reasonable means ~~necessary~~ to discover any defects in such other work, and before proceeding with the Work report promptly any such improper conditions and defects to the Contractor in writing, and allow the Contractor a reasonable time to have such improper conditions and defects remedied.

- **COMMENTS**

The mechanical contractor should be held only to a reasonable and customary standard regarding ambiguities and errors in the contract documents, or site conditions and the proper work of others.

Trash\Debris

- **KILLER**

Subcontractor will clear its trash from the project site daily. If Subcontractor fails to do so, Contractor may clear Subcontractor's trash and charge

Subcontractor the cost of same.

- **YOU CAN LIVE WITH...**

Subcontractor will clear its trash from the project site daily to a dumpster on-site provided by Contractor. If Subcontractor fails to do so, Contractor may after 24 hours' written notice to Subcontractor, clear Subcontractor's trash and charge Subcontractor the reasonable cost of the same.

- **COMMENTS**

Adding the language indicated will ensure you need not provide site waste removal and can save you from those pesky clean-up back charges.

Warranties

- **KILLER**

The Subcontractor shall repair, or remove and replace, at the Subcontractor's own expense, workmanship or materials which prove to be faulty or defective at any time within one year from the date of final acceptance of the Contractor's work by the Owner. In the event of any such repair or removal, this warranty period will be extended one year from the date of completion of such repair or removal.

- **YOU CAN LIVE WITH..**

The Subcontractor shall repair, or remove and replace, at the Subcontractor's own expense, workmanship or materials which prove to be faulty or defective at any time within one year from the date of ~~final acceptance of the Contractor's work by the Owner~~ substantial completion of the Subcontractor's Work. ~~In the event of any such repair or removal, this warranty period will be extended one year from the date of completion of such repair or removal.~~

- **COMMENT**

Clauses such as this extend the potential warranty period unreasonably.

The mechanical contractor cannot be held to an extended warranty where Owner acceptance of the project may be delayed for reasons beyond the mechanical contractor's control or for general contractor caused issues. Likewise, extensions of warranty periods for corrective warranty actions may cause indefinite warranty periods. Beginning the warranty period at substantial completion of the mechanical contractor's work is a reasonable approach, especially since there is a strong likelihood that the equipment will be in use.

THE SCHEDULE

Accepting a Completion Schedule

- **KILLER**

Subcontractor shall perform the work in a prompt and diligent manner and in accordance with the schedules given from time-to-time to the Subcontractor.

- **YOU CAN LIVE WITH...**

The Contractor shall prepare the Construction Schedule with reasonable accommodation for Subcontractor's Work. Subcontractor shall perform the work in a prompt and diligent manner and in accordance with the reasonable schedules given from time-to-time to the Subcontractor, and as agreed to by Subcontractor.

- **COMMENTS**

Never agree to blindly accept GC/ Owner's schedule. The best schedules are mutually developed. The GC should be responsible to prepare a schedule establishing the sequence and duration of all activities and then refine it to include the Subcontractor's input.

No Damage for Delay

- **KILLER**

Should Subcontractor's performance of

this Agreement be delayed or disrupted by any acts of Contractor, other subcontractors, or Contractor's suppliers, or delayed or disrupted by any acts or causes which would entitle Contractor to an extension of time under the Contract Documents, Subcontractor shall receive an equitable extension of time for the performance of this Agreement but shall not be entitled to any increase in the Agreement Price or to damages or additional compensation as a consequence of such delays or disruptions.

- YOU CAN LIVE WITH...

(A) Should Subcontractor's performance of this Agreement be delayed or disrupted by any acts of Contractor, other subcontractors, or Contractor's suppliers, or delayed or disrupted by any acts or causes which would entitle Contractor to an extension of time under the Contract Documents, Subcontractor shall receive an equitable extension of time for the performance of this Agreement ~~but shall not~~ and shall be entitled to any increase in the Agreement Price or to damages or additional compensation as a consequence of such delays or disruptions. (B) Should Subcontractor's performance of this Agreement be delayed or disrupted by any acts of Contractor, ~~other Subcontractors, or~~ acts or causes which would entitle Contractor to an extension of time under the Contract Documents, Subcontractor shall receive an equitable extension of time for the performance of this Agreement but shall not be entitled to any increase in the Agreement Price or to damages or additional compensation as a consequence of such delays or disruptions, except the extent Owner or other third party is liable and pays GC for the cost of the delays or disruptions incurred by Subcontractor.

- COMMENTS

Do not give up your right to delay damages if at all possible. The direct and

indirect cost of a delay can be ruinous. Either get rid of the risk as shown in (A) above, or, as shown in (B) above, you can compromise by limiting your recovery for Owner caused delays to the amount recovered by the GC from Owner on your behalf.

Please note that these "no damage for delay" clauses are ~~widely~~ generally enforced by the courts, however, some states do have statutes voiding these clauses in public contracts or in some cases holding such clauses unenforceable as against public policy.

Subcontractor's Delay/Liquidated Damages

- KILLER

In the event of any failure of Subcontractor to complete his work within the required time and upon the dates established as provided herein, the Subcontractor hereby agrees to reimburse the Contractor for any and all liquidated damages, if any, that may be assessed against and collected from the Contractor by the Owner.

- YOU CAN LIVE WITH...

In the event of any failure of Subcontractor to complete his work within the required time and upon the dates established as provided herein, the Subcontractor hereby agrees to reimburse the Contractor for any and all liquidated damages, if any, that may be assessed against and collected from the Contractor by the Owner, but only to the extent the delay was due to the Subcontractor's wrongful failure to comply with the agreed upon schedule.

- COMMENTS

The GC should not be permitted to simply pass liquidated damage assessments down to the Subcontractor without first determining the extent to which the Subcontractor was responsible for the delay as

compared to other subcontractors as well as the GC.

Also, be aware that in many cases, it is better to have “liquidated” damages identified in the Contract Documents as opposed to having the uncertainty of “actual” damages in the event you cause a delay. At least when liquidated damages are identified, you know what delay will cost.

Acceleration

- **KILLER**

In the event Subcontractor fails to maintain the schedule, Subcontractor shall without compensation, work such overtime as GC may direct until Subcontractor is in compliance with such schedule.

- **YOU CAN LIVE WITH...**

In the event Subcontractor fails to maintain the schedule, Subcontractor shall without compensation, work such overtime as GC may direct until Subcontractor is in compliance with such schedule if said failure to maintain the schedule was Subcontractor’s fault.

- **COMMENTS**

Be careful not to give up your claim for acceleration costs where the inability to maintain the schedule was due to causes beyond your fault or control.

INDEMNITY AND INSURANCE

Liability Indemnity

- **KILLER**

The Subcontractor agrees to indemnify and save the Contractor, Owner and the Architect harmless from any and all claims, suits, losses, damages or expense on account of injuries to or the death of any and all persons whomsoever, and any all property damages arising or growing out of or in any manner connected with the work

performed by or for the Subcontractor’s account under this agreement or caused or occasioned in whole or in part by reason of the presence of the person or property of the Subcontractor, its employees, agents or suppliers, except when such claims or suits shall arise out of the sole negligence of the Contractor.

- **YOU CAN LIVE WITH...**

To the extent of its fault or negligence, the Subcontractor agrees to indemnify and save the Contractor, and Owner ~~and the Architect~~ harmless from any and all claims, suits, losses, damages or expense on account of injuries to or the death of any and all persons whomsoever, and all property damages arising or growing out of or in any manner connected with the work performed by or for the Subcontractor’s account under this agreement or caused or occasioned in whole or in part by reason of the presence of the person or property of the Subcontractor, its employees, agents or suppliers, except when such claims or suits shall arise out of the sole negligence of the Contractor.

- **COMMENTS**

Many GC forms contain very broad indemnity provisions that might be considered deal breakers if not modified. As the majority of states have statutes that impact the Owner/GC’s ability to shift risk to a Subcontractor via an indemnity clause, it is recommended that you have your attorney and/or insurance broker assist you with these clauses. The “comparative” negligence language demonstrated in the modification above is fair. Also, because of the design responsibilities and duties to inspect the work typically held by Architects, it is unwise to indemnify them.

The AIA subcontract form, as well as others, address this issue by including language similar to the following; “The Subcontractor’s liability hereunder does

not extend to the liability of the Architect arising out of (1) the preparation of plans, specifications, designs, reports, surveys or Change Orders, or (2) the giving or failure to give instructions by the Architect, provided the such giving or failure to give is the primary cause of the injury of damages.”

Patent Indemnity

- **KILLER**

Subcontractor agrees to defend and save harmless the Contractor and Owner from and against liability or loss, cost or expense on account of an infringement or alleged infringement of any patent rights by reason of the Subcontractor’s Work or any materials, equipment or techniques used therein by Subcontractor.

- **YOU CAN LIVE WITH...**

Subcontractor agrees to defend and save harmless the Contractor and Owner from and against liability or loss, cost or expense on account of an infringement or alleged infringement of any patent rights by reason of the Subcontractor’s Work or any materials, equipment or techniques used therein by Subcontractor. However, this provision shall not apply to items specifically required by the Contract Documents.

- **COMMENTS**

If the Owner has mandated a particular item is to be incorporated into the construction, the Owner should retain the risk of a patent problem. On the other hand, if the Subcontractor is given the discretion to select the item, it is fair that the patent risk shift to the Subcontractor. In that event, however, be sure that your purchase order form passes that risk off to the manufacturer.

Waiver of Subrogation

- **KILLER**

The Subcontractor’s Workers Compensation and Employer’s Liability

Policies shall contain Waivers of Subrogation in favor of Contractor and Owner.

- **YOU CAN LIVE**

~~Compensation and Employer’s Liability Policies shall contain Waivers of Subrogation in favor of Contractor and Owner.~~ (B) The Subcontractor’s and General Contractor’s Worker’s Compensation ~~and Employer’s Liability~~ Policies shall Contain Waivers of Subrogation in favor of ~~Contractor and Owner~~ the other.

- **COMMENTS**

Most Subcontracts identify the minimum insurance coverage’s required by the GC and/or Owner. You should review this section with your insurance agent or broker on each job to insure compliance. The above killer clause will preclude your insurance company from getting reimbursed for payments it made to one of your injured workers, for example, if the injury resulted from the negligence of the Owner of GC. In fairness, each party should remain responsible for damages and injuries stemming from their own fault or negligence. If you can’t negotiate out this killer clause as in (A), at least make it mutual as shown in (B) so that you and your insurance company are off the hook for injuries to the employees of the GC

PAYMENT

Pay if Paid

- **KILLER**

Receipt of payment for Subcontractor’s work by GC shall be a condition precedent to the right of Subcontractor to receive payment from GC. Subcontractor acknowledges that it relies on the credit of Owner, not GC, for the payment of its work.

- **YOU CAN LIVE WITH...**

(A) Receipt of payment for Subcontractor's work by GC shall ~~be a condition precedent~~ occur prior to the right of Subcontractor to receive payment from GC. ~~Subcontractor acknowledges that it relies on the credit of Owner, not GC for the payment of its work.~~ (B) Receipt of payment for Subcontractor's work by GC shall be a condition precedent to the right of Subcontractor to receive payment from GC. Subcontractor acknowledges that it relies on the credit of Owner, not GC for the payment of its work. However, notwithstanding the above, Subcontractor's payment shall not be withheld if the Owner's nonpayment is due to disputes between the Owner and GC or GC's other subcontractors not in any way related to Subcontractor's performance hereunder.

- COMMENTS

The "condition precedent" language in this killer clause leaves the Subcontractor with no recourse against the GC in the event the Owner fails or refuses to pay the GC, regardless of the reason for the nonpayment. The modification as indicated in (A) above is fair in that it permits the GC to wait until it receives the payment from the Owner before being obligated to pay the Subcontractor. However, if more than a reasonable time passes for the Subcontractor's payment, the GC will then have to pay the Subcontractor, even if the Owner hasn't yet paid the GC. Most GC's are loath to delete the "condition precedent" language, and where the Owner is a solvent government or other risk free owner, you might choose to let it go. However, if the "condition precedent" language must remain, at least negotiate the change indicated in (B) above so that your money is not withheld due to the fault of others. In some states, such clauses are ineffective and cannot be used to relieve the GC from its obligation to pay subcontractors. In other states, the clause cannot be used to defeat a subcontractor's lien rights. Also, there have been several court

decisions where this clause was deemed invalid as a defense to the subcontractor's rights against the GC's bond.

A number of states also differentiate between "pay if paid" clauses (the Sub only gets paid if the GC gets paid), and "pay when paid" clauses (the Sub gets paid when the GC gets paid). Some pay when paid states provide for the Sub to be paid if a reasonable time for the GC to be paid has passed. These provisions are governed by state law, specific to each state, and the case law varies. Be sure to consult with legal counsel so you understand how the law applies in your state.

Finally, if you are under a strict pay if paid provision, be cautious of waiver of lien rights provisions in the contract. It is generally never a good idea to waive lien rights by contract. The combination of contract provisions that include a pay if paid clause and waiver of lien rights may result in no recourse against either the owner or the GC in the event of non-payment.

Retention

- KILLER

Notwithstanding any other provision of this Subcontract or the Prime Contract, it is agreed that Contractor shall retain 10% of the amount due Subcontractor as progress payments until final completion and acceptance of Subcontractor's Work by Owner.

- YOU CAN LIVE WITH...

Notwithstanding any other provision of this Subcontract or the Prime Contract, it is agreed that Contractor shall retain 10% of the amount due Subcontractor as progress payments until final completion and acceptance of Subcontractor's Work by Owner. However, in no event shall retainage exceed that which Owner is withholding

of behalf on Subcontractor's Work.

• COMMENTS

Don't let the Subcontract deprive you of the reduction in retention that the GC is enjoying. Also, remember that on federal and most state projects, the Prompt Pay Act in effect precludes the GC from withholding money received on behalf of the Subcontractor's work even if the subcontract terms permit the GC to do so. Finally, note several state statutes exist that limit the amount of retention an Owner may withhold.

Liability for Lower Tier Liens

• KILLER

Subcontractor shall defend indemnify and hold Contractor and Owner harmless against all liability for claims and liens of any laborers, materialmen or subcontractors of Subcontractor for labor performed or material used or furnished by, through or under Subcontractor for the Project.

• YOU CAN LIVE WITH...

Subcontractor shall defend indemnify and hold Contractor and Owner harmless against all liability for claims and liens of any laborers, materialmen or subcontractors of Subcontractor for labor performed or material used or furnished through or under Subcontractor for the Project unless the same arises due to the Owner's or Contractor's wrongful nonpayment.

• COMMENTS

Do not accept liability to keep the job free of liens or claims by your subcontractors and suppliers when the reason for their actions is as result of the wrongful failure of the Owner or GC to properly pay you for the work performed. When the GC has made timely payments to you, it is your responsibility to pay your lower tier subcontractors and to keep their claims and liens from affecting the GC, Owner or Owner's property.

Release of Liens

• KILLER

Subcontractor agrees that as a condition precedent to receiving partial payments from Contractor for Work performed pursuant to this Agreement, Subcontractor shall execute and deliver to Contractor with its request for partial payments as above provided, a full and complete release of all claims and causes of action Subcontractor may have or claim to have against Contractor or Owner through the date of the execution of said release.

• YOU CAN LIVE WITH...

Subcontractor agrees that as a condition precedent to receiving partial payment from Contractor for Work performed pursuant to this Agreement, Subcontractor shall execute and deliver to Contractor with its request for partial payments as above provided, a full and complete release of all claims and causes of action Subcontractor may have or claim to have against Contractor or Owner through the date of the execution of said release but only of the extent of amount requisitioned and paid through the date of the execution of said release.

• COMMENTS

Never waive your lien rights for claims, change orders or retention that you may not yet have requisitioned for or for work not yet performed.

NOTE: Increasingly, GCs are including severe release language on the monthly requisition form. Carefully review all language on the requisition form and make any adjustments necessary to protect your lien rights.

MISCELLANEOU

S Assignment

- KILLER

Subcontractor shall not assign this Subcontract without the written consent of the General Contractor.

- YOU CAN LIVE WITH...

~~Neither party shall Subcontractor shall not assign this Subcontract without the written consent of the other General Contractor.~~

- COMMENTS

The GC does not want you to turn the Subcontract over to some unknown entity for completion. Similarly, you should protect yourself from having to perform for a future unknown GC. Sometimes, the Owner's Lender requires that the Owner and GC retain the right to transfer the subcontracts to the Lender. In that event, be sure that the GC is not released from liability to you for at least those events that took place prior to the date of the assignment to the Lender.

Bond Forms

- KILLER

Subcontractor shall pay for and furnish to Contractor 100% performance and 100% payment bonds on Contractor's standard bond forms attached hereto.

- YOU CAN LIVE WITH...

Subcontractor shall pay for and furnish to Contractor 100% performance and 100% payment bonds on Contractor's standard bond forms attached hereto as modified and agreed to by subcontractor.

- COMMENTS

Always review the bond forms supplied by the GC. Most often they will require some modification. Have your bonding agent review these forms as well to insure that (1) the payment bond form limits the definition of a proper claimant to one having a direct contract with you to supply labor or materials to the project, and (2) both bond forms limit the time frame within which to assert and pursue claims under

the bonds.

Notice of Claim

- KILLER

Subcontractor shall give Contractor written notice of all claims for any additional compensation or damages within three (3) working days of the beginning of the event for which such claim is made; otherwise, such claims shall be deemed waived.

- YOU CAN LIVE WITH...

Subcontractor shall give Contractor written notice of all claims for any additional compensation or damages within three (3) working days of the beginning of the event for which such claim is made; otherwise, such claims shall be deemed waived if Contractor is prejudiced by such late notice.

- COMMENTS

Notice provisions must be carefully adhered to or risk losing your rights to collect additional, deserved compensation. To provide some cushion, the additional language reflected in the modification to the killer notice clause will require that the GC show that your late notice somehow impaired the GC's position to either defend against the claim or to collect the damages from the Owner or other third party.

Attorney Fees

- KILLER

In the event it shall be necessary for Contractor to retain legal counsel to enforce any of its rights hereunder, Subcontractor agrees that it shall be responsible for payment of all reasonable attorney's fees, expenses and costs incurred therewith.

- YOU CAN LIVE WITH...

In the event it shall be necessary for either party Contractor to retain legal counsel to enforce any of its rights hereunder, the other party Subcontractor agrees that it shall be responsible for payment of all reasonable attorney's fees, expenses and costs incurred therewith.

COMMENTS

Sometimes it is easier just to delete this provision. In most cases, silence in the subcontract will result in each party bearing its own attorneys fees. However, the modification as shown above at least makes the ability to collect attorney fees mutual.

Venue and Choice of Law

- KILLER

The validity, interpretation and performance of this Subcontract shall be governed and construed in accordance with the laws of the state where the GC's home office is located and any litigation between the parties hereto shall be conducted in and by the appropriate courts having jurisdiction where the GC's home office is located and the parties consent to such jurisdiction.

- YOU CAN LIVE WITH...

The validity, interpretation and performance of this Subcontract shall be governed and construed in accordance with the laws of the state where the Project GC's home office is located and any litigation between the parties hereto shall be conducted in and by the appropriate courts having jurisdiction where the Project GC's home office is located and the parties consent to such jurisdiction.

- COMMENTS

Check these types of provisions to be sure they do not force you to travel to resolve a dispute and to confirm that the law governing the agreement is of a

neutral location. Note that increasingly, states are legislating these issues and in some instances, these killer clauses are voided by such legislation.

Labor Harmony

- KILLER

The Subcontractor shall procure its materials from such sources, and employ such labor subject to contract terms and conditions in order to ensure harmonious labor relations on the site and prevent strikes or disputes by its employees or other trade employees. The Subcontractor, in the event of a labor dispute including strikes, shall take whatever action is required in order to prevent the disruption of work on the project site.

- YOU CAN LIVE WITH...

The Subcontractor shall procure its materials from such sources, and employ such labor subject to contract terms and conditions in order to ~~ensure~~ reasonably: (a) provide for harmonious labor relations on the site and (b) prevent reduce the potential for strikes or disputes by its employees or other trade employees. The Subcontractor, in the event of a labor dispute including strikes, shall take ~~whatever action is required~~ all reasonable actions in order to ~~prevent~~ minimize the disruption of work on the project site.

- COMMENT

The MCAA contractor cannot be put in a position where contract requirements could be in conflict with either collective bargaining agreements or any labor laws. The changes noted above are a fair and reasonable approach to harmony clauses.

CONCLUSION

Hopefully, the above discussion will prove helpful to you in your future contract negotiations and will put you on

notice of some of the more common killer clauses. Remember, this is but a sampling of the killer clauses you may encounter. Each GC and Owner has other clauses that may be peculiar to their company or jurisdiction.

Be sure to read the contract documents and try to negotiate out any language that seems particularly unfair to you. If the GC will not budge, you may need to accept the terms on the current project, but try to resolve in advance a better agreement for the future work you will hopefully do together.

If you are only changing a few provisions in a subcontract, it is easiest to get a red pen, mark up the document and sign it. With a multitude of changes, it is better to take the time to prepare a separate amendment to the subcontract. When you attach a separate amendment, be sure to mark the subcontract signature line as follows so that your modifications become part of the subcontract itself:

BY: SUBCONTRACTOR Signature)*
*Subject to the attached Modifications

In any event, always give the GC a heads-up cover letter or courtesy call to let them know that you are modifying their subcontract (as you indicated in your bid).

In most cases, your proposed changes will not be accepted flat out and you will need to do some persuading. The GC's representatives often lack authority to change their forms so be sure you are negotiating with the right person. With each of the clauses identified above as well as any others you may find, your negotiating approach is simple. You are merely asking to modify some of the terms that are plainly unfair to the subcontractor, and modifying other terms so they are mutually applicable to both the subcontractor and GC. Though you may need to go a few rounds, your very basic

argument of fairness is hard to refute.

This bulletin was originally prepared by **Caryl Sandler Shuham of Shuham & Shuham, P.A. (Plantation, FL)** for the MCAA Management Methods Committee for use by MCAA members. Committee members revised and updated the bulletin to ensure its accuracy and relevance to current legal practice, standards and rules.

The information in this article should not be construed as legal advice from the author. MCAA contractors should contact their legal counsel for specific legal advice.



Bulletin

Fixed-Price Construction Contracts, Material Price Volatility and Contract Cost Adjustment Clauses

Introduction

Volatility of construction material and equipment costs is greater now and in recent years than previously has been the case. That volatility and uncertainty in stable pricing and commodity availability is likely to grow worse in coming years, not stabilize. The combination of raw material and natural resource scarcity, burgeoning infrastructure demand worldwide, with concomitant commodity and construction demand in the Far East and elsewhere, and unpredictability of world political stability (and shipping infrastructure too) all argue strongly for ever-greater vigilance in commodity purchasing and price commitments in procurement planning for fixed-price construction contracts.

Even worldwide climate change can affect commodity availability and price stability. In some cases, drought has led to hydro-electric power rationing and cutbacks in mining and material production which has cut material availability and put upward pressure on prices unpredictably.

Construction Material and Equipment Cost Volatility Will Continue to Increase

Given that price stability is no longer the norm, sound procurement planning and contracting policy call for more routine assessment of the benefits of including price

adjustment clauses in fixed-price construction contracts as a matter of equitable risk allocation. With volatility emerging as the norm in the 21st Century, fair contract risk allocation will more frequently require an equitable cost adjustment clause in fixed-price construction contracts as the most specific way to adequately address an otherwise uncontrollable and unforeseeable risk factor.

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Specific Cost Adjustment Clauses are Better Than More General Force Majeure Clauses

Cost adjustment escalation clauses set the basic parameters for the foreseeable range of price fluctuation by a set baseline – either actual costs, catalog prices, or common price indexes and then allocate shared risk of volatility beyond that range between the

contracting parties. This approach benefits the contractor, the owner and the project as a whole. The shared risk approach to either exceptional increases or decreases in price can help eliminate bid contingencies, avoid defaults and delays mid-project for the benefit of all parties and the project as a whole.

Force Majeure and Contract Impossibility Defenses are not Adequate to Address the Problem

Such clauses operate in somewhat the same way as common unforeseen site conditions clauses but are more immediate problem avoidance, risk sharing clauses. They allocate uncontrollable and unknown risk equitably, rather than putting all the risk on just one party. Unbalanced risk-shifting subjects the owner and the project to project disputes based on that unbalanced risk. Cost adjustment clauses address material cost volatility and unavailability in a way that is much more specific than a standard *force majeure* clause. *Force majeure* clauses (superior force, acts of God, etc.), in most cases, on their face, are limited to very extraordinary extraneous events, often are subject to very narrow interpretation by courts, and may be limited to time extension remedies only. Similarly, contract breach/non-performance defenses relating to impracticability/impossibility of performance have been developed for uniform commercial code applications, are often subject to very narrow interpretation as well, and are not directly applicable to construction services contract cases in the first place. And, in any event, such defenses are called on after the project suffers the adverse impact; cost escalation clauses stem the adverse impact on the project by spreading the risk equitably and keeping the project on track.

Short-Term Price Commitments from Suppliers are Becoming More Common

In recent years, with the unprecedented economic growth and infrastructure expansion in China, India and the Far East,

and political instability world-wide impacting both supply and shipping, and with the world-wide competition for raw materials and construction commodities heating up and down more frequently and with greater spread of changes, the argument for considering price adjustment clauses in otherwise fixed-price construction contracts becomes ever more prudent. In that context, increasingly material and equipment suppliers abjure long-term pricing commitments (often no more than 30 days), making a fixed-price construction contract with longer-term material/equipment purchases a considerable gamble, with those cardinal risks and changes leaving all contract parties vulnerable and the project success ultimately in jeopardy.

Below are some standard form contract clauses that address this issue.

Influential Public and Private Contracting Policy Documents have been Responsive to Price Fluctuations and Risks

ConsensusDOCS Policy

The primary private sector contract cost adjustment clause is the ConsensusDOCS, 200.1, *Time and Price Impacted Material Amendment 1*. It recognizes the need to assess the context of price volatility as an element of procurement planning. It addresses both contract price volatility and excusable delays for material/product unavailability (without reliance on the *force majeure* clause).

The 200.1 document recites the existence of market conditions warranting equitable adjustments for price volatility and delays because of product/material unavailability. It calls for a baseline for price adjustments and rules out duplicative increases under other document contingency provisions. It calls for a 30-day notice period of claim impacts, and documentation of covered changes. It doesn't set definite limits on the amount or

percentage of increase or decrease permitted. The 200.1 document also provides that overhead and profit are not included in the equitable adjustment based on changes from the baseline. Increases or decreases are permitted only for items purchased and delivered after the date of the change. The document does not set any specific percentage change limits (as the FAR does). **[NOTE: As a private-sector form document, such percentage limits and adjustments must be left to the negotiations among the contracting parties.]**

AIA Supplementary Conditions Addresses the Subject

The American Institute of Architects standard form general conditions (A-201, 2007 Edition) does not address the subject. However, there is mention of the subject in the 2007 Edition of the *AIA Guide for Supplementary Conditions* (A-503), which says:

Section 3.8 Allowances In recent years, unanticipated price escalations in construction materials after the contract is executed have caused concern to owners and contractors. If the owner and architect are concerned about facing such price escalations in certain materials, they should identify those materials prior to the bid and provide for them in the bidding requirements as allowances.”

FAR Policy criteria – The Federal Acquisition Regulations (FAR) now recognizes that contracting officers may include economic price adjustments in fixed-price contracts where “the Contracting Officer determines that it is necessary either to protect the contractor and the Government against significant fluctuations in labor or material costs or to provide for contract price adjustments in the event of changes in the contractor’s established prices.” (FAR, Part 16.203-3)

The FAR adds that a fixed-price contract with [an] economic price adjustment may be used, when: (i) there is serious doubt concerning

the stability of market or labor conditions that will exist during an extended period of contract performance, and (ii) contingencies that would otherwise be included in the contract price can be identified and covered separately in the contract. Price adjustments based on established prices should normally be restricted to industry-wide contingencies. Price adjustments based on labor and material costs should be limited to contingencies beyond the contractor’s control.” (FAR, Part 16-203-2.)

The FAR sets out the basic dimensions of the price adjustment clause, as follows:

“A firm fixed-price contract with economic price adjustment provides for upward or downward revision of the stated contract price upon the occurrence of specified contingencies. Economic price adjustments are of three general types:

- (1) **Adjustments based on established prices.** These price adjustments are based on increases or decreases from an agreed-upon level in published or otherwise established prices of specific items or the contract end items.
- (2) **Adjustments based on actual costs of labor or material.** These price adjustments are based on increases or decreases in specified costs of labor or material cost standards or indexes that are specifically identified in the contract.
- (3) **Adjustments based on cost indexes of labor or material.** These price adjustments are based on increases or decreases in labor or material cost standards or indexes that are specifically identified in the contract.”
FAR, Part 16-203-1

FAR Contract clause – The FAR Economic Price Adjustment – Labor and Material clause (Part 52-216-4) calls for notice of covered increases or decreases to the contracting officer within 60 days, with supporting data, and contains the following

significant limitations: ... (c) any price adjustment under this clause is subject to the following limitations:

- (1) Any adjustment shall be limited to the effect on unit prices of the increases or decreases in the rates of pay for labor (including fringe benefits) or unit prices for the material shown in the schedule. There shall be no adjustment for –
 - (i) Supplies or services for which the production cost is not affected by such changes;
 - (ii) Changes in rates or unit prices other than those shown in the Schedule; or
 - (iii) Changes in the quantities of labor or material used from those shown in the schedule for each item.
- (2) No upward adjustment shall apply to supplies or services that are required to be delivered or performed before the effective date of the adjustment, unless the contractor's failure to deliver or perform according to the delivery schedule results from causes beyond the contractor's control and without its fault or negligence, within the meaning of the default clause.
- (3) There shall be no adjustment for any change in rates of pay for labor (including fringe benefits) or unit prices for material which would not result in a net change of at least 3 percent of the then-current total contract price. This limitation shall not apply, however, if, after final delivery of all contract line items, either party requests and adjustment under paragraph (b) of this clause. [Paragraph b provides for submission of price adjustment claims during the course of the contract, continuing performance during the term at agreed-upon rates, then overall percentage change adjustments at the end of the contract.]

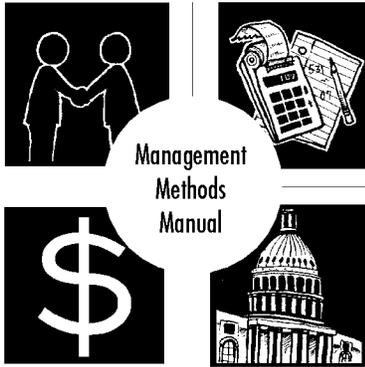
- (4) The aggregate of the increase in any contract unit price under this clause shall not exceed 10 percent of the original unit price. There is no percentage limitation on the amount of decreases that may be made under this clause.

(d) The Contracting Officer may examine the Contractor's books, records, and other supporting data relevant to the cost of labor (including fringe benefits) and material during all reasonable times until the end of 3 years after the date of final payment under this contract or the time periods specified in Subpart 4.7 of the federal acquisition regulations (FAR), whichever is earlier." (FAR, Part 52-216-4). **[NOTE: Contracting parties should scrupulously avoid any claims for costs not actually incurred, as False Claims Act provisions are strictly enforced and sanctions for violations are severe.]**

Setting the Baseline for Change

Actual costs, catalog prices or common published indexes can all be used to set the baseline for cost adjustment clauses. ENR publishes a series on common construction material cost indexes. (Go to: www.enr.com). Also, the U.S. Department of Labor's Bureau of Labor Statistics publishes a very comprehensive set of Construction Material producer price Indexes along with a comprehensive guide on the subject, *Escalation and Producer Price Indexes: A Guide for Contracting Parties*. (Go to: www.bls.gov/ppi/home.htm).

The information in this bulletin should not be construed as legal advice from the author. MCAA contractors should contact their legal counsel for specific legal advice and actual contract drafting or review.



Bulletin

Strategic Planning

WHY PLAN?

It is often said, "If you don't know where you are going, any road will get you there". Thus any business entity which has a purpose needs strategic planning. Actually, one of the most important functions of the chief executive of a corporation should be the determination of the goals and objectives of the company. Strategic planning forces the chief executive to choose future opportunities in the market place, investigate them and formulate goals and objectives to exploit these opportunities.

WHAT IS PLANNING?

Planning for a mechanical contractor may simply be stated as management's defining what is to be done, when it is to be done, how it is to be done and who is to do it. But, since a business entity does not operate in a vacuum, it is not an easy task.

Planning is thinking through what is desired and how it will be accomplished. After

thinking, research and discussion becomes the plan, which is the tangible evidence of thinking. Plans result from planning. Planning is a waste of time unless it results in a specific course of action to be taken within a given time period.

Planning for the future is not forecasting. Forecasting is extrapolating today's trends and events into the future. Planning is sitting down and determining ways to change the future to insure that results will be consistent with the goals of the corporation and value of its management. The resulting plans must be continually (or at least periodically) reviewed and adjusted to coincide with changes in the business environment and management's values.

WHAT IS THE MOST IMPORTANT STEP?

Before planning can begin, the corporation's chief executive must ask himself, "Where do we want this corporation to go?" or as many say, he must develop a strategy. To develop a strategy, the planner must ask, what



business is the company in or is it to be in and what kind of company is it, or is it to be. Chandler in his book, *Strategy and Structure*, defines strategy as a “Determination of long term goals and objectives for an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals.”

To develop a strategy, the chief executive must ask himself the following:

1. Where will the environment allow us to go?
2. What will our competitors allow us to do?
3. What are our abilities to get there?
4. What are our social responsibilities in getting there?

The mechanical contracting corporate executive must ask himself the above questions in view of what he sees for the future in terms of the following:

1. Technology of the mechanical contracting industry.
2. The changing concepts in the mechanical contracting industry, such as recent trends from bid-spec projects to design-construct projects.
3. Activities of competitors.
4. Financial resources.
5. Physical resources.
6. Personal resources.
7. Personal goals.

Obviously, the answers to many questions cannot be known at the start of planning. When factual data cannot be provided, special factors can and should be assumed. These “assumptions” should be listed and

clearly labeled as such in the plan, and they should be re-evaluated and updated as part of the continuing review process. The assumptions and answers provide a basis for the next step in planning: the strategy statement.

STRATEGY STATEMENT

The strategy statement of a mechanical contractor should at least define the following:

1. What business will the contractor be conducting, in terms of the functions that his work will perform?
2. What markets he will be in, both geographical and within given geographic segments?
3. How will he market his product? Will he merely bid work or will he employ full-time salesmen to obtain projects?
4. How will the corporation be financed?
5. What growth rate, in terms of sales and earnings, does he expect?
6. What kind of an organization does he want to have? Does he want to have complete control? Will he allow employees to buy stock? Is it planned for the company to merge with another company or for the company to go public?

After the strategic statement has been formulated, plans can then be made as to marketing activities, recruitment of personnel in the areas of sales, estimating, project managers, accounting, executive talent, etc; physical resources in terms of buildings, machinery and corporate facilities; and even the addition of branch offices.

Before any firm decisions can be made as the result of planning, the chief executive must sit down and determine what his strat-

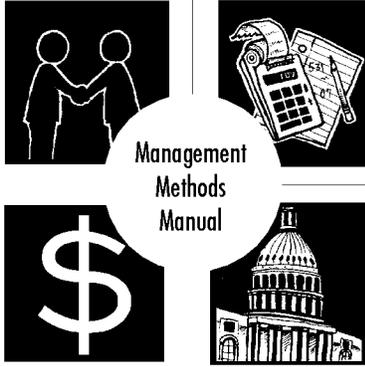


egy will be for the next year, two years and up to and including five years.

Developing a strategy and thereby getting off to a proper start in long-range planning for your corporation will be a difficult task. It means that you will have to consider what it takes to win the ballgame you have chosen to play. You must question the way you have always done things. You will have to think about what is changing in our industry, both on a technological and regional basis. You will have to determine what you can expect as far

as the growth of various segments in your market and your chosen geographical operating area; what will the unions be doing; what are your strengths; what are your weaknesses; what changes will you have to make in your personnel; how much money are you going to need, where is it going to come from and what risks will be involved?

After answering the questions, you will then have to ask yourself, "Is it all really worth it, and is it consistent with what I personally want to do?"



Bulletin

Corporate Structure: Using Outside Advisors/Directors

Foreword

This Bulletin is for general information purposes only. Before adding outside directors or forming an advisory committee, you should consult with legal counsel.

This bulletin deals with two aspects of expanding the management resources of a privately-held company by bringing in outsiders—what can they do for you and how should they be brought in?

Outside advisors can help the company in many ways: they can provide independent standards for management's performance, answer specific questions on operations, force management to plan for the future of the business (including succession), arbitrate internal differences, and keep management alert to relevant changes in the external world.

People who serve as outside advisors should (1) be objective and disinterested—have nothing to gain personally from the knowledge they will pick up about your company; (2) have experience in somewhat larger, successful companies—you will want help in

handling changing problems as you grow; and you are interested in learning how to make money, not how to go broke; (3) come from backgrounds or businesses different from yours. Since no outsider can know as much about your business as you do, you need people who will challenge traditional ways of doing things and help establish the individuality of your firm; (4) be sensitive to the coaching, appraising function and be both sufficiently patient and firm so that they can guide, counsel, and teach without resentment.

You have a choice as to the form of a group of outside advisors: they can be actual members of the board of directors or members of an advisory committee. The board is elected by the stockholders and appoints the officers. Where management and stockholders are the same, it is rare to find a board not



dominated by stockholders or their families, and therefore not truly independent. The board is legally responsible for the overall conduct of the company which it delegates to the officers. The advisory committee is entirely a creature of management—it has no legal status, appoints no one, and exists exclusively to help internal management as it wants.

Compensation for both should be about equal, since the same service is expected from people of the same caliber. Payment for each meeting attended runs from \$300 up. An added inducement is to hold a meeting at a resort area once a year. Aside from the equity of paying busy people for their time, a fee makes the relationship professional and easier to sever if someone is incompatible or incompetent. Assuming 3 outsiders at \$300 a meeting, 4 meetings a year, your annual net after tax cost would be about \$2,000 including some expenses. (Add the time of management to prepare for the meetings.) It would be hard to find a \$2,000 expense which has the potential to make such dramatic improvements in a company.

Where do you find people who will serve on the board of directors or advisory committee of a small company? We must now compare the two forms because the personal liability to which members of a board of directors are exposed is a deterrent strong enough to eliminate many good people. The inducement of stock options or a chance for a direct investment in the company may attract some potential directors, but this may be a high price for the current stockholders to pay for outside help, and the individuals would no longer, in fact, be outsiders. The advisory committee has been successful as a device to involve capable people precisely because it avoids the liability problem.

Aim high when you look for advisory committee members. People who have been successful advisors include the head of a grocery

cooperative, the retired Vice President of a retail chain, the President of a \$40,000,000 chemical company, the financial Vice-President of a real estate company, a top officer of an insurance company's commercial loan department, partners in an accounting firm, and a general contractor. Good people will serve because your invitation flatters them and the experience of helping a company grow is satisfying and fun.

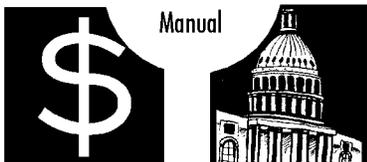
Also aim high for the subjects you want to cover: the type of business you want to be 3–5 years from now; personnel, space, financial, technical, equipment needs; ways of determining whether top management is doing a good job; what is likely to happen in the world that will affect you?

A few mechanics: hold the meetings during the day (it not only dignifies them but people are more alert); be sure to have an agenda distributed in advance with as much background data as possible; run the meetings tightly (for example, start at noon, stop at 3:00 p.m.); send out minutes promptly showing who is to do what by when; schedule the meetings at least once a quarter, perhaps monthly to start; tell the members that you are experimenting with the idea and with them individually; try to have more outside than inside members; a committee of 5 to 7 people in total works best.

Before establishing an advisory committee or adding outsiders to the board of directors, you should clarify your objectives in running your company and test your willingness to submit to outside advice. If you decide to use outsiders you will find that an advisory committee (or having outsiders on the board) can work wonders in focusing management's energies on significant survival and profit problems and opportunities. It is a tough discipline for management—the questions asked may be embarrassingly gutsy. But that's the reason for the outsiders they can and should ask tough questions, and then help you frame the answers.



Management
Methods
Manual



Bulletin

Bulletin No. CP 3
File: Corporate Planning

How to Get Out and Let Others In

Foreword

This bulletin has been prepared to provide an insight into the planning necessary to “get out.” It is for informational purposes only and is not intended to provide legal or other advice. Proper planning for the disposal of an ownership interest is a complex process that involves tax and estate planning considerations, among others. This bulletin discusses only some of the alternatives. You should consult with your legal counsel, accountant and financial advisors to structure the plan most suitable for you and your company.

INTRODUCTION

Every stockholder of a mechanical contracting business has to face the problem of disposing of his interest in his company at his death, disability, or retirement. The prospect is unpleasant because the causes, including retirement in many cases, are difficult to face. The inevitability of death and the probability of retirement or disability make it important for the stockholder-manager of a mechanical contracting business, his family, and his company to consider the practical alternatives and arrange for the disposition of his interest during his working lifetime.

EVALUATING ASSETS

The best, in many cases the only, market for the stock of a mechanical contracting

firm lies within the company. By planning now for the continuity of the firm through expansion of management and ownership opportunities, a stockholder-manager may be protecting his own economic interest, while perpetuating the organization.

Identifying the earnings assets of a mechanical contracting business requires an answer to the question: What is saleable, transferable, able to continue producing income, or protecting the assets of the company? Because of the nature of the industry, it seems clear that it is managerial talent that handles the estimating, obtaining bids, designing, negotiating with customers and subcontractors, buying material, coordinating work, controlling labor and other costs, arranging financing and bonds, and billing and collecting for work done. Although this list of



managerial functions may not be complete, it is a fair indication that the earning asset of a mechanical contracting business is its people. Any plans for disposal of interest in a firm, therefore, must provide for management succession. Without it, the assets will probably have to be sold or liquidated.

Although it was never a popular method of getting out, the sale of stock of a mechanical contracting firm to the public, in the opinion of most investment bankers, is probably remote. The sale of a business to other contractors—general, electrical, masonry, or another mechanical firm—is a possibility and may be the only alternative to liquidation if the company cannot be maintained through the development of internal renewal.

The interest of a buyer is dominated primarily by people. If he is not in the mechanical contracting industry, it would be a rare purchaser who would not insist that the management of the selling organization remain, usually tied to long-term employment contracts. If another mechanical contractor acquires a firm, he would be concerned with the continuing availability of top people.

Thus, getting out—whether it is selling to others, or retiring, or dying while owning an interest in your firm—requires not only digestible financial arrangements but clear, tough plans for letting others in.

By far the greatest market for getting out lies within the company: present and future stockholders who have or eventually will have the same personal interest in getting out and the same concern that the assets that have been accumulated will be protected and maintained.

BUY-SELL AGREEMENTS

It is important to be aware of the elements of a buy-sell agreement and some of the techniques that will encourage new management participation, while protecting the interest of retiring stockholder-managers.

Assuming at least stockholders, the choice of parties to an agreement lies between the individual stockholders or the stockholders and company. (Since the great bulk of all mechanical contractors operate in corporate form, the special problems of a partnership are not discussed.)

The preferred arrangement is usually between the stockholders and the company. Corporate assets are generally greater and have a higher yield than personal assets. Security to a seller is greater when an obligation is backed by a corporation. The payment of insurance premiums and the receipt of proceeds may be easier.

Since each company is unique and the needs of individuals and their companies are dynamic and therefore changing, the specifics of each buy-sell agreement must be individually hammered out and regularly updated. The following summarizes the main points that should be considered for inclusion in a buy-sell agreement.

Restrictions

Stockholders or their estates are usually restricted from selling or otherwise disposing of their shares (via gifts or through a will) to anyone except a relative actively working in the company, other stockholders, or the company. Because the number of shareholders in most mechanical contracting firms is small and consists primarily of active workers, the relationship between shareholders is more



similar to a partnership in which the partners have a say as to who their partners will be.

Options

Who can, or must, sell or buy? On death, or disability lasting more than a year, the estate or disabled person must sell, provided the company can handle the total purchase (more on this), and the company itself must buy. On retirement, with sufficient time to provide both new management and a financial plan, the same terms should obtain. The estate and a disabled stockholder's family need to know where they stand, and there is questionable fairness in permitting an estate or inactive stockholder to benefit from the efforts of the working stockholders.

Price is best set annually by the stockholders, who alone best know the value of the business. The value should be placed at a figure that is agreeable to each stockholder as either a buyer or seller. If after setting the value, stockholders cannot in future years agree on a price, one suggestion is to amend the last agreed-upon value by the change in book values. Another possibility is a formula based on the profits of the last five years, and the application of an agreed-upon (or industry average) multiplier. Book value, or a discount from book value, should be the minimum price, in case the formula equals less than book value.

Several normal price provisions should be considered:

- Date the value as of the month-end prior to the date of death, disability or retirement to avoid inclusion of life insurance proceeds.
- Provide for a real estate appraisal and include the difference today (probably an in-

crease) between cost and appraisal as part of the value.

- Regardless of which tax accounting system the company may use (which may be the completed contract method) use percentage-of-completion accounting for determining annual income and buy-sell values.
- In cases where there are only a few stockholders (not over four), shareholder value may be simply the amount of insurance that the shareholders agree they want to provide for their families and that the company can afford to carry.

Terms

The desire of an estate or retiring stockholder to receive payment as quickly as possible should be balanced against the goal of the company's continuing management to stretch out payments as long as possible. Usable formulas have included:

- Prompt payment of life insurance proceeds as either full or down payment.
- Annual payments keyed to the net after tax salary and related fringe benefits of the departed stockholder.
- Acceleration of payments based on a percentage of net income (for example, \$40,000 a year or 25 percent of the corporate net income after taxes, whichever is greater).

Security

Security is best left to the lawyers. Some provision is almost always included when there is an extended payout. Other aspects of security include:



- Making frequent payments (monthly or quarterly rather than annually)
- Maintaining required working capital
- Holding the acquired stock in escrow
- Obtaining personal signatures of remaining stockholders
- Taking a first or second lien on available assets without restricting the company's operations.

On any installment payout, Internal Revenue Service regulations require at least an interest factor to be applied to the outstanding balance. (Check with your CPA for current requirements.)

Post-Redemption Events

With the best intentions to arrive at a fair price, stockholder-managers may not be able to determine an objective valuation for their business. If the company is sold or liquidated at a higher price, after a stockholder's interest has been redeemed, some agreements provide that the value of the share redeemed be increased proportionately, but on a declining basis as time elapses from the date of redemption. For example, if a 25 percent stockholder's interest were redeemed as of January 1st for \$100,000, and 6 months later the total company were sold or liquidated for \$600,000, it is clear that the \$400,000 valuation, used as the total January 1st valuation, was understated. Because we can sell our interest in a company only once, it may be fair to adjust the redeemed stockholder's interest upwards. Since values change, the agreement could provide that participation in the increase would decline after the first 6 months at the rate of 1/18 a month for 18 months or 1/24 a month for 24 months. This provision also reduces the possibility of collusion or the

effect of pressure to set a low price. Liquidation or sale at a lower price should not result in a penalty to the stockholder, whose interest has been redeemed.

Arbitration

A standard binding arbitration clause is helpful to reduce the time and expense of disputes.

If retirement takes place when the individual is still young and healthy enough to be able to remain at work, a possible advantageous arrangement is to make part of the payments in the form of a covenant not to compete. Negotiated at arm's length, the covenant can be helpful because payments made (they must be specified in the agreement—including amount, for how long, for what restriction) are deductible to the company, when paid, and are ordinary income to the recipient. Depending upon the difference between the higher corporate income tax rate and the lower personal income tax rate of the retired recipient, the company may be able to pay more, and the retired stockholder receive more, than under a straight stock redemption plan.

THE NEW MANAGEMENT

Basic to any program to get out is a means of providing continuity of management—someone to pay for the getting out, whether it be by death, disability or retirement. Awareness of this management need should result in a difficult act: a review of the capabilities and potential of all managers to determine who is competent to run the company when the top people are gone. If the review results in the conclusion that available candidates are inadequate, stockholders-managers should take steps to attract potential or



proven managers. Consideration can be given to offering them the opportunity of acquiring an interest in the company.

If the company has potential but unproven managers, the current ownership should make plans (written and discussed) gradually to expand the manager's responsibilities in ways that do not endanger either the company's survival or the growth of the individuals. This takes careful, open participative planning and usually a change from centralized authoritarian (however, benevolent and paternalistic) decision-making. It is sounder to test likely managers while you are around than to have your widow, attorney or executor be forced to do so after you are gone.

Probably the best two ways to permit younger managers to invest in a company without requiring them to pay for past earnings are through: 1) recapitalization using preferred stock and 2) setting up a new company, capitalized with only the minimum operating assets needed to get started.

Under tax-free recapitalization, the bulk of the net worth is converted into preferred stock (frozen in value) and the balance into common stock to which future earnings accrue. The amount of common stock is kept small to make it easy for new managers to invest. For example, a company with a net worth (fair market value) of \$500,000 could be recapitalized into \$450,000 preferred stock and \$50,000 in common stock. A 10 percent interest in the future earnings of the company could be sold for \$5,000. Without recapitalization and using book value, a 10 percent in-

terest would cost \$50,000. The preference, dividend provisions, voting rights and proportions of the two classes of stock are infinite in their variety. Each company requires individual planning.

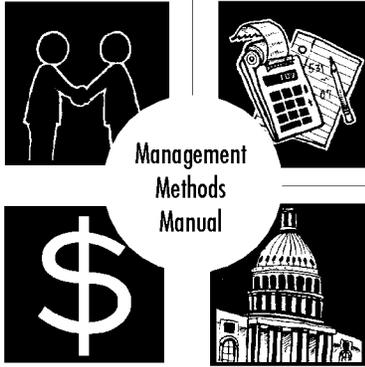
Similarly, the setting-up of a separate operating company as an offshoot of an existing one must be handled in the light of unique needs. Usually, the original company retains excess working capital and fixed assets, which are leased to the new company. In this way, the investment required to new stockholders—the continuing management who will be available to permit “getting out”—will be small enough to be digestible.

The proper insurance coverage can be a backstop in providing cash for the down payment, or the total amount needed under a buy-sell agreement, in case of the death of a prospective owner. Review your present coverage and needs. How much can you afford in premiums? Ask your insurance agent for terms and minimum deposit proposals.

SUMMARY

Plans for retirement should not be kept secret but announced to everyone concerned. The public announcement has the additional force of making it harder to delay the management change.

To summarize, plans for getting out have to start while you are still working. They must include provision for management succession and an individually designed buy-sell agreement.



Bulletin

Valuing the Closely Held Mechanical Contractor

INTRODUCTION

What is the closely held mechanical contractor worth in today's market? There are many reasons why an owner of a mechanical contracting business may need to know the value of his or her ownership interest. These include:

- Preparation for sale of a company
- Institution of an Employee Stock Ownership Plan
- Execution of buy-sell agreements among shareholders
- Donations of stock to charitable organizations
- Property settlements related to marital disputes
- Estate planning considerations, among others.

Given all of the above, the matter of valuing the stock (either common stock or preferred

stock) of the closely held mechanical contractor has become increasingly important.

How does one put a value on the stock of a closely held mechanical contractor when that stock does not trade on an exchange or in an active over-the-counter market? The first step in the valuation process involves determining the appropriate premise of value and defining that premise of value.

The term "fair market value" is generally appropriate for most valuation situations. "Fair market value" is defined by the Internal Revenue Service in Revenue Ruling 59-60 as "the amount at which property would be expected to change hands between a willing buyer and a willing seller, where neither party is under any compulsion to buy or sell and both parties have reasonable knowledge of relevant facts."

The business owner needs to be aware, however, that other premises of value *may* be appropriate in certain specific situations, and



that the definition of value is *critical* to the valuation process. As an example, the term “fair value” is a legal concept often used in dissenting stockholder actions, and may imply a different value than fair market value. Experienced corporate attorneys and valuation consultants can provide valuable assistance in determining the appropriate premise of value.

The second step in the valuation process involves the selection and application of appropriate valuation methodology. There are three traditional approaches to value—income, market, and cost. Each of these approaches may be used to develop an indication of the fair market value of the closely held mechanical contractor; however, the appropriateness of the approaches varies with the nature of the business being valued and the intended use of the appraisal.

The income and market approaches are generally most appropriate for profitable companies because the value of such firms is more dependent on the ability to generate earnings than on the value of assets used in generating revenues. For unprofitable or marginally profitable companies, a valuation consultant would consider the cost approach to a greater degree than for profitable companies, but the level of earnings is still considered in the valuation process.

The third step in the valuation process is to reconcile the value indications provided by the different approaches used, and make any required modifications to reflect the rights of the stockholder. For example, a *premium* would most likely be recognized over the value of the shares on a minority basis when the ownership interest subject to valuation represents control. Where the shares represent only a minority interest in the stock of a closely held company, the lack of a market and the

illiquid nature of the investment would be recognized by a *discount* from the indicated value as if the shares were publicly traded. Other adjustments might be required to recognize the existence of nonoperating assets or an excess or deficiency in working capital.

FACTORS TO BE CONSIDERED

Revenue Ruling 59–60 outlines the “approach, methods, and factors to be considered in valuing shares of closely held corporations for estate and gift tax purposes” and, as expressed in Revenue Ruling 65–192, is applicable to most other valuation situations as well. Revenue Ruling 59–60 pronounces the following items as fundamental in determining the fair market value of closely held stock:

- The nature of the business and the history of the enterprise from its inception
- The economic outlook in general, and the condition and outlook of the specific industry in particular
- The book value of the stock and the financial condition of the business
- The earning capacity of the company
- The dividend-paying capacity
- Whether or not the enterprise has goodwill or other intangible value
- Sales of the stock and the size of the block of stock to be valued
- The market price of stocks of corporations engaged in the same or a similar line of business having their stocks actively traded in a free and open market, either on an exchange or over-the-counter.

The following paragraphs present the typical analyses that should be completed and



the methodologies that should be considered in performing a valuation study. Specific examples related to the valuation of the closely held mechanical contractor are provided where possible. The valuation analyses should address each of the above factors emphasized in Revenue Ruling 59–60.

History and Nature of the Business

The history of a corporate enterprise will show its past stability or instability, its growth or lack of growth, the diversity or lack of diversity of its operations, and other relevant facts needed to form an opinion of the degree of risk involved in the business. The history to be studied should include:

- Nature of the business
- Products and/or services
- Operating and investment assets
- Capital structure
- Plant facilities
- Revenue and expense trends
- Management quality.

The analysis should place greater emphasis on conditions closer to the valuation date, as those conditions are of greater help in predicting future events and results. Events of the past that are unlikely to recur in the future should be discounted, since current value is based upon future expectancy.

Economic and Industry Conditions and Outlook

A sound appraisal of a closely held stock must consider current and prospective economic conditions as of the date of the valuation, including the national economy, the industry or industries with which the subject

company is allied, and the specific niche that the subject company serves. It is important to understand the relationship of the subject company's industry economics to the national economy as well as to complementary and substitute industry economics.

Prospective competition which has not been a factor in prior years should be given careful consideration in today's construction environment (e.g., high profits resulting from niche markets and lack of competition often lead to increased competition from contractors in relation to more competitive, less profitable specialties). Exhibits 1 and 2 provide examples of some of the factors that should be considered in performing an industry and competitor analysis as part of the valuation process.

Some of the key sources of information concerning projections for the construction industry include forecasts published by Engineering News-Record and the F.W. Dodge Division of McGraw-Hill, Inc., the U.S. Commerce Department, and Standard & Poor's, among others.

Financial Analysis of Subject Company

It is important to know whether the subject company is more or less successful than its competitors in the same industry, and whether it is maintaining a stable position with respect to those competitors. This is accomplished through a detailed financial review including a comparison to industry standards and comparable guideline companies. This review should include an analysis of the subject company's historical income statements, balance sheets and cash flow statements. It is most important to select a period of analysis that will cover the company's complete business cycle. Three, five, or ten years are typically chosen as a period of analysis.

EXHIBIT 1

Competitive Environment Analysis

This analysis focuses on the nature of the industry served by your firm. For each attribute, place a check by the descriptor that best describes the environment in which you operate.

Attributes	Environmental Turbulence Levels			
	Stable	Reactive	Anticipatory	Initiative
Market Structure	Monopoly	Oligopoly	Competitive	Multi-Competitive
Customer Pressure	None	Weak	Strong	Very Strong
Demand Growth Rate	Slow and Stable	Increasing and Stable	Declining/Oscillating	Fast/Oscillating
Stage in Industry Life Cycle	Maturity	Late Growth	Early Growth	Emergence
Profitability	High	High	Moderate	Low
Product Differentiation	None	Low	Moderate	High
Product Life Cycles	Long	Long	Short	Short
Frequency of New Products	Very Low	Low	Moderate	High
Economies of Scale	High	High	Moderate	Low
Capital Intensity	High	High	Moderate	Low
Critical Success Factors	Market Control	Market Share and Production Costs	Customer Perception and Distribution Service	Anticipation of Needs and Opportunities

EXHIBIT 2**Competitor Analysis**

Please identify your four primary competitors (for your company as a whole) and circle the main focus of their competitive advantages.

Company	Competitive Advantages					
	Marketing Technology	Distribution Performance	Price Added Features	Brand Loyalty Product Line Breadth	Service	Quality
	Marketing Technology	Distribution Performance	Price Added Features	Brand Loyalty Product Line Breadth	Service	Quality
	Marketing Technology	Distribution Performance	Price Added Features	Brand Loyalty Product Line Breadth	Service	Quality
	Marketing Technology	Distribution Performance	Price Added Features	Brand Loyalty Product Line Breadth	Service	Quality



The income statements should be as detailed as possible, and preferably will have been audited or reviewed by a public accounting firm. The appraiser will need to determine trends, separate recurring from nonrecurring events, distinguish between operating income and investment income, and ascertain the profitability or lack thereof of all business lines in which the subject company may be engaged. Often the divestiture of an underperforming business segment will substantially increase the value of the enterprise.

Analysis of the balance sheets over the selected period may reveal the acquisition of additional production capabilities or subsidiary companies, improvements or deterioration in financial position, and details as to recapitalizations and other changes in the capital structure of the entity. Analysis of the cash flow statements highlights the relationship of the company's working capital management to its cash flow.

The financial statements should be analyzed further through the use of ratio analysis. Financial ratios are often classified into one of five fundamental categories: liquidity, leverage, activity, profitability, and growth. Examples of relevant financial ratios in these categories include:

1. Liquidity

- Current Ratio
- Quick Ratio
- Receivables to Payables

2. Leverage

- Total Liabilities to Total Assets
- Total Liabilities to Equity
- Long Term Debt to Equity
- Net Assets to Equity
- Times Interest Earned

3. Activity

- Accounts Receivable
- Turnover
- Accounts Payable Turnover
- Working Capital Turnover
- Fixed Asset Turnover

4. Profitability

- Gross Margin Percentage
- Operating Income Margin
- Net Income Percentage
- Return on Total Assets
- Return on Equity

5. Growth

- Net Contract Revenues
- Net Income
- Total Assets
- Stockholders' Equity

These ratios are then compared to industry standards and comparable guideline companies. Sources of construction industry standards include Robert Morris Associates' "Annual Statement Studies", Prentice Hall's "Almanac of Business and Industrial Financial Ratios", Construction Financial Management Association's "Annual Survey", and various studies, reports, and statistics published by Engineering News-Record.

Company Outlook

The ultimate result of the appraiser's review of the history of the subject company and the nature of its business, economic and industry conditions and outlook, and relevant financial statements is his/her assessment of the subject company's outlook. The appraiser must use this information together with his/her industry and financial market experience to form a reasonable judgment as to the future prospects for the subject company.



VALUATION METHODOLOGY

Once the economic and industry analysis and financial analysis of the subject company have been performed, the appropriate valuation approaches (income, market, and/or cost) may be applied. For each valuation approach, an exhibit providing a hypothetical, over-simplified valuation model is provided. It should be noted that all multiples, discount rates, growth rates, etc. used in the exhibits are presented only as examples. These variables are critical to the valuation process, and a detailed analysis much beyond the scope of this publication is required to quantify the variables.

It is important to note that the value indication resulting from the application of each valuation approach may represent a different value "level" and may require further adjustment depending upon the ownership interest that is being valued. For example, the use of a market approach by reference to the market multiples of "freely traded" public guideline companies results in a value indication that represents "as-if-freely traded" minority interest value. This value must be adjusted upward by a premium for control if the ownership interest being valued represents a controlling interest. If the ownership interest being valued represents a small, minority interest in the common stock of a closely held company, then a discount for lack of marketability may be appropriate to determine "closely held" minority interest value.

In the income approach, the value indication may represent either a control value or an "as-if-freely traded" minority interest value, depending on the assumptions that were made in preparing the revenue and expense projections and on how the discount rate was derived. If the value indication represents control, successive applications of a minority interest

discount and a discount for lack of marketability are required to determine "closely held" minority interest value. If the value indication represents "as-if-freely traded" minority interest value, then only a discount for lack of marketability is appropriate to determine "closely held" minority interest value.

In the cost approach, the value indication represents control value. Successive applications of a minority interest discount and a discount for lack of marketability would again be required to determine "closely held" minority interest value.

Exhibits 3 and 4 present a balance sheet (as of a December 31, 199X valuation date)

EXHIBIT 3

ABC CONTRACTORS, INC. BALANCE SHEET AT DECEMBER 31, 199X

ASSETS	
Current Assets	\$4,500,000
Property and Equipment, at cost less accumulated depreciation	375,000
Other Assets	<u>122,000</u>
Total Assets	\$4,997,000
LIABILITIES AND STOCKHOLDERS' EQUITY	
Current Liabilities	\$3,260,000
Long-term Debt less Current Maturities	300,000
Other Liabilities	<u>50,000</u>
	3,610,000
Stockholders' Equity	<u>1,387,000</u>
Total Liabilities and Stockholders' Equity	\$4,997,000

EXHIBIT 4

ABC CONTRACTORS, INC.
COMPARATIVE INCOME STATEMENT

For Year Ended December 31,	199X	199X-1	199X-2	199X-3	199X-4
	\$	\$	\$	\$	\$
Revenues	13,290,000	12,192,000	11,427,000	10,284,000	9,255,600
Cost of Revenues	9,967,500	9,144,000	8,570,250	7,713,000	6,941,700
Gross Profit	3,322,500	3,048,000	2,856,750	2,571,000	2,313,900
Selling, General and Admin. Expenses	3,056,700	2,804,160	2,628,210	2,365,320	2,128,788
Operating Income	265,800	243,840	228,540	205,680	185,112
Other Income (Expense)					
Interest Income	20,000	18,000	16,000	14,000	12,000
Interest Expense	(25,000)	(28,000)	(31,000)	(34,000)	(37,000)
Total Other Income (Expense)	(5,000)	(10,000)	(15,000)	(20,000)	(25,000)
Earnings Before Income Taxes	260,800	233,840	213,540	185,680	160,112
Income Taxes	104,320	93,536	85,416	74,272	64,045
NET INCOME	156,480	140,304	128,124	111,408	96,067



and five years of historical income statements for ABC Contractors, Inc., the subject of our sample valuation.

Income Approach

In the income approach, value is dependent on the present worth of future economic benefits to be derived from ownership. In one form of the income approach, a discounted cash flow approach, value indications are developed by discounting future net cash flows available for distribution to equity shareholders to their present worth at market-based rates of return.

Cash flow is used because it is one of the most important elements in the financial management of a corporation. The ability of an enterprise to create cash inflows, meet cash requirements and provide for related financial and investing activities is an important determinant in the value of that enterprise. Cash inflows include earnings; depreciation, amortization and deferred taxes (since these are non-cash expenses); collection of debt principal; sales of assets; and reductions of net working capital. Cash outflows include repayment of debt principal, investments in fixed assets, and additions to net working capital.

A major requirement of the discounted cash flow approach is a forecast of income and cash flow. The forecast must begin a projection of revenues based on historical data, economic conditions, and industry conditions. Various income statement accounts are then projected based on their historical relationships to revenues or other pertinent variables. Statutory corporate income tax rates are used (assuming that the subject company is a C-corporation as opposed to an S-corporation or a partnership) to arrive at projected net income amounts.

Projected net cash flow is then calculated by projecting the various cash inflows and outflows described above. The net present value of the future net cash flows when discounted at an appropriate required rate of return, provides an indication of the value of the company's stockholders' equity.

A detailed discussion of discount rates is beyond the scope of this publication. However, the discount rate that is chosen must reflect the rate of return that would be required by a typical investor, given the various risk attributes of the subject company. One method commonly used to quantify a discount rate is the "built-up method". This method begins with the risk-free rate (for Treasury bills or bonds) and adds various increments for equity risk, industry risk, specific subject company risk, etc. Other, more sophisticated, models used to estimate a discount rate include the Capital Asset Pricing Model and the Arbitrage Pricing Theory.

Exhibit 5 is an example of a discounted cash flow approach used to value the stock of ABC Contractors, Inc. Net cash flows are projected over some future period that is usually consistent with the company's business planning period and/or is long enough to reach a period of stabilized earnings and growth. At the end of this explicit forecast period, continuing value is calculated by assuming that cash flows will continue to grow into perpetuity at an assumed growth rate. This "assumed growth into perpetuity" calculation is one of several methods that are often used to calculate a firm's continuing value (i.e., value beyond the explicit forecast period). Other methods include applying a projected price-to-cash flow, price-to-earnings, or market value-to-book value ratio.

In the example presented in Exhibit 5, the conclusion of value represents "as-if-



freely traded” minority interest value. As previously mentioned, this value must be adjusted upward by a premium for control if the ownership interest being valued represents a controlling interest. If the ownership interest being valued represents a small minority interest in the common stock of a closely held company, then a discount for lack of marketability may be appropriate to determine “closely held” minority interest value.

Market Approach

The market approach is based on the principle of substitution. This principle states that a prudent investor would pay no more for an asset than the cost of acquiring an equally desirable substitute on the open market. One form of the market approach, the guideline company approach, makes use of market price data of stocks of similar companies (the “guideline companies”) with financial comparisons to the subject company. Stocks of these corporations must be actively traded in a public, free-and-open market, either on an exchange or over-the-counter. Although it is clear no two companies are entirely alike, the guideline companies should be engaged in the same or similar line of business and should not be greatly dissimilar in terms of size. After various operating and financial comparisons are made, one may draw conclusions about the valuation ratios applicable to the subject company—compared to how investors are appraising the stocks of the guideline companies.

Three valuation ratios commonly used by both investors and appraisers are price-to-earnings multiples, price-to-cash flow multiples, and the ratio of market price to tangible book value. In selecting the valuation ratios applicable to the subject closely held com-

pany from among the range reported by the publicly traded guideline companies for each ratio, one must consider such items as the size and diversification of the subject company, liquidity position, the degree of financial leverage employed, historic and projected profitability, and growth prospects.

Exhibit 6 summarizes the selected valuation ratios for several publicly traded companies that were analyzed and considered to be comparable to ABC Contractors, Inc. Exhibit 6 also presents value indications for the stock of ABC Contractors, Inc. based on applying selected valuation ratios to the earnings and book value parameters of ABC. Once again, this value must be adjusted upward by a premium for control if the ownership interest being valued represents a controlling interest. If the ownership interest being valued represents a minority interest, then a discount for lack of marketability may be appropriate to determine “closely held” minority interest value.

Cost Approach

In the cost or asset-based approach, the fair market value of the subject company’s stockholders’ equity is developed by adjusting the company’s balance sheet to reflect the fair market value of its assets and liabilities at the valuation date. The fair market value of stockholders’ equity is then obtained by deducting the fair market value of the company’s liabilities from the fair market value of its assets.

Adjustments to the reported book values of inventories and tangible fixed assets (plant, property and equipment) are often required to reflect fair market value. In addition, “off-balance sheet” assets such as goodwill and going-concern value must be valued and included on the fair market value balance sheet.



EXHIBIT 5

ABC CONTRACTORS, INC.
DISCOUNTED CASH FLOW VALUATION MODEL
For Year Ending December 31,

	199X+1	199X+2	199X+3	199X+4	199X+5	Continuing Period
	\$	\$	\$	\$	\$	\$
Revenues	14,619,000	16,080,900	17,688,990	19,104,109	20,441,397	
Cost of Revenues	11,110,440	12,221,484	13,443,632	14,519,123	15,535,462	
GROSS PROFIT	3,508,560	3,859,416	4,245,358	4,584,986	4,905,935	
Selling, G&A Expenses	3,362,370	3,698,607	3,698,607	3,698,607	3,698,607	
OPERATING INCOME	146,190	160,809	546,751	886,379	1,207,328	
Other Income (Expense)	(5,000)	(5,300)	(5,618)	(5,955)	(6,312)	
Earnings before Income Taxes	141,190	155,509	541,133	880,424	1,201,016	
Provision for Income Taxes	56,476	62,204	216,453	352,170	480,406	
Net Income	84,714	93,305	324,680	528,254	720,610	
Add: Depreciation and Amortization	50,000	53,000	56,180	59,551	63,124	
Gross Cash Flow	134,714	146,305	380,860	587,805	783,733	
Deduct: Capital Expenditures	60,000	60,000	65,000	65,000	65,000	
Required Additions to Working Capital	132,900	146,190	160,809	141,512	133,729	
NET CASH FLOW (a)	(58,186)	(59,885)	155,051	381,293	585,005	620,105
Calculation of Continuing Value Divided by: Capitalization Rate (b)						19.0%
Continuing Value						3,263,710
Present Value Interest Factor (c)	0.8944	0.7155	0.5724	0.4579	0.3664	0.3664
Discounted Net Cash Flows	(52,043)	(42,850)	88,756	174,612	214,321	1,195,684
Sum of Discounted Net Cash Flows	1,578,480					
Divided by: Number of Shares Outstanding	10,000					
"As-If-Freely Traded" Minority	\$157.85					
Interest Value per Share Rounded	\$158.00					

(a) Net cash flow in Continuing Period is estimated at a 6% growth rate from 199X+5.

(b) Capitalization rate is calculated as the 25% discount rate less an assumed long-term growth rate of 6%.

(c) Present value interest factors are calculated using a 25% discount rate and assuming mid-period receipt of funds.

EXHIBIT 6

Guideline Company Valuation Model

	Guideline Companies				Low	High	Average	Chosen	Contractors \$	Value \$
	Company 1	Company 2	Company 3	Company 4						
Aggregate Market Value of Common Equity To:										
Most Recent 12-Month Net Income	9.0	10.2	12.4	9.8	9.0	12.4	10.4	10.0	156,480	1,564,800
5-Year Average Net Income	14.6	13.4	10.9	10.4	10.4	14.6	12.3	12.0	126,477	1,517,720
Most Recent Reported Tangible Book Value of Common Stock holders' Equity(%)	121.8%	116.2%	95.2%	179.1%	95.2%	179.1%	128.1%	125.0%	1,387,000	<u>1,733,750</u>
				Concluded Value						1,600,000
				Divided by: Number of Shares Outstanding						<u>10,000</u>
				"As-if-Freely Traded" Minority Interest Value per Share						\$160.00



The book value of inventories, which typically reflects the lower of cost or market value, should be adjusted to reflect estimated net realizable value. Net realizable value is equal to selling price less costs of disposal less a reasonable profit on the selling effort.

Tangible fixed assets are typically appraised using either a market approach or a cost approach. Prices for similar property recently sold or offered for sale are investigated and comparisons are made between the market comparative assets and the subject property, if the assets are of standard design and specification and a market exists (market approach). Such factors as the date of the sale or offering, the location, size, shape, utilities present, zoning, physical characteristics, maintenance history, age, and present and prospective serviceability and use are considered in arriving at the opinion of value. If the assets are of special design or specification or if market data on similar property is unavailable, estimates of the current cost new can be obtained from various pricing sources (cost approach). Current cost new is then reduced to recognize any applicable depreciation re-

sulting from physical deterioration, functional obsolescence, and economic obsolescence before reaching an indication of value.

Intangible assets of a mechanical contractor include assets associated with a going concern, such as an assembled and trained work force, customer relationships, the name and reputation of the business, goodwill, etc. These assets are often valued on a composite basis using an excess earnings method. Using the excess earnings method, a "normalized" level of earnings is reduced by fair returns on working capital and fixed tangible assets employed in the business. The excess earnings are then capitalized, at an appropriate capitalization rate, into an indication of value.

Liabilities must also be restated to fair market value in the cost approach. If the subject company has a below-market rate of interest on any of its debt instruments, then the fair market value of that debt may be below its recorded book value.

An example of a cost approach used to estimate the control value of ABC Company, Inc. is presented in Exhibit 7.

EXHIBIT 7
ABC CONTRACTORS, INC.
FAIR MARKET VALUE BALANCE SHEET AT DECEMBER 31, 199X

Assets	As Reported	Valuation Adjustments	Pro Forma
Current Assets	\$4,500,000	\$0	\$4,500,000
Property and equipment, at cost			
less accumulated depreciation	375,000	225,000	600,000
Other Assets	122,000	(22,000)	100,000
Intangible Assets	0	250,000	250,000
TOTAL ASSETS	\$4,997,000	\$453,000	\$5,450,000
Liabilities and Stockholders' Equity			
Current Liabilities	\$3,260,000	0	\$3,260,000
Long-term Debt less Current Maturities	300,000	20,000	320,000
Other Liabilities	50,000	0	50,000
	<u>3,610,000</u>	<u>20,000</u>	<u>3,630,000</u>
Stockholders' Equity	1,387,000	433,000	1,820,000
Divided by: Number of Shares Outstanding			10,000
"Control Value" per Share			<u>\$182.00</u>



Reconciliation of Value Conclusions

In the previous example, three valuation approaches were used to provide value indi-

cations. A summary of the value indications with the value “level” that they represent is as follows:

	Income Approach	Market Approach	Cost Approach
Control Value “As-If-Freely Traded”	TBD	TBD	\$182.00
Minority Interest Value “Closely Held” Minority	\$158.00	\$160.00	TBD
Interest Value	TBD	TBD	TBD

Additional Considerations in Valuing a Controlling Interest

The value indications provided by the discounted cash flow approach and the guideline company approach represent equity value on an as-if-freely traded minority interest basis. The indication of value provided by the asset-based approach, however, represents value on a 100% controlling interest basis since it is not derived from discount rates or valuation ratios that reflect the ownership rights in, or the liquidity of, minority interests in publicly traded stocks. Therefore, in valuing a controlling interest, the discounted cash flow approach and the guideline company approach value indications must be adjusted for a premium for control.

A premium for control may be justified by the controlling shareholders’ ability to enhance the operating characteristics and thereby increase the cash flows of the company. Some of the more important prerogatives of control include electing directors and appointing management, determining management compensation, declaring and paying dividends, acquiring or liquidating assets and determining policy. A premium for control also is intended to reflect potential synergis-

tic benefits that might result from a sale of the company. These synergistic benefits may be achieved through consolidation of marketing channels, purchasing systems, production facilities, overhead functions, warehousing and transportation systems. Since a minority interest lacks these prerogatives of control and the ability to achieve synergistic benefits, it follows that the minority interest discount is the transformation of the premium for control.

The size of the premium for control, and related minority interest discount, applicable to the subject company depends on the earnings streams anticipated and also on market conditions. In order to analyze market conditions, one must examine merger and acquisition activity in the market. An experienced valuation consultant can assist with research in this area.

Additional Considerations in Valuing a Minority Interest

As discussed above, the indications of value resulting from application of the discounted cash flow approach and the guideline company approach are on a minority interest basis, since the discount rate (dis-



counted cash flow approach) and ratios (guideline company approach) used in each approach are based on minority interest transactions in public company stocks. However, the indication of value resulting from application of the asset-based approach is on a control basis and does not yet recognize the fact that a minority investor would not pay “full control value” for the assets.

One method of quantifying the minority interest discount is based on premiums for control that have been paid in the market.

$$\text{Minority Interest Discount} = \frac{\text{Premium for Control}}{1 + \text{Premium for Control}}$$

and

$$\text{Minority Interest} = \frac{\text{Minority Interest Discount}}{1 - \text{Minority Interest Discount}}$$

Therefore, an indication of an appropriate minority interest discount can be calculated following the estimation of a premium for control, as described above.

It may also be appropriate to apply a discount for lack of marketability to the “as-if-freely traded” minority interest value that results from the discounted cash flow approach, the guideline company approach, or the asset-based approach (after minority interest discount). This is because the lack of a public market for the shares of the closely held company is a condition that would make a potential minority investor offer less for the shares than their publicly traded value, since the liquidity of a security holding has value to an investor over and above the intrinsic value of the underlying business. In quantifying the discount for lack of marketability, one must consider such items as flotation costs (the costs of taking a company public, if practicable), rel-

evant tax court decisions, and factors such as the size of the holding being valued, the volatility of share prices of comparable publicly traded companies, and the quality of earnings and dividend payout ratio of the subject company. Again, an experienced valuation consultant can assist with research in this area.

VALUING PREFERRED STOCK

Revenue Ruling 83–120 was issued by the Internal Revenue Service in order to amplify Revenue Ruling 59–60 and specify additional factors that must be considered in valuing preferred stock of a closely held company in a recapitalization. The IRS determined that, in general, the most important factors to be considered in valuing preferred stock are dividend yield, dividend coverage, and protection of liquidation preference.

The dividend rate of a preferred stock issue must be adequate in order to support a value of the preferred stock at par value. Adequacy is measured by comparing the dividend rate of the subject preferred stock to the dividend rate of high-grade, publicly traded preferred stock. Dividend coverage, or the ability of the company to pay the stated dividends on time, is measured by various coverage ratios such as asset coverage, earnings coverage, and fixed charge coverage. Inadequate coverage indicates that the value of preferred stock is lower than its par value. Finally, consideration must be given to whether the issuing company will be able to pay the full liquidation preference at liquidation. Asset coverage ratios are calculated and compared with the ratios for high quality preferred stock to determine adequacy of coverage.

Various other factors to be considered in valuing the preferred stock issue include the



existence of voting rights, redemption privileges, and any covenants or provisions that could inhibit the marketability of the stock or the ability of the owner to enforce dividend or liquidation rights. It is only after a careful analysis of all of the above factors that the value of a non-publicly traded preferred stock can be determined.

SUMMARY

The income (discounted cash flow), market (guideline company), and cost (asset-based) approaches are three generally accepted valuation approaches used by appraisers and valuation consultants to value the stock of closely held companies in general, and that can be used to value the stock of the closely held mechanical contractor in particular. Each approach may be appropriate depending on the nature of the subject company's business and the purpose of the appraisal. The use of more than one approach requires a careful analysis to ensure that the basis of value is consistent among the approaches, and a reconciliation of the indicated values.

In summary, it must be recognized that the valuation process reflects a complex set of factors that cannot be captured in a single formula. Determining the value of the stock of the closely held mechanical contractor involves a careful analysis of market data and market conditions, as well as a detailed investigation into the financial position, performance and outlook for the subject company.

Ernst & Young Valuation Services Group for use by the Mechanical Contractors Association of America, Inc. and its members. Because the matters covered herein are complicated, this publication should not be re-

garded as offering a complete explanation and should not be used for making decisions. Any suggestion should be reviewed with your attorney and valuation consultant.

For additional information, contact Ernst & Young through John L. Heffron at 215/448-5526, Lee C. Russell at 215/448-5099, or Lawrence W. Signorelli at 410/783-3818.

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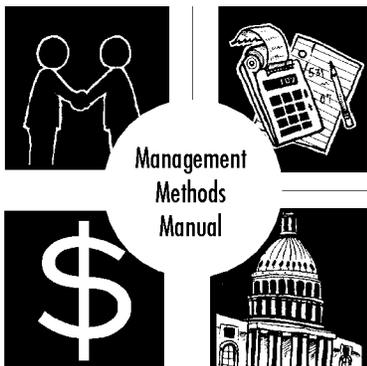
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Bulletin

The Management Audit: Peer Group Guidelines

Foreword

In connection with the peer reviews discussed below, it should be emphasized that the host company and the reviewers comprising critique teams should not be in competition with one another. Serious antitrust problems, such as price fixing and bid rigging, can emerge from the sharing of competitively sensitive information; in particular, job selection criteria, estimating techniques, and overhead and markup determination. If a host company desiring to conduct a peer review finds it impractical to form a critique team comprised wholly of non-competitors, it should consult with its legal counsel as to excluding certain types of information from the scope of the audit. Under no circumstances may contractors agree not to compete with each other, either generally or with respect to particular projects.

INTRODUCTION

Numerous external influences are making it more and more important for mechanical contractors to find ways to manage their businesses effectively and professionally. Non-union competition, difficulty in obtaining sufficient bonding capacity, and the growing tendency of construction owners and general contractors to prepurchase major equipment, squeeze the margins and extend payment cycles of their subcontractors are but a few of these negative influences.

In order to survive and grow in this increasingly hostile environment, mechanical contractors must become better managers and business professionals. Achievement of success in today's environment is increasingly complex and requires a far greater understanding of the principles and best practices of running the mechanical contracting firm.

Where can a mechanical contractor obtain this understanding? Certainly many worthwhile efforts are being made by MCAA and other organizations to provide knowledge



and assistance in this area through publications, seminars and convention programs. Universities, consulting firms and business authors have made the continuing education of managers into a major new market for their services, usually at very high cost. But most of these resources are not familiar with our business and try to adapt methods used in completely different industries. However, all of these are valid approaches, but all require time and effort on the part of the contractor, who often has difficulty applying the lessons offered for his own situation.

MANAGEMENT AUDITS

Many have turned to management consultants for quick solutions. Due to the high cost of the consultants' time, however, these outsiders are forced to rush to conclusions, and often their reports and recommendations either fail to grasp the particular situation completely and come out sounding totally "canned," or at least they have not had time to establish credibility and gain the trust and confidence of the owner and/or managers of the company.

A similar approach to this which has been used successfully in recent years by many businesses, including mechanical contractors, is the management audit. Essentially, this technique involves the use of a detailed checklist similar to the checklist used by many management consultants for their consulting assignments. Management audits can be self-administered or done with outside assistance.

The problem with the self-administered audit is that a busy owner/manager is unlikely to spend the amount of time required to thoroughly plan, organize and document the extensive amount of material required to perform

the management audit properly. In very brief summary, to execute the technique properly one needs to have written descriptions of every aspect of his company as if he were making a formal presentation to a committee of outside professionals. Few busy mechanical contractors have the discipline, the time or the management skills to accomplish this difficult process on their own in order to derive maximum benefit from their efforts. Simply "thinking through" the details of the checklist achieves very little result. Most of the systems and procedures used by a company have been developed by the owner/manager or passed down by the previous management. It is inherently difficult for one to be objective in criticizing the operation one has created or followed.

If a contractor has an outside board of directors or board of advisors—one made up of independent business people who neither work in the company nor provide any services to the company—he has the right kind of forum to assist with a management audit. Presentations to an outside board must be well-organized and complete. However, periodic meetings of such a board are necessarily of brief duration and unable to handle even a significant fraction of the large volume of detailed information prepared for a proper management audit, except over an extended period of time. Experience has shown that such boards, not being familiar with mechanical contracting, are not successful in advising management on operations. Further, boards consisting of employees or family members are reluctant to suggest to the owner/manager that his systems may not be the best.

PEER GROUP CRITIQUES

Another approach which can work very well is the peer review, a critique carried out



by a contractor's peers. Several groups of contractors have been informally organized to meet periodically and assist each other through idea exchange to run their respective businesses more professionally and more profitably. It should be noted here that these groups are not organized, sponsored or controlled by MCAA.

Those considering forming such a group should consider the following characteristics:

1. Geographic dispersion of group members—if there is competition in the same market areas, it will be difficult to share sensitive information. (See Note on page 1.)
2. Similarity in size/type of work done.
3. Generally from six to ten member firms per group.
4. Principals of the firms generally know and trust each other before joining such a group.
5. A common desire to learn from each other and to improve the operation of their companies.
6. A willingness to disclose confidential information to fellow members such as statements, salaries, methods, procedures, the good and the bad, is essential.
7. Above all, an acceptance of the fact that there are always ways to improve every contractor.

MCAA membership becomes a good vehicle for forming this kind of affiliation because of the exposure members gain to other members from all over the country through attendance at annual conventions, technical or management seminars, and particularly through work on MCAA committees or the board of directors.

The critique outline, which is an Addendum to this bulletin, is the basis of the audit

process. The entire group convenes at the host contractor's place of business for several days of intense review of policies and procedures, discussions with both management and non-management personnel, study of facilities and methods, and detailed investigation of the contractor's accounting, cost control, estimating, purchasing and project-management systems. In this process, personnel relations problems, heretofore unknown to the management, will frequently surface. Care must be taken to keep knowledge sources completely anonymous. The reviewers are not there to identify and recommend discharge for any personnel, though they may suggest investigation of anyone suspected of dishonesty, substance abuse or obvious lack of competence.

The key to a successful critique is the thorough, complete preparation of "the company manual" and a careful review of this material by all of the visiting contractors before the critique. The magnitude of the preparation task should be indicated by the following:

Properly prepared materials conforming to the appendix generally fill up a four- or five-inch, three-ring binder, depending on the size and complexity of the organization. While much of the content will already exist, most participants have to spend a great deal of time and effort to update policies and procedures, write operating and marketing plans, and document numerous informal systems. Above all, this manual should tell it like it truly is—not as you wish it were. By being completely frank and honest in this preparation, the host contractor will know more about his company than he did before the preparation.



Creation of “the company manual,” the process of organizing and writing down in a presentable and understandable form the way we want our companies to work makes us come to grips with many important issues. The host contractor sometimes learns from the critique process that some of his systems do not function at all like he thinks they do. An important benefit which always results from the critique is a great improvement in communications among and within most of the departments in the company. The associated learning process is three-fold: (1) clarifying ideas on how we *want* our company’s systems to work; (2) learning from our employees and peers how they really *do* work; and (3) hearing input from our peers on how they probably *should* work.

While similar mechanical contracting firms are probably more alike than they are different, there are many factors which prevent the “text-book solution” from working in all cases. Different market conditions, unique skills of some personnel, physical facilities, the goals and ambitions of the business owners, and how a company is capitalized are just some examples of what often makes companies unique.

Guidelines For Peer Group Critiques

1. Companies must have absolute openness with each other.
 - a. Requires close personal relationships. There is no room for false pride or egotism in this process.
 - b. Exchange all company data. (See Note on page 1.)
 - Financial statements
 - Salary schedules
 - Insurance and bonding data
 - Bonus, profit sharing, and stock option plans

- Strategic planning
- Procedure/policy manuals
- Brochures, videos, marketing tools
- Forms, report formats
- Estimating and bidding techniques
- Project management, status reports, labor scheduling and control
- Change order procedures

2. Attitude toward critique must be “like a drunk going to AA.”
 - a. Must admit you need help.
 - b. Most companies do a few things well, a few absolutely miserably, and the rest adequately.
 - c. Above all, resist the attitude “they don’t understand” or “their suggestions might work (in every city in America), but they won’t work in Podunk.”
3. The critique format must be rigidly defined beforehand.
 - a. Must not let the critique become a “brag session” for the host company.
 - b. Preparation of the company manual is the key.
 - c. Don’t waste time looking at jobs. This is just another form of bragging and not productive.
4. Basis for critiques is the “company manual.”

Recommended Agenda for the Critique—Three-Day Session

1. Day One.
 - a. Critique team members arrive before noon of Day One for group luncheon:



- Host principal describes any problem areas on which he /she wants group to focus.
 - Critique group plans critique and sets priorities and agenda.
 - Possibly time for tour of office, shop and warehouse facilities.
- b. Evening of Day One-cocktails/dinner:
- Host company has *all* key people there (it's not a bad idea to invite pretty much everyone except field people unless the company is too large).
 - Principals of host company sit separately (so employees will feel free to talk).
 - Critique team members disperse themselves among host company employees.
 - Best to have place cards at the tables so you can match reviewers to host personnel.
 - Reviewers really try to draw host personnel out about:
 - Pride in the company
 - Morale
 - Attitude toward company leadership
 - How the company is really doing
 - Individual goals—is the person with the company for the long term?
2. Day Two.
- a. Reviewers meet for 7:00 a.m. breakfast/get to host company by 8:00 a.m.
- b. Split up into teams of four to five people:
- The more reviewers you have, the better.
 - Imperative the host company prepares its people by telling them to be absolutely candid.
 - Imperative the reviewers reassure the people that no individuals will be put on the spot.
 - Must get the department heads out separately, or their subordinates will not open up.
 - Ideally, should split the people into groups of one to two with each reviewer.
 - Host company should prepare for the review by identifying potential problem people/departments.
 - Each team goes to every department.
 - Company manual is reviewed/challenged-every form, procedure, etc.
- c. Lunch 12:00–1:00:
- Best to have lunch brought in (going out takes too long).
 - Exclude the host personnel from the room so discussion can continue.
- d. After departmental reviews finished:
- Principals and department heads meet with reviewers.
 - No holds barred Q & A session. May interview principals individually.
 - This session may last two to four hours.
- e. Evening of Day Two:
- Key host people.
 - Possibly outside professionals—lawyer, accountant, banker, insurance/bonding, outside board members, if any.



- Seating planned strategically to promote open exchange of information.

3. Day Three.

a. Reviewers meet for 7:00 a.m. breakfast:

- No host personnel present.
- Reviewers meet in groups as they toured and form conclusions:
 - Strengths
 - Weaknesses
 - Recommendations
 - Danger spots.
- Group appoints a reporter:
 - Conclusions are written out for presentation to the host company.
 - Reporter delivers the group's report to the principal of the host company.
 - Best if host principal does not rebut the report until it has all been presented.
- Typical reaction is resentment/assertion that the reviewers don't understand the situation.
- Following this meeting, everyone leaves.

Generally it takes the host principal about two weeks to digest the criticism and to begin taking constructive steps to implement.

Follow-up

1. Host company photocopies the report and sends to all members of the group.
2. At the next meeting, the principal reports his actions as a result of the review. He should report: what has been done; what

is in process; and what is rejected, won't be done, and why not.

Observations and Recommendations On Agenda

1. Don't attempt critique until you have visited all your companies:
 - Learn as much as you can about each other.
 - Start to develop your manuals by dealing with one or more topics at each of your company visits.
2. Allow enough time:
 - Everyone should arrive in time for lunch the first day.
 - No one should plan on leaving before 3:00 p.m. the last day.
3. Most host company personnel must be properly briefed to talk openly to the interviewers.
4. One-on-one contact is the key to finding the problems.
5. Department heads must not be in their group when it is interviewed.
6. The critique group should meet prior to starting the departmental reviews:
 - Questions need to be coordinated.
 - Each group asking the same questions becomes boring to the employees.
 - The reviewers should divide themselves up into groups (not the host):
 - By interest areas, e.g., sheet metal, accounting, etc.
 - By personality.
7. The host company should solicit questions from its employees (anonymous, of course):



- What areas do the employees want probed?
 - What questions do the employees want the reviewers to investigate?
8. The company manual should include the company's salary schedule:
 - Only the principals should get this information.
 - Send it separately from the manual.
 9. Reviewers must balance "war stories" with questions:
 - Host company people want to know how reviewers handle situations.
 - Reviewers are there to learn more than to "teach."
 10. There may be little value in the dinner with the outside professionals:
 - They are not going to be critical of their clients.
 - Perhaps the most value is having the reviewers form opinions about the quality of the outsiders.
 - Discussions may turn up opportunities to reduce fees or interest rates, or improve services.
 11. Under no circumstances should the host principal be allowed to hear the discussion of the "conclusions" meeting:
 - Give the principal a chance to challenge/rebut after the report is finished.
 - Group may decide to give audio tape of session after presentation is made.
 12. Time is of the essence:
 - As little time as possible should be spent traveling and on "housekeeping" items.
 - The principal of the host company must act as the timekeeper and be sure schedule is followed.
 13. The conclusions are not always correct but experience has shown them to be right far more often than wrong.
 14. The second critique is generally more valuable than the first.

CONCLUSION

It is not an easy thing for an experienced, successful mechanical contractor to hear his company criticized, sometimes severely. However, constructive criticism from capable contemporaries as described in this bulletin becomes an extremely positive, beneficial experience, and one which is sure to enhance his company's profitability.

1. History of company



ADDENDUM COMPANY ANALYSIS

1. History of Company
 - A. When founded, by whom, why, how
 - B. Early years—briefly
 - C. Major changes in structure, philosophy, type work, area, personnel, particularly in last five years.
 - D. Last five years in some detail
 1. Larger jobs (outstanding, unusual, type, areas)
 2. Bid versus negotiated
 3. Principal customers
 4. Company share of market or rank in area
 5. Company policy, philosophy and objectives
2. Biography of principal officer(s) and key people such as division managers and department heads
 - A. Age, family, military service, outside interests, hobbies, clubs, directorships, civic or professional recognition or awards
 - B. Education (degrees, licenses, certifications, continuation interest, seminars)
 - C. Professional and trade memberships, officerships
 - D. Work experience (company, products or type of work, position, duties, responsibilities)
 - E. Present duties and responsibilities
3. Organization structure (chart and work flow chart)
 - A. Work flow from bid to completion of job
 - B. Duties and responsibilities of key people
 - C. Brief outline on background of key people
 - D. Decision making, including limits
4. Bidding and estimating
 - A. Choosing what to and what not to bid and why
 - B. Getting plans (deposits, purchases)
 - C. Vendor lists and notices
 - D. Subcontract and equipment solicitation techniques
 - E. Scope letters, out-of-town setups, etc.
 - F. Take-off and pricing techniques (material, who prices)
 - G. Labor estimating
 - H. Breakdown of take-off (who, how)
 - I. Job overhead determination
 - J. Determining markup (who, how)
 - K. Design/build, preliminary engineering and estimating



ADDENDUM (continued)
COMPANY ANALYSIS

- L. Corrections or last-minute procedures
 - M. Samples of forms used
 - N. Interrelation of estimating, engineering, operations, management, purchasing, and any other departments
 - O. Costing of construction equipment
 - P. Use of EDP, present or future
5. Purchasing
- A. Equipment and subcontracts (recap sheets, policy, who buys)
 - B. Material (perpetual inventory, by job, segmentation, delivery schedules, surplus disposal, pickups)
 - C. Tools (by job, stock, open order, etc.)
 - D. Capital equipment (who and how)
 - E. Confirm and/or price all orders (why or why not)
 - F. Limits of authority to purchase (who and how much)
 - G. Samples of purchase orders and subcontracts
6. Execution of work
- A. Who is in charge?
 - B. Forms used (how, why, when)
 - C. Engineering review of plan and spec work (who, when, depth)
 - D. Design and specifications on design/build work
 - E. Job manning, startup, tooling, organization
 - F. Field control of labor
 - G. Field reporting (cost, progress)
 - H. Field transportation
 - I. Truck dispatching
 - J. Tool control techniques
 - K. Subcontract control
 - L. Drafting (planning, samples, how much)
 - M. Prefabrication (how, what, who plans and supervises, how costed)
 - N. Delivery scheduling
 - O. Use of GPM (bar chart, other)
 - P. Labor coding, short interval scheduling
 - Q. Capital equipment (allocation, costing, maintenance)
 - R. Status reports (preparation, review, frequency)
 - S. Labor analysis, percent complete (who, when)
 - T. Purchase take-off (who, breakdown, other uses)



ADDENDUM (continued)
COMPANY ANALYSIS

7. Sales and public relations

- A. Brochures, fliers, mailers, ads, PR efforts, letters, TV or radio, Service Department
- B. Salesmen (how paid, qualifications)
- C. Entertaining (limits)
- D. Leads and cooperation with manufacturers' suppliers
- E. Cost-plus or lump-sum negotiation and why
- F. Participation in charity and civic affairs (who, how much)
- G. Professional and trade associations
- H. Club memberships and policy

8. Service Department

- A. Do you have one?
- B. Billings (amount, percent of volume, profit, percent of total)
- C. Overhead allocation (how)
- D. Who is in charge?
- E. Separate company? (location, personnel)
- F. Billing procedure (who does it, when, markup on labor and material)
- G. Collection procedure
- H. Callbacks
- I. Manpower (problems, training, commissions, trucks)
- J. Inventory

9. Corporate financial structure

- A. Stock (classes, preferred, bonds, capitalization)
- B. Stockholders (percent each)
- C. Voting trusts or other restrictions
- D. Directors (who and principal occupation)
- E. If outside directors, why?
- F. If not outside directors, why not?

10. Accounting

- A. General description
- B. Type equipment
- C. Personnel (number and duties)
- D. Use of outside CPA
- E. Type of statements (percent complete, audited)
- F. Tax return (percent complete, completed contract—which one and why)
- G. Interrelations (accounting with management, estimating, purchasing, contract administration, labor analysis, status report)
- H. Billing procedure



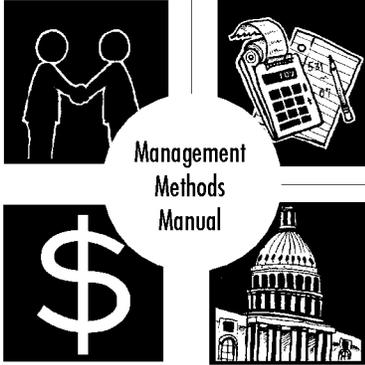
ADDENDUM (continued)
COMPANY ANALYSIS

- I. Payables procedure
 - J. Cash forecasting (short-term, long-term)
 - K. Employment of surplus funds (see item O)
 - L. Collection procedure
 - M. Banking and borrowing
 - N. Deviation from MCAA manual
 - O. Subcontract retainages
 - P. Asset management
11. Insurance program
- A. Independent agent(s)? Stock company or mutual? Negotiated or bid?
 - B. Retrospective clause? (experience)
 - C. Type coverage and limits
 - D. Umbrella
 - E. Executive and director liability protection
 - F. Design and engineering (company indemnify PE? E&O coverage?).
 - G. See item C. Discuss floater, completed contract explosive and excavation in detail.
 - H. Group and life, including stock redemption
 - I. Premium pay method
 - J. Use of insurance company safety and other aids
 - K. Services by bonding agent
 - L. Independent consultant, Insurance Buyer's Council (IBC)
12. Compensation scheme
- A. Salaries
 - B. Bonus
 - C. Profit sharing and/or pension
 - D. Medical plans
 - E. Salary continuation
 - F. Other fringes
 - G. Company car
 - H. Expense account
 - I. Vacation
 - J. Memberships
 - K. Tickets
 - L. Use of company equipment, labor, etc.
 - M. Side ventures
 - N. Loans
 - O. Stock distribution or options



ADDENDUM (continued)
COMPANY ANALYSIS

13. Financial history for last five years
 - A. Statements
 - B. Profit and Loss
 - C. Ratios (which ones are determined regularly, how do you use them, what decisions do you make from them)
14. Areas of weakness
15. Areas of strengths
16. Future planning (one-year, two-year, five-year, volume, type, areas, personnel, financial, training). Information on the company's personnel policy and administration, whether formal or loose, recruitment plans for both field management and office management—where, how, main specs (age, education, experience), training programs present and contemplated (in house, outside, formal, planned, informal).
17. Management information systems (present use, future plans)
18. Marketing concepts (present and future)



Bulletin

Total Quality Management

INTRODUCTION

Total Quality Management is a business concept that has proven very beneficial to many companies around the world. The Mechanical Contracting Foundation in conjunction with The Trane Company has begun a process that will enable contractors to become informed about the subject of Total Quality Management and adopt Total Quality Management for their businesses.

This is the first in a series of bulletins to be published by the Management Methods Committee for the purpose of informing the mechanical contracting community about Total Quality Management.

Before any company can decide whether to adopt a Total Quality Management approach to their business, they must first understand the concept. This bulletin presents an overview of Quality and Total Quality Management.

QUALITY

It seems that not a day goes by when we don't hear this word. People are always talk-

ing about quality. We hear it in television commercials; we read about it in newspapers and magazines; trade and business organizations offer seminars and courses on "quality."

What's the big deal? Why all this emphasis on quality?

There is a quality revolution occurring in the United States out of necessity. Quality is vital to business survival. Foreign competitors, especially the Japanese, have greatly increased their share of the American market, particularly in the areas of consumer electronics, automobiles, steel, machine tools, and optics. Their success in these areas is due to the superior quality of their products and services.

The Japanese have been working on continuous quality improvement since the 1950s. Japanese management has discovered that companies whose processes produce continuously high quality products and services reap a three-fold benefit:

- Lower costs
- Higher profit margins
- Larger shares of the market.



As the quality of their products and services improved, customer satisfaction and expectations increased. The result: American consumers prefer many Japanese products and fewer American companies are able to compete. Today, the Japanese are a very serious threat in any business in which they choose to compete. Perhaps the contracting industry will be in their sights next!

American business finally became aware of the situation in the 1980s. Many progressive companies realized that, in order to compete effectively in today's marketplace, the quality of the goods and services they provided must be second to none. While the Japanese have had a tremendous head start, American business has made great strides in the last decade and continues to rapidly close the quality gap with the Japanese. Some American companies, such as Motorola, are now the preferred supplier to Japanese companies.

The Japanese have attained their pre-eminent status by adopting a Total Quality Management approach.

TOTAL QUALITY MANAGEMENT (TQM)

First of all, Total Quality Management is grounded in one basic focus—customer satisfaction. Satisfying our customers by meeting their requirements and expectations every time is the underlying goal of Total Quality Management (TQM).

There are several definitions of TQM and most are similar to the following:

“A continuous, structured approach that ensures the creation and control of error-free processes which consistently meet our customers' expectations.”

Note that this definition describes TQM as continuous. It is an ongoing, never-ending process that demands time, resolve, hard work, consistency of action, and significant cultural change. It requires commitment on the part of all the people at every level of an organization, whether large or small, and a well-laid-out strategy and plan to implement the process.

TQM recognizes that the quality of the goods and services that any company produces is the sum of the quality of individual employee's output. Therefore, TQM concentrates a great deal of effort on defining and better satisfying each employee's business requirements with the understanding that internal improvement leads to improvements for our external customers.

TQM consists of four basic concepts called the four keys of quality management:

The First Key is: Quality is meeting customer requirements. In the past, we all have had our own definition of quality: Good, shiny, attractive, expensive . . . and the list goes on. These definitions make it very difficult to measure and manage quality. The definition used in TQM makes quality a very specific item. Quality is meeting our customers requirements. We must talk to our customers to discuss their needs and our ability to satisfy them. The customer is the final judge of our conformance to the requirements.

The Second Key is: The system for causing quality is prevention. This is a proactive approach that requires an organization to adopt a system that removes opportunities for errors before they can occur. It involves studying work processes to determine where defects can occur and then changing the process to keep them from happening.



Prevention of problems or defects is always less expensive in the long run than fixing problems after the fact.

The Third Key is: An attitude that customer requirements will be met each and every time. For some, this implies perfection; that mistakes or errors will never be made. This is not the case. In the past, many businesses operated with an attitude that embraced an acceptable quality level standard. This has led individuals to believe that errors are expected or at least acceptable to a given level. Often this attitude is self-fulfilling. In our ever more-competitive markets, it is this attitude that is unacceptable. An attitude of meeting customer requirements is a personal performance standard that each employee must decide to adopt. It is a part of TQM training to assist all members of an organization to adopt this attitude.

The Fourth Key is: Measurement. It is vital that a system of measurement be established because measurement plots progress toward targets and goals and provides the personal incentives needed by individuals contributing to quality improvement. Quality measurements can measure the output of a business process directly and indirectly. Most importantly, measurements provide a means of determining progress or impressions, and they simplify the process of documenting quality improvement results.

These four keys of quality management must become a part of the organization's culture if true quality improvement is to occur. This will require changes in attitudes and values on a company-wide basis. For this to happen, management must want it to happen, the work force must be trained to possess the skills to enable it to happen, and information on results must be freely and openly available so that it can be seen to happen.

Responsibility for continuous improvement must be passed down to the lowest possible operating levels. The role of management is to train and prepare their staff so that they are able to assume responsibility and to provide guidance and encouragement to all in their quality improvement efforts.

The contracting industry has seen a rapidly accelerated rate of change and business challenges during the past few years. It is very likely that this situation will continue into the foreseeable future. In today's competitive environment, those businesses that differentiate themselves from the competition through a commitment to continuous quality improvement will prosper and grow in the 90s.

A recent government study of 20 companies, which were among the highest scoring applicants for the Malcolm Baldrige National Quality Award, reported the following average annual percentage improvements:

- 10% decrease in errors
- 11% decrease in customer complaints
- 12% decrease in order processing time
- 11% improvement in product reliability
- 14% increase in market share.

Other studies provide the following examples of results achieved in the construction industry:

- 17% savings in direct job labor costs
- 20% savings from reduction in home-office overhead
- 5% savings from reduction in subcontractor costs



- 22% increase in revenue from repeat business.

These results were reported by firms that have made a serious commitment to TQM.

The external customer makes all of the effort worthwhile. Ultimately, it is what the external customer wants that drives the mechanism of TQM.

Customer requirements are often very basic. They want systems to work, they want to feel they have obtained value for the money spent, they want phone calls returned when promised, action when promised, knowledgeable and polite service, and, yes, the job finished on time. Every employee of every department has a critical part to play in the quality profile of a company.

TQM is not to be taken lightly. Its successful implementation demands obsessiveness from a company's senior management and involvement by all who work for the company. If this is accepted, then TQM is capable

of far reaching beneficial results. Improved quality will definitely lead to higher profitability and growth, and work becomes a far more pleasant experience for all employees.

CONCLUSION

Adopting a TQM approach to business will result in many benefits. However, it is very important to realize that improvement is not often achieved in large, quantum leaps but rather is achieved through a series of many small incremental improvements to an organization's business processes and activities.

The type of business doesn't matter, be it manufacturing or service, fast food or mechanical contracting. Quality is no longer an option! It is the single most important aspect of business today. Those progressive firms which will be successful in the 1990s recognize the importance of quality and the need to adopt a TQM approach to their businesses.



Bulletin

Mechanical Contractor's Guide to Crisis Management

Development of a plan to train the project management team to respond and effectively minimize the impact of a jobsite crisis.

OVERVIEW

The project management team at a mechanical contracting company deals with a myriad of problems and issues daily, from a vendor shipping incomplete orders to dealing with out-of-sequence work and deciding how to keep the job flowing smoothly. The purpose of this bulletin is to encourage the development of a plan to address crises that lead to serious injury/fatality, such as crane accidents, falls, natural disasters or other such incidents.

The same project management team that deals with the day-to-day job-site problems will also necessarily be the first to react to a crisis. It is vital that the team is trained in reacting to the crisis to prevent additional death, injury or property damage, as well as limit damage from incomplete or inaccurate media coverage, and deal professionally and compassionately with the affected individuals.

Time is critical in a crisis. The company already has a plan to evacuate the jobsite and assemble for accountability. There is also a plan to summon and guide emergency medical system

personnel to any injured parties. In a binder on the jobsite, project management should have a list of hazardous chemicals to secure to limit further damage. If sub-contractors are directly involved with the crisis, their management will have to be among the first contacted. As for your company, notify immediately upper management and the loss control department. Plan to make other calls later to the human resources department, payroll, information systems, etc. as required.

PREPARE A CRISIS MANAGEMENT PLAN

When a crisis affects either a company or a jobsite, company officers and jobsite management personnel will be faced with multiple issues and demands. A plan that has been established, communicated and practiced can assist the company in managing the crisis. Here are some tips for an effective crisis management plan:

1. **Separate the responsibilities of crisis management from crisis communication.** Assign one person to manage the on-site issues, another person to be the liaison with first responders (police, fire, etc.) and public officials (OSHA, EPA, etc.), and another person to notify family of injured personnel and to accompany any injured workers to a medical facility.
2. **Assign a media spokesperson.** In the event of injuries or deaths, the spokesperson should be the highest ranking company official possible. Those responsible for managing the crisis should report to the media spokesperson to ensure that information about the crisis is accurate and timely. And be sure to assign a back-up.
3. **Assign a person to monitor social media networks.** Direct that person to correct any false or misleading information immediately.
4. **Put the plan in writing, update it annually, and communicate roles and responsibilities to all parties.** Consider staging a mock disaster drill at least annually to practice roles and to be prepared.

SEQUENCE OF RESPONSE

Crises, like accidents, are not always predictable; by definition, they are inopportune. There must be a selected group of individuals on each jobsite who are trained to handle emergencies. The primary burden will fall on the project manager and general foreman, but they will need the support of many others to effectively manage a crisis.

Initially, the project manager will likely be the senior company representative. If the project manager is not on site, this duty will fall to the general foreman.

The primary immediate concern is to secure the area. Take the steps that are already in your established crisis plan and identify any individuals who are injured or deceased. This could be someone with whom you have worked for years, and/or also could be a friend. Regardless of personal emotions, very critical steps must be taken immediately:

1. **Designate a responsible person to accompany the EMS transport of the deceased and injured.** These people must be familiar with hospitals and effective in relaying information back to the company.
2. **The project manager or project executive should notify family members/next of kin concerning the deceased or injured.** This is a particularly difficult task, and requires training beyond the scope of this bulletin.
3. **Local and/or federal authorities may have to be notified.** There will be case-by-case decisions to be taken on this point. For example, a large oil spill or a chemical leak must be reported. In extreme cases, the surrounding local community may need to be evacuated.
4. **The spokesman or project manager should keep the work force informed.** Release personnel when you can, reminding them not to speak with the media. Keep sufficient work force members on hand to perform tasks as needed. The loss control department shall communicate with medical facilities on the status of the hospitalized and injured. Loss control will update the workforce and management.

5. **After all authorized investigations are complete, start the clean-up procedures** to ensure the work-site can return to normal operations at the earliest opportunity.
6. **As necessary, the main office will have to assist with information gathering**, historical records, payroll assistance for the injured or deceased, and possibly preparation of checks as required. Information services might have to assist the recovery of electronically stored material and telephone assistance.
3. **All information should come to the crisis management team for evaluation.** The media will need to know: Who? What?, When?, Where?, Why?, and How? Because of the inherent confusion in a crisis, there may be conflicting reports and inconclusive testimony from witnesses. Only information deemed accurate will be passed on to the spokesperson.
4. **To the greatest extent possible, try to be in a position to communicate with the media within 30 minutes.** If not, give the media a time frame within which you will be able to address them. Have an agenda ready before the interview process starts. Be succinct, specific and get to the point right away. Do not offer conclusions unless you are sure of them.

DEALING WITH THE MEDIA

In the event of a crisis, the media will invariably be involved. A “no comment” strategy rarely is a good idea. The media will usually find someone else to talk with, and then the company loses complete control over the story. A good media communications plan that can convey the facts about the incident and explain how the company is taking positive steps to address the crisis will almost always be a better strategy. Consider the following:

1. **Issue strict orders that neither company employees nor sub-contractors are to speak to the press.** All questions from third-party sources must be directed to the designated spokesperson.
2. **If a job-site crisis has occurred, prepare an area for the media.** The media’s job is to find information and prepare their story. The better the company can accommodate them and disseminate objective, accurate, timely information, the more influence you will have on the character of the reporting. The spokesperson should be trained in dealing with the press. (see Crisis Management and Presentation by Janine Reid. Copyrighted © 2000 by Janine L. Reid Group, Inc.).
5. **Keep the press informed with current information.** Keep the information objective by refusing to speculate on answers. Information from the jobsite, hospital, and some historical information about the company will need to be assembled and disseminated
6. **Never, ever lie to the media.** Be accurate. If you make a mistake, stop and correct yourself.
7. **PRnewswire.com is a possible way to control Internet news** where the company can post its own story.

RETURNING TO NORMAL OPERATIONS

After the crisis has subsided, it is critical to identify the cause and establish training throughout the company to prevent a similar

occurrence in the future. If there was a fatality or serious injury, care must be taken to restore morale on the jobsite. Outside assistance in the form of counseling may be required.

If the crisis incident involved sub-contractors or vendors, company management must evaluate contractual and business relationships to provide continuity in business affiliations.

Legal consultation may be necessary to protect the company's interest throughout the crisis.

SUMMARY

Although the mechanical contracting industry has placed its highest priority on safe work practices on the jobsite, the potential exists for significant crisis incidents. Develop a company plan to deal with the immediate situation to prevent further harm, care for the injured or deceased, warn the local community, and deal with the publicity. By effectively limiting the impact of such a crisis, you could save your company's future.



Bulletin

Disaster Recovery Getting Your Business Back in Operation after a Disaster

Overview

Every company should have plans to deal with emergencies and disasters. Plans well executed could save lives, minimize loss of assets, and even save the entire business. A catastrophic event to your building does not need to result in catastrophic losses for your business.

How well you are prepared for such an event will make all the difference in assuring business continuity and having peace of mind. Being prepared means having:

- A strategy to protect or duplicate vital resources
- A plan to respond to emergencies
- A plan for recovery from a disaster, including access to vital resources
- Resources to support your recovery plans

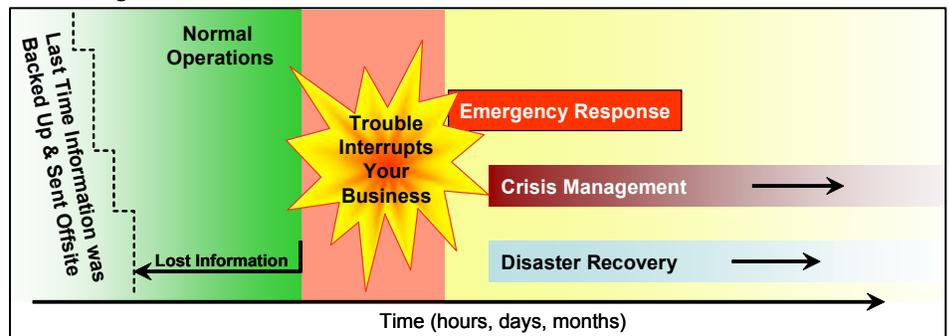
Often, for convenience, **Emergency Response** and **Disaster Recovery** Plans are written as a single document. However your plans are written, they need to be current and thoroughly familiar to managers and certain staff who will lead the organization in the recovery effort. This MCAA Management Methods Bulletin will guide you through developing a **Disaster Recovery** plan or improving an already existing plan.

This bulletin corresponds well to various public

standards, including ANSI NFPA1600, BS25999, HIPAA Security Rule and Sarbanes-Oxley guidelines that may pertain to your business.

Emergency Response vs. Crisis Management vs. Disaster Recovery

This MCAA Management Methods Bulletin is about **Disaster Recovery**. The differences



between **Emergency Response**, **Crisis Management** and **Disaster Recovery** are often confusing, and it is important for you to understand those differences. The above graphic depicts a timeline showing when each of these plans is utilized after a significant event causes an emergency, crisis, or disaster:

Starting at the left, note the dotted line that represents times during normal operations that information (hard or soft copy) critical to your business is backed up from one media to another (usually disk to tape) and the backup copy is sent and stored off site in a safe

location. Different data are backed up at different times. When a business interruption occurs and critical information is lost, backup copies from different points in time are then available for use in staging a recovery. The time between the last backup and the interruption is a period during which new information may have been added but is no longer available. That data is now lost, and any information that is not an affordable loss must be recovered from paper files, business partners, clients, etc.

Emergency Response

Typically, a substantial interruption to business operations is followed quickly by your **Emergency Response**, as shown in the table above. Steps are taken to protect employees, notify local emergency units, assess the situation and salvage physical assets where possible.

Crisis Management

This is followed immediately by **Crisis Management**, which involves contacting employees and suppliers, taking steps to prevent further damage and secure facilities, and dealing with customers, stakeholders and the press. Sometimes, a “crisis” is not operational and does not affect a facility, such as incidents related to sudden market shift, product failure, labor relations, executive succession, public perception, or a cash crisis. Each of these incidents requires executive intervention and serious attention and falls into the category of **Crisis Management**.

Disaster Recovery

If the incident is an operational interruption, such as by fire or flood, we consider this a “disaster,” and **Disaster Recovery** protocols go into effect, as described below. **Disaster Recovery** is the subject of this bulletin.

In the section below, we define the elements in the chart and discuss how they relate. Later, in the section *Why the Difference Matters to You*, we discuss how you would need to respond.

Definitions

For the purposes of this bulletin, the meanings of certain terms are detailed as follows:

Emergency: an urgent, usually unexpected occurrence requiring immediate action prior to the decision to declare a disaster.

Crisis: an unexpected de-stabilizing event that may threaten an organization’s personnel, revenue, reputation or ability to deliver customer service.

Disaster: any significant disruption that forces a mission-critical business function to relocate, at least in part, to a location different from its normal location, on a temporary or permanent basis.

NOTE: A “disaster” falls into the “crisis” category; an “emergency” can develop into a crisis. Many crises are not *operational*, such as *product failure, labor relations, adverse international events, or sudden market shift*. A “disaster” is always a crisis, but it is only one type of crisis.

SAMPLE SCENARIO: It is mid-morning and severe weather is predicted. Decisions need to be made about whether employees should be sent home. This is an **emergency**, for which immediate action (decision-making, preparation for the storm and communication with personnel) is necessary. If the storm hits hard, the facility may be damaged and workers may be frightened. This is a **crisis**, where senior management must deal with employee concerns and welfare, communication with clients and vendors, possible first aid, facility repair, productivity, and a host of administrative issues. If some or all of the business processes need to be moved to another facility, the scenario becomes a **disaster**. It requires logistics for workforce mobilization, notification of personnel, distribution of supplies to the recovery site, and allocation of technical resources, such as computers and telephones.

Why the Difference Matters to You

Emergency Response is about people – their safety, their emotional well-being, and their behaviors under pressure. (It is not about business resumption.) It is also the period of time during which the determination is made as to the extent of the potential impact and the

type of management response that is appropriate under the circumstances. Emergencies require short term response.

Crisis Management is about organizational control during a crisis. It provides for executive, employee, client and vendor inter-communications, problem resolution protocols, common language among decision-makers, administration, and coordination of service continuity activities. It also addresses public and customer relations immediately following a serious incident. It typically follows the **Emergency Response** and is longer term.

Disaster Recovery is about re-establishing and sustaining the flow of mission-critical business processes to serve business objectives at an alternative site. With continuous process flow, a business can maintain a strong financial basis, keep its good reputation, comply with regulations and the law, and serve its clients.

Your plans for **Emergency Response** include fire drills, notification of personnel during severe weather, dealing with medical situations, suspicious activity at your office, elevator failure, bomb threats and the like. **Disaster Recovery** efforts typically come into play once the emergency has been or is being handled. This bulletin on **Disaster Recovery** focuses on business resiliency and continuity. We discuss **Emergency Response** and **Crisis Management** only as they relate to **Disaster Recovery**.

A Word about Pandemic Response Planning

A pandemic is a worldwide epidemic. There has been a good deal of press for the past few years about the potential for the H5N1 virus (also known as “Avian Flu” or “Bird Flu”) to become transmissible between humans. To date, the virus seems to be contagious only from birds. Severe pandemics occur approximately three times per century and generally kill millions of people. It is a serious matter on a personal level, since the current mutation has killed more than half of the people it has infected. The virulence of the virus is likely to diminish if it mutates to a human-transmissible form, but it will still be dangerous.

Such a pandemic could have a serious impact on businesses, and most large corporations are considering how they would respond to the unavailability of large percentages of personnel for several weeks. Epidemiologists estimate that the U.S. workforce could be diminished by 30 to 60 percent during an H5N1 pandemic.

As we have defined “disasters” as the need to move functionality to another location, pandemic response does not fit neatly into the **Disaster Recovery** arena. However, it is not to be taken lightly, and you may want to consider the matter in your **Crisis Management Planning**. There are things you can do to mitigate the impact of a workforce outage and also preventive measures you can take to limit the spread among your employees. This is a complex, separate topic that lies within the scope of **Crisis Management Planning**.

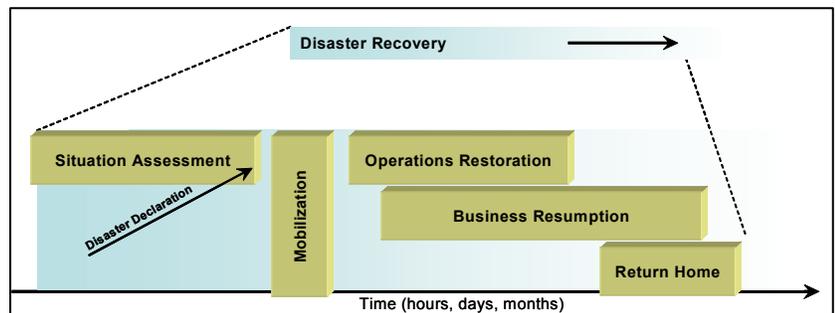
What You Need for Disaster Recovery

The Disaster Recovery Process

To recover from a catastrophic event that causes a disaster, you need to know:

- How to get out (**Emergency Response**)
- Where to go when you do (**Disaster Recovery**)
- What you’ll need when you get there (**Disaster Recovery**)
- What to do after you arrive (**Disaster Recovery**)
- What to tell employees and others (**Crisis Management**)

In the diagram below, we focus on the **Disaster Recovery** process. This process is represented by the bar labeled **Disaster Recovery** in



the diagram on page 1. In the diagram above, we show additional detail.

Once the **Emergency Response** is in progress, principally for the safety of personnel, a team can begin to assess the situation. This assessment may result in the “declaration” of a disaster. It is important to restrict *authorization to declare* to high-level executives, since the resulting movement of function and people could be an expensive proposition.

As soon as a disaster is declared, employees must be mobilized to set up functionality at an alternative site. This is largely a technical matter with assistance from your facility and administrative departments. If you have subscription services from vendors who provide recovery services, they need to be contacted to activate the services you’ve been paying for. For example, if you have been subscribing to a recovery site, they need to prepare for your arrival. Your off-site data storage services vendor needs to move the latest data to your recovery site.

At your alternative location, technicians need to set up, configure, connect and test equipment, install software as needed, and prepare the site for use. Once the site is ready for use, your workers need to execute their recovery plan roles – sending the right people at the pre-planned times and knowing what to do when they get there. Meanwhile, technology personnel continue to prepare for more arrivals and support the employees who need special help adjusting to the new environment.

Returning home shifts recovery steps into reverse and requires just as much care.

Strategy

This section summarizes six areas important in recovering resources to maintain business strength in the face of disaster: **Information, Tools, Workspace, Processes, Plan Maintenance, and Funding**. Following these summaries, we provide a level of detail that may help you to write your **Disaster Recovery Plan**.

Minimizing Information Loss: Business information is stored in many forms – computer readable data, ledgers, paper files,

books, and human memory. It is difficult to recover the latter if people perish, but most other information media are recoverable if you plan appropriately. There is some information you can reconstruct or do without and some you can obtain from outside entities (publishers, regulators, vendors, competitors, etc.), but much information critical to the business requires pre-disaster protection from permanent loss.

Tools to Continue Operations: Consider the tools you need every day to produce the results clients expect and that you need to run your business. Without computers, trucks, and flat-bed printers, could you produce those results? Could you continue to operate?

Place for People to Work: Your field personnel would continue operating even if your headquarters were unavailable – provided headquarters functionality could be sustained and office workers could continue to support field operations. Therefore, office workers need a place to work. Some employees might be able to work from their homes if the technology and controls are in place to make that possible.

Knowing What to Do: This is the recovery plan document that tells people where to go, what to do when they get there, who is accountable for what, what resources are available for recovery, and what information you will need, such as phone numbers of recovery team members, other employees, and vendors.

Rehearsing and Maintaining the Plan: Shortly after any recovery plan is declared complete, it is out of date. If your business is like most, things change daily. Your plan needs to be maintained in a form that is easily modifiable and easy to re-distribute. Most plans are maintained online in whatever word processing software is used in your company. Even with a current plan, however, it isn’t much use if people don’t know what it contains and how it should be used. The best way to accomplish this “orientation” to the plan is by staging a simulated incident for employees to experience. These rehearsals are usually called Table Top Exercises.

Funding the Recovery Effort: Insurance coverage could help you financially during and after the often painful experience of recovering your business functionality. Moreover, having adequate coverage could get you back on line quicker.

The following sections detail the above strategy areas...

Minimizing Information Loss – Data Recovery

Most business executives understand that there is some information they cannot afford to lose. If that information resides only in certain people's memories, you know it must be documented to protect it. Even outside of a business disaster, people can become unavailable, and their unavailability should not be cause for the business to suffer. If the information is only in paper files and it is critical, you may need to copy those files (electronically by scanning or on more paper) and store the copies offsite. Similarly, electronic data can be lost if it is not backed up and stored in some form at another location. Consider the diagram on page 1 of this bulletin. Working backward from the business interruption event, note that the amount of data lost depends upon the last time that data was backed up and sent off site. There is a technique called "data replication" that can shorten that time-frame to subseconds, so that virtually no data is ever lost because at any given moment, the data just entered was immediately sent off-site over a remote network. You may consider this capability for extra-critical data.

Data shared with clients or business partners may not be lost if your facility is lost, but you need to ensure that your clients or partners know of this dependency and would be ready to help you replace that data in the time you would need it following a disaster. Likewise, if the data you cannot afford to lose includes books, professional documents, selected magazine articles, product information, and off-the-shelf computer program disks, make sure you know how to get this information in the time needed by listing the items you receive from vendors, book-stores, etc. as well as corresponding contact information. Maintain this list off site.

Tools to Continue Operations

If you have accounted for the recovery of data you cannot afford to lose by backing it up and storing it off site, you have taken the most important step to recovery. However, you now must consider where you will restore that data.

For backup data on computer tapes, you will probably need to load those down to disks, and you will need computer "servers" to process the information and make it accessible to employees and possibly to clients and vendors. You will also need computer networks (LAN for "Local Area Network" and WAN for "Wide Area Network" where *local* means *in office*), which consist of equipment and telephone lines. For telephone lines, you will need telephones and the centralized in-office equipment that runs those phones. Printers and scanners also are needed and must be connected to your computers, and photocopy machines that do not require computer connections are just as important. These things are basic to your technical services that will need to be restored, but tools are not just about computers and phones.

Do field personnel park their business-owned trucks in your office parking lot? If you lost the office building and the equipment stored nearby, assume that you could lose that equipment. Ask your field supervisors to make a list of essential equipment that field employees need and that are typically stored in the office or just outside. Then, have someone investigate how long it might take to replace this equipment. If the replacement turnaround time is longer than the time you would need the equipment, you might consider having extra equipment standing by, storing your equipment in another place, or distributing your equipment across multiple sites.

Place for People to Work – Alternative Workspace

Your business cannot function without people. As obvious as that sounds, even large corporations forget that their people need a place to work, and that place must be equipped with resources that people need – computers, file cabinets, desks, phones, high-speed networking equipment, etc. Furthermore, if

certain groups of people need to be near other groups in order to be productive, separate hotel rooms, for example, may not work.

You are well advised not to plan for enough alternative workspace to accommodate all personnel immediately following a disaster. The more you pre-allocate, the higher the cost. Consider how many people you will need in the first few hours, the first day, the first week, etc. If you are using a commercial recovery-site, negotiate for lower subscription fees in exchange for higher occupancy fees at the time of a disaster. The latter should be covered by Extra Expense Insurance.

Knowing What to Do – a Documented Plan

The most important recovery plan is the one that tells people what to do at the time of a catastrophic event. This plan should be as clear and succinct as possible so that anyone following the plan is not distracted by unnecessary and extraneous instructions and facts. For example, when a disaster occurs, few people are concerned about how the plan was maintained or tested or who backed up the right data and how it was sent off site. Those elements of preparedness belong in a supporting plan.

Rehearsing and Maintaining the Plan

A plan untested is better than no plan at all – but not by much. Testing the plan at the time of a disaster allows no room for failure. At the very least, the technology components of your plan should be tested. Other tests are possible, including notification tests and Table Top Exercises to give key employees a top level view of the plan and a chance to practice it under safe circumstances where mistakes are allowed.

Plan maintenance procedures need to be set up so that the plan is updated periodically. Names and contact information will change, vendors may change, and the need for recovery resources may increase or decrease. Review and update your plan at least quarterly, and keep in mind that the more often you update the plan, the smaller the number of updates.

Funding the Recovery Effort – Insurance

No amount of financial compensation after a disaster will ensure that you will be able to continue critical business functions. Only a proper, viable plan with supporting resources will make that possible. However, insurance coverage could provide financial resources that will help you to fund the recovery effort and ease the strain during difficult times. Having adequate coverage may help you to recover more rapidly from a catastrophe. The following types of insurance apply to operational crises:

Extra Expense Insurance: This type of insurance is designed to pay for expenses you would not ordinarily incur unless you had a disaster. For example, it covers fees to: retrieve data from an offsite storage location, use a recovery site for equipment, or occupy alternative workspace.

Business Interruption Insurance: This type of insurance pays only for “loss of profit” due to an outage. It does not cover all revenues that you might incur by not doing business. Furthermore, you will need to document for the insurance company exactly how much profit you would have gained had the disaster not occurred.

Insurance to Cover Loss of Assets: This type of insurance is designed to pay for the loss of assets specifically identified in the insurance policy. Typically, it does not cover consequential losses. For example, if you are able to put a value on certain data, but the loss of that data causes major business disruptions that result in other losses, the insurance company will pay only for the value you assigned to the data.

A common question: “Will a recovery plan reduce my insurance premiums?” Not likely, but you should speak with your insurance agent. We do not recommend doing recovery planning to reduce insurance premiums. Taking preventive measures may help. Do what your business requires to ensure the ability to survive. If other benefits follow, so much the better.

The Recovery Planning Process

Standard Methodology

Large and small organizations have similar needs in arriving at a recovery strategy. You need to know, for example, the kind of damage a disaster could do to your business. Large corporations conduct a formal "Business Impact Analysis" for this purpose. In smaller firms, it is possible to do such analysis more intuitively, but you still need to be aware of what you can and cannot afford to lose. Corporate contingency planning has evolved over the past decade to employ planning tools to achieve a specific order of objectives. The following diagram, formalized by Eagle Rock Alliance, illustrates this order of objectives.

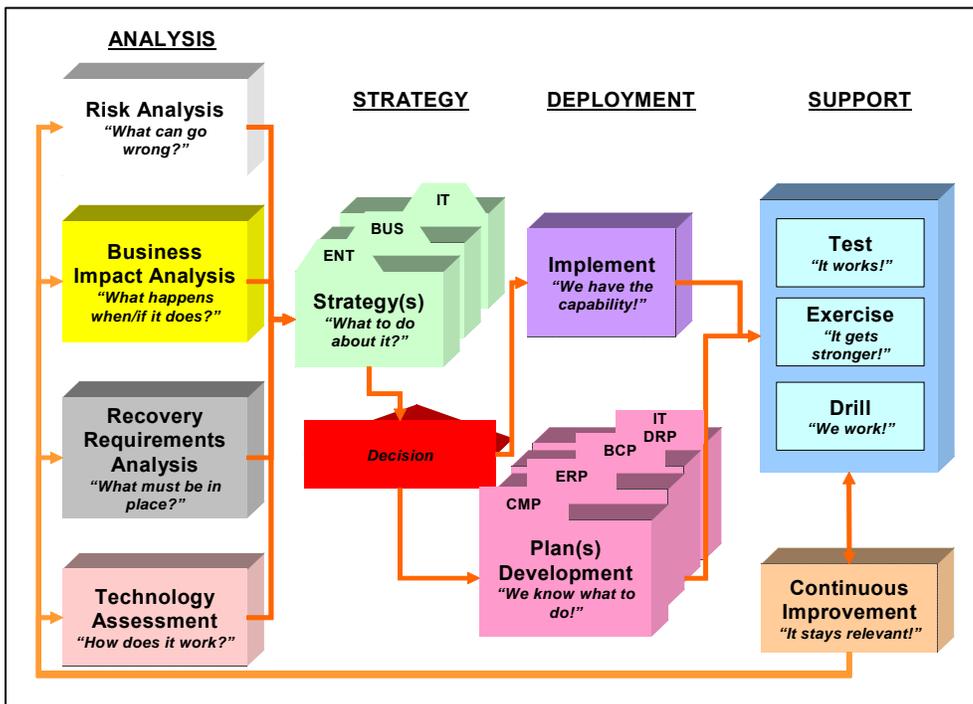
The Simple Approach – a Quick Start

The simple approach to **Disaster Recovery Planning** is to ensure the ability to survive.

Cover your greatest exposures first with a simple plan – not necessarily well-documented – and put a program in place to gradually build upon that plan. Protecting your greatest exposures is a 1-2-3 process:

1. **Protect your employees** with training in **Emergency Response** procedures.
2. **Protect critical information** by having data backed up and cycled off site regularly.
3. **Protect business processes** by arranging for an alternative location where your most critical people can operate temporarily.

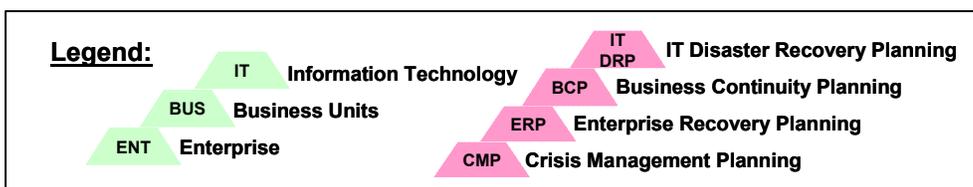
The nemesis of the simple approach is thinking that you need a full-scale recovery plan tomorrow. Not true. As with any business function, you need to start somewhere. Strive for progress, not perfection. You can tune your most basic program as you have time and funds.



Shortcomings of the Simple Approach

Once you have started with the simple 1-2-3 approach, take a breather, but do not stop there. As Will Rogers asserted, "Even if you're on the right track, you'll get run over if you just sit there."

While you were developing the first simple, *business survival* plan, you may have found items that you would like to have that are better than mere survival. You may want, for example, to ensure the ability to position your business for continued profitability. When you consider the issues beyond mere survival, some questions will occur for you: What can go wrong, and what might you lose when it does? (See the "Standard Methodology" diagram to the left.) What would I need to



have in place to minimize disruption to critical processes, and how would the recovery technology work?

The simple approach is a great start, but not the end of the road. Ultimately, it's smart to have a comprehensive and well-documented plan.

If You Do NOT Have a Plan...

You may not have a documented plan, but even if you have not started with the "simple approach," you probably have the basis for a "strategy" in mind. Most organizations do. For example, you may have thought about the need to back up critical information and store it at an off-site location. You may have actually arranged this activity but do not consider it part of your **Disaster Recovery Plan**. You may have considered where critical personnel might work if your primary location were to become unavailable. Even if you have only thought about these things or are just beginning to consider them based upon this Bulletin, you are headed in the right direction. Consider the 1-2-3 Simple Approach above to get started, after which you can rest assured that you've postured your company for a *good chance* to survive in dire circumstances. Having accomplished that feat, you've bought yourself some peace of mind and some time to take the next step. Following are some things you can do to ensure survival.

Beyond the Quick Start

- Check out free resources, such as www.ready.gov for **Emergency Response**.
- Assign a planner or planning team from within or outside your firm.
- Identify your greatest risks.
- Develop a strategy to deal with the greatest risk.
- Write a plan to document the strategy.
- Implement the plan.
- Socialize the plan among the stakeholders.

What to do next

See the next section of this Bulletin.

If You Already Have a Plan...

Your existing recovery plan may be all that you need. It may cover those exposures which you consider to be the most damaging and most likely. You may feel that your organization can handle smaller risks without significant planning or preparation. On the other hand, previous planning may have been constrained by limited funds or insufficient time to plan, or maybe you thought it was enough at the time but have a different perspective today.

Plans are typically dynamic and are always subject to change as business circumstances change. It is usually worthwhile to perform a regular review of your plans.

Improving Your Plan

The first thing you need to do is to take stock. Where is the plan meeting business objectives and where is it not? If you have a plan and resources to back it up, you are spending time and money on the ability to recover from a disaster. Improving that plan may cost *more* time and money, and you need to know what you are protecting so that those resources are not spent unnecessarily.

Upon serious reflection, most contingency planners agree that their recovery plans protect high-level corporate objectives, namely to maintain:

- Fiscal strength (revenues, investments, assets)
- Customer service and a positive corporate image
- Legal compliance (regulatory, contractual, etc.)

Your business processes support those objectives. Which processes are most critical in doing so, and how much downtime can you afford for each of those processes and still meet corporate objectives? This is what a Business Impact Analysis is about.

You can perform a formal analysis or make some "educated estimations" about process downtimes. Be careful in your estimations, as they will play an important role in where you focus your recovery planning energies. A few years ago, a large service organization began

to heavily fund recovery of their billing process, assuming that it was the most critical element in generating revenues. Upon further analysis, they realized that loss of billing for as much as a month would only DEFER revenues – which the CFO asserted was acceptable, but that lost customer service (their call center) could result in permanent loss of customers and a much greater loss of revenue in the long term. The result of this new understanding was a shift in funding recovery of the more critical process. The lesson learned was not to be deceived by what APPEARS to be obvious.

Once you truly understand where to focus your planning efforts, your next step is to determine what it would take to recover critical processes within your estimated acceptable downtimes. Given that you already have a plan, this next step may involve shorting up existing recovery resources, or you may wish to revamp your strategy entirely. If the latter, you'll want to consider the options available to you. "Alternative Site and Backup Options," beginning on page 11, provides a list of recovery options and what they mean. For you to select judiciously from the options, you might research the field of reliable vendors, determine which viable options match your preferred strategy, and perform a cost-benefit analysis. Costs vary widely among vendors, so it is wise to do your research completely – and negotiate!

The options listed in this bulletin are of a general nature – to provide basic understanding. A truly comprehensive analysis of recovery options viable for your situation should be performed by your technical personnel after your business needs are defined. Make sure that your technically oriented personnel are in synch with the business need so that they do not over-estimate or under-estimate the technical requirement. For example, if your data-loss tolerance for a particular system is two days, real-time remote replication is probably over-kill and needlessly expensive. Similarly, do not ignore new technologies, such as wireless solutions, that enhance flexibility greatly for little additional cost.

One final note about improving your plan: being recoverable in the face of a regional type outage is more than just recovering your own capabilities. You need to consider your supply

chain. Will your most critical vendors be able to provide supplies when you need them? You might wish to check with your vendors to determine how resilient they are to a regional outage.

Reviewing and Exercising Your Plan

Your **Disaster Recovery** plan is a dynamic document that needs to be in constant synch with changing situations and business needs. Most plans are reviewed at least semi-annually. A review can be as simple as an internal audit or as complex as a full-scale recovery exercise.

A good way to determine where and when your plan needs to be improved is by testing it regularly. Benefits of exercising your plan run the gamut from raising awareness to validating the interplay of all recovery components. It includes notification tests, equipment component tests, network switching, data restoration tests, and table top (simulation) exercises. The latter is becoming increasingly popular in exercising **Emergency Response** and **Crisis Management** as well as **Disaster Recovery** but usually involves some external skills in design and facilitation. The payoff, however, is in considerable participant understanding and "buy-in" at all levels of the organization.

Who Owns the Plan?

In a small business, the owner of the business is often the owner of the plan. The owner has prime responsibility, but usually holds others accountable for such matters as ensuring that backups are sent off site regularly, that the plan documentation is kept current, that recovery procedures are tested, that vendor contracts are maintained, and that information about the plan is communicated to critical employees. Often, these accountabilities are given to one person. Industry analysts indicate that in most small firms, Business Continuity Management reports to the CEO, another high-level executive, or the Board of Directors.

Solutions and Costs

Solutions to recovery issues vary greatly from company to company. They depend upon potential impact and your tolerance for risk.

The chart on page 11 contains some options from which you might choose for recovery site and information backup.

The combination of solutions you choose will contribute to the cost, and while this cost varies from business to business, there are rough estimates you might consider for planning purposes. The cost of maintaining a Business Continuity Program is often \$1,000 to \$2,000 per employee and usually less per employee at the higher end due to economies of scale. It includes:

- Fees to an off-site storage vendor
- Employee time to sustain the program and/or consulting fees
- Contractual fees for Recovery Site for equipment and/or workers

- Quick Ship contract and/or special recovery equipment
- Document scanning or copying
- Time and materials to disseminate information and exercise the strategy

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Want more?

If you search the web using keywords like “small business disaster planning,” you will find a host of sources that recommend methods and templates for **Disaster Recovery Planning**. A word of caution is advisable here. Beware of “one size fits all” planning templates and forms. Here are two websites you might browse to get additional perspectives on Business Continuity Planning:

Website	Site Sponsor / Owner	Benefit
www.era-1.com	Eagle Rock Alliance, Ltd.	Browse the site to see what's generally available in Business Continuity and Corporate Resilience; also contains links to other sites that provide sample plans. For samples, go to: www.era-1.com/samplesSB.htm
www.ready.gov	Department of Homeland Security	Go to “Downloading & Ordering All Ready Publications” to find documents that might apply to your business.

Alternative Site and Backup Options

Data Center Equipment and Network Recovery

OPTION	DATA CENTER EQUIPMENT AND NETWORK RECOVERY
1. COMPANY INTERNAL RECIPROCAL	Use of existing local company facilities to re-distribute and/or deploy additional mission-critical equipment and networks (supporting multiple business processes) amongst them.
2. COMPANY ALTERNATIVE DATA CENTER – INTERNAL HOTSITE	Alternative, existing company data center outside the local area (region, state, country) that can be used to house additional equipment designated for testing and recovery purposes only.
3. COMMERCIAL HOTSITE – SHARED SUBSCRIPTION	Fully equipped, secured, environmentally conditioned and operationally ready data center offering a variety of specific hardware platforms ready for almost immediate use when the service provider is notified of a disaster. Facilities are pre-emptible by another subscriber having a simultaneous requirement for hotsite services.
4. COMPANY MIRRORRED OR REDUNDANT DATA CENTER	Alternative company data center that totally replicates the primary data center.
5. COMMERCIAL HOTSITE – DEDICATED SUBSCRIPTION	Fully equipped, secured, environmentally conditioned and operationally ready data center offering a variety of specific hardware platforms ready for almost immediate use when the service provider is notified of a disaster. Hotspot use is generally for the duration of the disaster, but could be limited to 6-8 weeks by some providers.
6. COMPANY ALTERNATIVE DATA CENTER – INTERNAL COLD SITE	Alternative, existing company data center outside the local area (region, state, country) that can be built-out at post-disaster time with salvaged equipment from the disaster site, or built-out at time of disaster with acquired equipment.
7. QUICK SHIP BY THIRD-PARTY OR VENDOR	This strategy is essentially what its name implies, the shipment of computer and network equipment quickly. Most third-party leasing vendors provide this as a recovery solution to their customers. Customers are charged a priority equipment search fee and the normal leasing charges plus a premium once shipment is requested.
8. COMMERCIAL COLD SITE SUBSCRIPTION	Empty, secured, environmentally conditioned data center with office space, voice and data communications lines, and electrical power, etc., ready for computer and network equipment to be moved in. Often such equipment is provided through a contract with an equipment leasing company, or via the third party or vendor quick ship option. This strategy is usually coupled with a hotspot subscription, if occupancy of the hotspot is limited to 6-8 weeks and no other options are available to the company.
9. COMMERCIAL MOBILE/PORTA-SITE SUBSCRIPTION	For smaller hardware configurations or emergency office environments, there are mobile computer/office environments available. The difference between these two is that mobile sites are stand-alone units on mobile trailers, whereas the porta-site is transported to your facility and constructed upon delivery.
10. RECIPROCAL AGREEMENT	Contractual agreement between two or more local (trusted – non-competing) independent companies that allows for the use of a portion or entirety of each other's data centers in the event of a disaster.
11. COMMERCIAL REAL ESTATE PURCHASE, RENTAL OR LEASE	Acquisition of local space suitable to house a data center environment, and build-out at time of disaster or post disaster.
12. DO NOTHING	Do nothing! Accept risk?

Work Area and Voice Recovery

OPTION	WORK AREA AND VOICE RECOVERY
1. COMMERCIAL RECOVERY SPACE SUBSCRIPTION	<p>Fully equipped (in-stages), secured, environmentally conditioned and operationally ready recovery space suitable, configured and available for an office / workstation environment in the event of a disaster. Access to recovered business systems is also an integral part of this offering.</p> <p>Voice recovery must be pre-arranged with the provider and their local telecommunications carrier for types of services (PBX, wireless, ATM, DSL, 800-900, Centrex, trunk-hunt, calling features, etc.), and the number of lines and sets required. An alternative, but limited, solution to voice communications could be cellular phones held by key recovery personnel.</p> <p>Additionally, a central point of control (command center), known as a "Recovery Command Headquarters (RCHQ)," is required for recovery operations This space / room is where the Recovery Command Team manages and communicates the progress and status of recovery operations. This RCHQ requires all of the amenities of a work area or business recovery facility.</p> <p>Sometimes this solution is coupled with a hot-site subscription, as an additional measure for recovery space in the event of a catastrophic situation.</p>
2. COMPANY RECOVERY SPACE – LOCAL	<p>Alternative, existing, local company space suitable, available or pre-emptible as an office / workstation environment in the event of a disaster situation. This facility is known as a "Business Recovery Facility (BRF)," and can range from fully equipped and configured to pre-designated space only. Candidates for BRFs are existing conference rooms, testing & learning labs, and spare offices. Other ways to accommodate this strategy is office / workstation sharing amongst employees, and having the ability to work from home.</p> <p>Voice recovery must be pre-arranged with the company's local telecommunications carrier for the switching / translations of numbers and services from the disaster affected locations to the BRF. In some instances, company trained staff can perform this work, if the equipment is on-site and operable.</p> <p>Additionally, a central point of control (command center), known as a "Recovery Command Headquarters (RCHQ)," is required for recovery operations.</p>
3. COMPANY RECOVERY SPACE – REMOTE	<p>Alternative, existing remote (in the region, out of state) company space suitable, available or pre-emptible as an office / workstation / RCHQ environment in the event of a disaster situation. All other requirements as stated above apply to this solution.</p>
4. RECIPROCAL SPACE	<p>Contractual agreement between two or more local (trusted – non-competing) independent companies that allows for the use of a portion of each other's available office / workstation environment in the event of a disaster. This solution requires that each company have the spare space, compatible equipment, secured environment, voice and network capabilities, etc. to accommodate a pre-specified number of seats.</p>
5. COMMERCIAL RECOVERY SPACE ACQUIRED ATOD	<p>A strategy that is identical to pre-subscribing to commercial recovery space, except no prior arrangements have been made, time to recovery of personnel may be beyond acceptable downtimes, and the solution is not testable. This solution is only practical if unplanned space is required in the aftermath of a disaster, and no existing local or remote company space is readily available.</p>

Data Backup and Restoration

OPTION	DATA BACKUP AND RESTORATION
1. COMMERCIAL OFF-SITE DATA BACKUP STORAGE SUBSCRIPTION	Storage of tape or disk backups to a secured, climate-controlled, fireproof media vault or room at a storage facility maintained by a commercial media storage provider. The media storage provider's facility could be local, in the regional area, or out-of-state.
2. COMPANY OFF-SITE DATA BACKUP STORAGE	Storage of tape or disk backups to a different physical company location. Depending on budget and geographical risks, off-site storage could be a company's building next door or their branch office facility across town. A better choice is a secured, climate-controlled, fireproof media vault or room at the company's owned/leased facility.
3. COMMERCIAL ELECTRONIC VAULTING, A.K.A. ADVANCED RECOVERY SERVICES SUBSCRIPTION	A technology that sends backup data directly from the company (subscriber) site to a service provider's remote hot site facility. This very costly solution requires that direct access storage devices (DASD) or a Library Storage Module (LSM) be dedicated to the subscriber, preventing the service from being shared with other subscribers. Also required is a communications network having proper bandwidth between the sites. Data backup and recovery is nearly immediate, company controlled and unrestricted.
4. COMPANY ELECTRONIC VAULTING	A technology that sends backup data directly from a company's primary site to a company's secondary site. This costly solution requires that direct access storage devices (DASD) or a Library Storage Module (LSM) be in-place at the secondary site. Also required is a communications network having proper bandwidth between the sites. Data backup and recovery is nearly immediate, company controlled and unrestricted.
5. DISK-TO-DISK REMOTE COPY	A technology that operates at the disk volume level and is significantly less complex to set up and administer than host-based replication. This is the most popular solution used today. The solution benefits from capturing all application environment changes. A drawback however is the lack of transaction knowledge and potential for data corruption in the event of a disaster.
6. MIRRORING	A technology that maintains a replica of databases and/or file systems by applying changes at a company's or commercially provided secondary / recovery site in lock step with or synchronous to changes at a company's primary site. Due to its synchronous nature, mirroring requires significantly greater network bandwidth than shadowing. The Maximum Acceptable Downtime (MAD) for supported business processes is approximately 20 minutes to several hours, while the data-loss tolerance is reduced to the loss of uncommitted work.
7. SHADOWING (REMOTE JOURNALING)	A technology that maintains a replica of the database and/or file systems, typically by continuously capturing changes and applying them to a company's or commercially provided recovery / secondary site. Shadowing is an asynchronous process, thus requiring less network bandwidth than synchronous mirroring. The MAD is relatively short, typically 1 to 8 hours, while the data-loss tolerance is as up-to-date as the last receipt of any online transaction.
8. DO NOTHING	It is often appropriate not to back up data that can be regenerated from electronic sources that will become available following a disaster. For example, reports maintained on electronic media may be regenerated from the original data once that data is restored at a hot site.



Bulletin

Fraud Prevention

INTRODUCTION

Fraud is a common news story. Reports about trusted employees who defraud their employers, leading to severe financial loss or the failure of a business, often become headline-making news.

One definition of occupational fraud is “The use of one’s occupation for personal enrichment through the deliberate misuse or misapplication of the employing organization’s resources or assets.” Every company is faced with the potential of fraud. Some are more prepared to manage the risk than others. Some may have processes in place that detect fraud soon after it occurs, while others are unaware of the deception for years and are completely caught off-guard when it comes to light. And, many fraudulent activities go undetected and are never reported.

Fraudulent activities can be committed by a wide range of people, most of whom do not fit a typical criminal profile. These individuals can be employees, subcontractors, suppliers and consultants. It is prudent and fiscally responsible to consider the sources of fraud and establish policies and procedures to prevent its occurrence as much as practically possible.

According to the Association of Certified Fraud Examiners, fraud in the workplace can often be traced back to insufficient internal controls. The most important contributing factors are lack of internal controls (35.5%), override of existing internal controls (19.4%), lack of management review (18.7%), poor ethical tone from the top (9.1%), lack of competent Personnel in oversight roles (7.3%), lack of independent checks/audits (3.3%) or lack of employee fraud education (2.5%).

In 2012, reported cases of fraud in the construction industry occurred in billing (36.2%), Corruption (34.0%), Check tampering (21.3%), non-cash areas (21.3%), payroll (19.1%), cash larceny (17.0%), expense reimbursements (12.8%) and financial statements (8.5%).

What are some examples of fraud and steps that contracting business owners can take to prevent fraud?

INTERNAL JOB COSTING AND ACCOUNTING

- **Project managers (PM) intentionally recording costs to the incorrect job.** For example, the PM may have job A that has encountered difficulties and projected to be below budget, and job B is expected to narrowly meet

original margin estimates. The PM could code an invoice related to job B to job A to make the job appear stronger while “hiding costs” in the job that is already known to be experiencing difficulties. Conversely, costs could be hidden in an over-performing job to make an under-performing job appear closer to target margins.

- **Project managers could hold back expenses** (i.e., hiding invoices in their drawer) to manipulate the timing of the job cost posting and associated revenue recognition. At the same time, accounting personnel could manipulate the timing of expenses to achieve desired financial reporting results (i.e., smoothing revenue recognition).
- Within construction companies there can exist a risk of **fictitious contracts** to boost the bottom line. This could be evidenced by lack of an executed contract, altered documentation, no change orders, etc.
- **Risk of losses not being recognized in full on jobs in a loss position.** This exists both as a risk of error and a risk of fraud. Accounting personnel could manipulate the job schedule to hide the loss estimate or intentionally avoid recognizing 100% of estimated losses when losses become more likely than not for a particular contract.
- **Risk of error and fraud surrounding job estimates** due to the high degree of estimation involved with percentage of completion accounting. As the job schedule at any given date should reflect the expected position for jobs in progress, management attitudes indicative of intentionally deceiving financial statement users through overly conservative estimates or

overly aggressive estimates might be a sign of fraudulent activity.

- **Check fraud – internal.** Someone in the Accounts Payable (AP) area creates a bogus vendor and invoice and cuts a check payable to that vendor then receives the check and cashes it for personal gain.
- **Expense Reports** – Turning in expense reimbursements with improper or fictitious supporting documentation.
- **Project managers manipulating job costs by holding them down at year end** to show a good margin on a job that is actually indicating financial losses for the purpose of receiving a performance bonus. If all the costs were properly accounted for, the job would not show a profit.
- **Stealing tools** – Make sure that tools and equipment that are purchased for a job stay on the jobsite. Ensure the tools are not shipped to another jobsite or taken home by an employee or subcontractor for personal use.
- **Ghost employees on the payroll** – A foreman could set up a fictitious employee, record their work time, receive and cash the check with/without the help of a payroll employee.
- **Diverting lump sum costs to Time and Material projects** – Beware of situations when either your own company or your subcontractor has a lump sum project and a T&M project on the same jobsite. Costs originally attributable to the lump sum project can easily be billed through the T&M project, causing the payer to pay for the work twice.

- **Cash Payments** – Dealing in cash receipts is ripe for fraud. Anyone receiving cash payments for goods or services can easily pocket the money with no trace of payment. The person receiving the cash could pocket it while noting it paid rather than depositing the cash. Make sure that receipts for cash transfer are signed by two parties on the receiving end and that cash is turned over to a third party so that the person receiving the cash is not the same person who applies it. Make sure a paper trail accompanies all internal cash transfers.

EXTERNAL SOURCES

- **Check fraud.** Someone obtains an accounts payable check and is able to “wash” out the name or amount and change the information. For instance, a check made out to Brand X for \$2,000.00 can easily be altered to add in a “0” and it suddenly becomes a \$20,000.00 check.
- An outside party creates a **fictitious company** and submits an invoice to your company payable to the fictitious company, then deposits or takes off with the company funds.
- **Vendor kickbacks.** In certain situations, a vendor can quote a higher price to a contractor employee than the goods or services are worth. When the invoice is paid in full, the vendor makes a “kickback” payment to the employee. To combat this issue, always require competitive bids for all goods and services. Also, periodically review invoices for individual unit prices to make sure they are in line with industry averages.

CONCLUSION

Fraud is preventable, but it takes

proactive steps and constant vigilance. Provide individuals within your company with a means to report fraud and suspicious activity. Make sure that you arrange for independent external audits periodically. On occasion, schedule targeted fraud awareness training for staff. In addition, consider the following measures.

Fraud Prevention Checklist:

- Is ongoing anti-fraud training provided to all employees of the organization?
- Is an effective fraud reporting mechanism in place?
- Are proactive steps taken to detect fraud vs. being reactive to an act only when exposed?
- Is the management climate/tone at the top one of honesty and integrity?
- Are fraud risk assessments performed to proactively identify and mitigate the company’s vulnerabilities to internal and external fraud?
- Does your internal hiring policy include the following (where permitted by law)?
 - ✓ Past employment verification
 - ✓ Criminal background checks
 - ✓ Credit checks
 - ✓ Drug screening
 - ✓ Education verification
 - ✓ References check

Positive Pay – Positive pay systems can be setup between your payroll and AP departments and your local bank. With each check run, the mechanical contractor sends the bank a file with the payee name and amount. When the payee goes to cash the check, it is referenced by the bank against the positive pay list and the bank should only accept the check if it passes the test of the payee name and/or the amount of the check. This prevents check fraud.

Dual Signatures – Make sure that all checks over a certain threshold are signed by two parties, even if one signature is an automatic computer signature. Also require that key documents such as purchase orders, original invoices and receiving reports accompany checks to be signed. This helps prevent unauthorized check disbursements.

Sources:

“The Most Common Types of Construction Fraud,” *Construction Business Owner Magazine*, Jim Schmid and Todd F. Taggart, June 1, 2011.

2012 Report to the Nations on Occupational Fraud and Abuse, ©2012, Association of Certified Fraud Examiners, Inc.

“Construction Fraud: How Does it Happen?,” Freley & Driscoll, P.C., Contractor newsletter



Bulletin

Business Writing for Success

INTRODUCTION

Effective written communication is essential in modern business to make inquiries, describe actions needed or performed, convey information, summarize the terms of an agreement, present a report or accomplish a variety of purposes required to conduct business. Effective business writing is focused, clear and aims to accomplish a purpose.

This bulletin provides some basic guidelines about when and how to write effective communications for business. It is not a primer on grammar and punctuation; rather, it suggests what to consider before writing a message, letter, memorandum, directive or other communication. Then, it offers some common sense rules about how to prepare and convey the communication to achieve the desired result.

THE BASICS OF GOOD BUSINESS WRITING

Before sitting down to write a business communication, think about the following:

- **Who** is the audience, person or persons?
- **What** is the communication about?
- **Why** is the action necessary?
- **What action or outcome** is required or requested?
- **Keep the message simple.**
- **How will the message be delivered?**

The “Who”: Preparing an effective message begins by thinking about the audience and how best to reach them, him or her. The choice of words, tone, structure and delivery method all depend on who is to receive the message. You won’t reach your audience if you don’t think about what makes them tick (from a business perspective), how they think and how they may use the information you send them. For example, a message intended for the CEO of a major corporation will look, read, and use a much different format than one intended for the junior member of a project team.

The “What”: The purpose of the message is its heart. A message may:

- Inform, and/or;
- Persuade, and/or;
- Direct.

Keep your purpose for the message in mind and state it clearly at the beginning of your message. If you can’t state the message purpose in one or two sentences, then you need to revisit the purpose again. Use the balance of your message to provide details that lead to the accomplishment of the purpose. Organize your thoughts and present them logically.

Once you finish the message, then check to see that you did, indeed, accomplish the stated purpose. If not, start over.

The “Why”: The message may require an explanation of its background—what circumstances made it necessary to convey the information, directive, action or announcement. Not always indicated, the “why” provides perspective to help the reader understand why the message was sent.

Keep It Simple! Your message will miss its mark if you wrap it in a confusing cloud of complex words and sentences. State your message in simple, clear terms and make your point.

Avoid bringing into the discussion unrelated topics and data. Support your message with clear, logical, substantial data, facts and other information that bring the reader to the conclusion that you intend.

And, do not add unnecessary words that divert the reader’s attention from the main point. Every word should contribute to the accomplishment of the purpose. No one stated it better than Strunk and White in *The Elements of Style*:

“Vigorous writing is concise. A sentence should contain no unnecessary words, a paragraph no unnecessary sentences, for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts. This requires not that the writer make all his sentences short, or that he avoid all detail and treat his subjects only in outline, but that every word tell.”

Delivery: How and when you choose to deliver the message also affects its impact.

For example, is the subject of the message best conveyed in a formal letter, memorandum or by email? The decision about format is driven by all the other considerations discussed above.

Obviously, a message sent to the CEO of a corporation about the terms of a contract is best conveyed via formal letter to be sure

the information presented is “on the record.” However, a question to a project manager about an equipment purchase may be best conveyed by e-mail to elicit the quickest response.

A memorandum usually deals with internal company issues. The message may be printed and sent through the company’s internal mail system or electronically.

Whatever format you choose, always remember that what you write can make or break you. If the message addresses a sensitive or personal issue, consider carefully the consequences of sending the message in any written form. It may be best to deliver the message orally.

APPLYING THE BASICS

As noted above, most written business communications are usually letters, memorandums or e-mail messages. Each format has issues that you should consider when deciding which to use for your message.

Letters

A business communication intended for another company, a government agency, customer, supplier or other entity is best conveyed in the form of a formal letter. The letter provides a record of the communication and, therefore, is considered an official document with respect to the issue discussed.

Business letters are written on company stationery, and are addressed to the intended person at his/her business address. The letter also contains the date of the letter and references the issue addressed.

A word about style: The “keep it simple” rule applies in letters as in other forms of communication. However, always try to begin the letter with:

“This letter concerns [whatever the issue is]”, followed by a very brief introduction of you and/or your company. For example, “As you may know, I am the president of ABC Contractors, Inc., a family-owned company with 50 employees that has served Anytown for 80 years.” Then, follow with a positive statement, such as “We greatly appreciate your business during the past 10 years.” The balance of the letter can then be devoted to the main purpose of the letter, positive or negative.

Remember...your company may have spent years building its relationship with a customer, supplier, or other entity that is to receive this letter. Whether the information conveyed is positive or negative, always provide a reason for the action or decision taken. The recipient of this letter deserves that consideration. Provide your contact information at the end so the person can reach you for further information.

In the case of a letter to a government agency, its beginning should focus on the positive elements of the policy, ruling, legislation or other matter that the letter addresses before it outlines your objections.

Memorandums

Communications intended for company personnel are usually conveyed in the form of memorandums or memos. Memos are used to explain or announce company policies, personnel matters, instructions, reminders or other matters. Memos can be sent to as few or as many persons as are indicated by the message. And, they are written for internal company audiences, not for the general public or outside entities. Consider the following before you begin to prepare the memo.

Format: Memorandums are internal written letters. Therefore, over time, a form of address has evolved that allows the author to easily state who the memo is intended for, by whom, when it's sent and the subject:

To:
From:
Date:
Re:

Define your audience: The subject determines to whom the memo should be directed. If the subject affects all personnel, then the audience is “staff.” Subjects that affect only a few personnel then go to them specifically. Nevertheless, expect that the memo may end up in the hands of those not intended to receive it. Choose your words carefully.

What's your purpose? Memos generally have a definite purpose—to inform, direct, or persuade or some combination of each. In each, think about how you want to use the memo to accomplish your purpose.

- **Informational memos** provide facts, background and other essential data about a particular subject. It's easy to get into too much detail. Decide what information is most important to provide. At the end of the memorandum, provide your contact information for those who have questions or want more information.
- **Persuasive memos** are also informative, but the information is organized to lead the reader to a desired conclusion.
- **Directives** convey orders about actions to be taken. They are brief and very clear. Use this tool when you are concerned about staff misunderstanding your intent. Choose your words carefully.

Be decisive: Begin by stating your purpose or objective for the memo and then back it up with a logical, well-organized presentation of the facts that made it necessary to address. Don't ramble. If you write a loosely organized and illogical outline of the matter, you'll lose your reader and risk irritating him or her to the point of abandoning the memo altogether.

Be accurate: When you use facts and data in a memo, make sure they are correct or you risk your own credibility and professionalism with your colleagues, customers and other business contacts.

E-Mail

The Internet has revolutionized modern communications, particularly in business. Electronic messaging or e-mail has allowed us to instantly connect with other company personnel, customers, suppliers and other business associates with quick messages and attached, longer documents. This service has made business communications cheaper, faster, easier and more convenient, making e-mail our preferred method of communication. However, it has also produced some new challenges.

First, the brevity of e-mail messages has caused us to relax the rules of good writing. Messages are too often sent before the writer checks basic grammar, punctuation and content. Sloppy messages that make no sense leave just as bad an impression as those delivered by more traditional means.

Second, e-mail invites candid expression, which is usually inappropriate and inadvisable in a business context. Reconsider the content of your message before sending it.

Third, too often e-mail messages are sent to the wrong parties. Double check your list of addresses to make sure they are, in fact, those you intend to receive the message.

Fourth, be careful when you send an attachment. If possible and appropriate, convert the attachment to an Adobe Acrobat PDF before it's sent to preserve its original content and prevent unwanted modifications. If PDF conversion is not possible, be sure to keep the original.

Finally, always be mindful that there's nothing private about e-mail. Once you hit the "send" button, your message is public

and subject to scrutiny from any number of entities. And, your e-mail messages can be used in legal proceedings against you and your company. Choose your words carefully.

Things to consider...

Keep it simple: E-mails are for quick, short messages, not long, complicated dissertations. Long, rambling e-mail messages may be ignored, deleted or archived for later, but usually not read immediately by busy staff persons. If you feel it is necessary to transmit a long message or document, then send it as an attachment to a brief, introductory note. To draw attention to an important message, mark the message as urgent before you send it.

One message per e-mail: Your message will more likely be read if it deals with only one message presented briefly and succinctly.

Re-read before you send: The casual nature of e-mailing tends to make us forget about grammar and common sense rules.

- **Clipped, short messages are acceptable**, but they must make grammatical sense and they should be free of obvious spelling and punctuation errors.
- **Messages that contain sensitive information (i.e., financial data, sales projections, legal issues, etc.)** should not be e-mailed because they can be hacked by outsiders or retrieved.
- **Sending or forwarding messages with sexually explicit content is not only unacceptable and inappropriate in a business environment, but illegal.**
- **Keep personalities out of e-mail.**

Unless you want your personal business and your opinions to become public, keep them to yourself and off the Internet.

- **Courtesy still works.** It may not always be appropriate to do so, but try to begin a message with a considerate opening, such as “I hope this finds you well” or “Looking forward to our meeting next week.” It sets a positive tone for the rest of your message and may entice the recipient to read it.

A Word About Texting

A decade ago, SmartPhones – Blackberry, iPhones, Droids, etc. – made hardly even a ripple in the great consumer sea, but today, they have crashed onto the landscape like a tidal wave. These clever hand-held devices are multi-functional telephones/camera/computer with Internet capability/calculator/GPS finder and much more. Communicating with these devices has presented business writers with an entirely new set of challenges.

Texting, the term used to describe the “shorthand” writers use to send messages with their SmartPhones, is a combination of words and acronyms for phrases, such as BTW (by the way) or BOTE (back of the envelope calculation), CYL (see you later) and many more. This form of messaging evolved to accommodate users’ demand for very fast and very easy to compose messages on very small keyboards. An entire dictionary of online jargon is readily available on the Internet.

More and more businesses are relying on SmartPhones and texting to relate to customers, associates, colleagues, employees, suppliers and others in their professional network. Connections are less complicated and quick, simple messages are easy to send.

A word of caution, however. As with other forms of electronic communication, text messages can be hacked and used against you and your company, so be careful when and how you use this form of communication. Make sure you know the terms of your agreement with the service you use to be sure you and your employees do not accumulate huge bills for texting charges.

CONCLUSION

Today’s business communications are substantively still the same as their forebears, but can be transmitted in mediums that can reach a customer across the street and across the world in the blink of an eye.

More than ever, think before you write, reread what you write and choose your delivery medium carefully. Always be mindful that once you put thoughts and ideas into words, they will become public, no matter how many firewalls you build into your computer system.

Information for this bulletin was drawn from *Good Writing: It Begins with Principles*, Harvard Business School Press, Boston MA (2006) with permission from the Builders Exchange of Central Ohio.

Sample Memorandum

ABC Mechanical, Inc.

TO: All Foremen
FROM: John Smith
RE: Gas Cylinders
DATE: 9/8

Please review this information with everyone on your project.

Our demurrage (cylinder rental charges) costs have risen sharply. Effective immediately, all empty gas cylinders must be returned as soon as they are emptied to reduce these costs.

Demurrage costs are calculated on the third Friday of every month. You must make sure that all empty cylinders are returned to the shop no later than the end of the business day on the third Thursday of every month. For this month, it is September 17. Please schedule trucks with Jeff accordingly.

Thank you.

Sample Letter

ABC Mechanical, Inc.

Mr. Paul Jones
ACE General Contracting Company
1234 Maple Street
Anytown, Any State 00036

RE: State University Dormitory

Dear Paul:

This will document our discussions in your office and with State University yesterday.

Ongoing Service and Warranty Issues

ABC Mechanical will have a plumbing service tech onsite on 5/15 to trace the hose bibb plumbing to determine whether the hot water is infiltrating this system.

The boiler pump we looked at Monday will be re-set to run continuously. Please note that this is contrary to manufacturers' recommendation and the design of the system, but is as requested by the owner.

Brick facia will be repaired on one or two of the rooms. Please identify which rooms specifically.

Leonard valve kits repaired by State University staff will be returned to us. It was noted that these would be given to our service tech onsite Tuesday. These will be returned to the manufacturer for warranty replacements.

ABC Mechanical service personnel have been instructed in the future to report to the physical plant office. In the event of an after-hours call they have been instructed to contact Brian Woods on his cell for instruction.

Domestic water issues

Attached is a breakdown of our 12/4 quote. Additional valves were provided for efficient maintenance of the system. Our cost for this work is \$2,891. Our cost for work

associated with ongoing warranty related to existing water condition is \$3,159, which is the remaining balance of the 12/4 quote.

PTAC issues

ABC Mechanical will provide to State University an extended 2-year warranty on all of the PTAC units in the dormitory for condensate water leaks into the dormitory rooms. This warranty will extend until September 1.

ABC Mechanicalr will relocate 15 PTAC units that extend outside the building by shifting the units into the building within the existing sleeves. Otterbein will provide any required cosmetic touch up, painting, or trim needed to “dress out” these units inside the rooms. These units are in the following room numbers:

101 (3 units)	104	106	107	108	110
116	128	131	201	210	233
320					

State University will pay to ABC Mechanical the \$18,083 quoted to ACE on 10/27. \$9,041.50 will be paid within 30 days, and \$9,041.50 will be paid at the end of the extended warranty period or sooner if, in the opinion of ABC Mechanical and State University, the risk of loss to State University from condensate water leaks has proved to be minimal.

Finally, the retainage of \$88,973 will be released as the contracts are closed between ACE and State University, and ACE and ABC Mechanical. We expect that retainage will be paid to us no later than 45 days from this letter. Please advise immediately if this cannot happen.

Thank you for your assistance in bringing these issues to conclusion.

Sincerely yours

John Smith
President, ABC Mechanical, Inc.

Sample E-Mail Message

From: John Smith
Sent: June 02, 2:28 PM
To: Tim Clark
Subject: ABC Mechanical – State University Hospital Project

Our team has a presentation scheduled with ACE, State University and Premier Architects on Tuesday 6/8/, 10 AM at State University. The presentation will last until 11:30 AM. Are you available to attend with us?

We will need to review some specifics of the job and the details of our current plan. If possible, I would like to do this on Friday sometime. I need to go to Anytown tomorrow to put together the pre-construction, schedule and technical construction presentation with our joint venture partners.

Please let me know what your availability is. I should be here until around 3:15 today or you can contact me on my cell later this afternoon or tomorrow



Bulletin

“Rule-of-Thumb” Parameter Estimating

Developing “Rule-of-Thumb” estimating information is of value for several of the following reasons:

1. When reviewing the work of your take-off people and estimators, a variance in cost, both high or low, could signal the need for closer examination before the bid is submitted.

2. Improving relationships with owners and general contractors who can rely upon you for reasonably accurate budgets for new projects.

3. Provide a convincing argument for a specification change to reduce costs on a project, especially if it is over budget.

4. In situations where the architectural drawing and outline mechanical specifications are the only information available, the mechanical contractor would have to work very closely with the people developing the final mechanical specifications and drawings to avoid a design more costly than the parameters used in the “Rule-of-Thumb” that was applied.

Many mechanical contractors have not set up a “Rule-of-Thumb” parameter estimating system because they believe that they are unsafe and they certainly are no substitute for a detailed take-off and evaluation.

Continual updating of your information to compensate for inflation will be required for any recordkeeping of this type.

It would be best to divide your recordkeeping into the elements of your particular markets. For example:

- One- to three-story office buildings
- High-rise office buildings
- One- to three-story townhouses or apartments
- High-rise residential
- Hospitals

Records may be divided into as many different areas as you may feel are required.

The Form on the next page is just one version. If you use your own creativity, you can come up with a form that best suits your company needs.

Sample Parameter Estimating Form

Job: _____ Bid Date: _____

Location: _____

Type of Construction: _____

Sq. Ft. Floor Space _____	Sq. Ft. of Roof Area: _____
Total Cooling (tons): _____	Total Heating (MHB): _____
Total CFM: _____	Total No. Roof Drains: _____
Total No. Plumbing Fixtures: _____	Controls - Electric: _____
Average Hourly Wage Cost: _____	Controls - Pneumatic: _____

I. H.V.A.C.

Total Costs (A) _____	Total Selling Price _____
Costs/Ton _____	Selling Price/Ton _____
Costs/Sq. Ft. _____	Selling Price/Sq. Ft. _____
Costs/CFM _____	Selling Price/CFM _____
Costs/MBH _____	Selling Price/MBH _____

II. PLUMBING

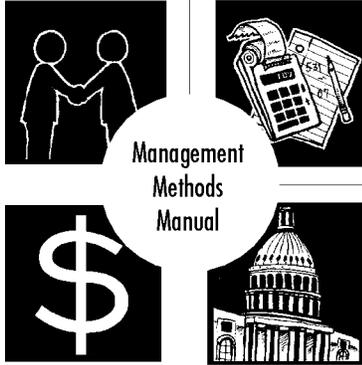
Total Costs (A) _____	Total Selling Price (A) _____
Utility Costs (B) _____	Utilities Selling Price (B) _____
Roof Drainage Costs (C) _____	Roof Drainage Selling Price (C) _____
Inside Costs (A-B-C) _____	Inside Selling Price (A-B-C) _____

III. SUBCONTRACTORS

Sheet Metal Costs	= $\frac{\$ \text{_____}}{\text{sq. ft. of floor space}}$	= \$ _____ /sq. ft.
H.V.A.C. Insulation Costs	= $\frac{\$ \text{_____}}{\text{sq. ft. of insulation}}$	= \$ _____ /sq. ft.
Plumbing Insulation Costs	= $\frac{\$ \text{_____}}{\text{number of fixtures}}$	= \$ _____ /fixture

Examples:

<u>Plumbing-Inside Costs</u> Number of Fixtures = Cost/fixture	<u>Roof Drainage Costs</u> Sq. Ft. of Roof Area = Cost/sq. ft
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Bulletin

Unit Pricing

Foreword

This bulletin should be used in conjunction with bulletin number CO 1 (Change Orders) and bulletin number PD 2 (Factors Affecting Labor Productivity). The intent of this bulletin is to discuss the "Unit Price" basis for pricing changes. MCAA's intent is to promote a better understanding of considerations to be given in the formulation of fair and equitable unit prices for the consumer and the contractor and what pitfalls a contractor can expect in the implementation of a unit price change or contract.

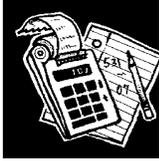
INTRODUCTION

In an attempt to reduce the evaluation of changes to a simple counting of "beans", many owners, general contractors, construction managers, engineers and architects go to great lengths in soliciting and implementing unit price schedules. On the surface this approach seems to be simple and equitable. In reality it is quite complex and rarely equitable.

The results of a recent survey conducted in a major metropolitan area showed that contractor-calculated unit prices based on the same specification and time frame varied immensely from contractor to contractor. Comparison pricing of a piping sketch of a 4" bypass connection and valve between two 8" mains using (a) the individual contractor's unit prices and (b) the contractor's usual estimat-

ing procedures indicated that every respondent would have fared better without unit prices. The unit price method did not offer the contractor the opportunity to charge for items such as: tie in to existing; drain and refill; testing; disruption of work crews; etc.

The unfairness of unit prices for construction work should be evident to all. If the price established is based on the "worst" condition that the contractor will encounter, the price is unfair to the consumer. While a price based on the "best" jobsite condition is unfair to the contractor. In actuality, the unit prices most of us will see will be the result of negotiation based on "average" job conditions. As we all know, job conditions rarely turn out to be average in any specific location or instance and, therefore, will result in prices that are usually "unfair" to the contractor.



These questions must be asked:

1. How are unit prices established?
2. What pitfalls can a contractor expect to see?

ESTABLISHING A “FAIR” UNIT PRICE SCHEDULE

We are all accustomed to the normal pricing procedures we use to bid and win jobs. We painstakingly take-off, itemize and price each item of equipment, each foot of pipe, every fitting and valve, each pound of duct, taking into account countless drawing notes and specification comments which we think might affect the cost of our work. After the take-off is complete, we apply our overhead and profit margins and submit our price. During the take-off, we evaluate each work situation and assign varying degrees of difficulty to the cost of the work in an attempt to forecast the differences in jobsite conditions.

Any attempt to account for all jobsite variances in the development of a unit price schedule would result in a huge and unmanageable matrix of numbers and conditions. Therefore the approach taken by most contractors is to develop unit prices that reflect the “worst” possible conditions. This usually results in severe confrontation between the buyer and seller, something no contractor needs when trying to negotiate a job. The final outcome is usually a schedule that favors the customer.

A practical way to establish a unit price schedule that is equitable to both parties is to use a “Base Schedule” and “Correction Factor” approach. Under this approach, the final unit price is established by using costs and procedures for normal job conditions and then adjusting them by applying multipliers to reflect actual conditions.

Guidelines

The following guidelines should be used in the preparation of the “base” unit price schedule.

1. Estimate all costs to be encountered in performance of each item. (See Bulletin No. PD 2 Factors Affecting Labor Productivity.)
2. Be sure to include the following:
 - Office overhead
 - Field overhead
 - Material and labor cost escalation
 - Added costs of processing changes
 - Added costs for coordination
 - Added costs for bonds and other special insurance
 - Safety
 - Warranty
3. Include fair and reasonable profit margin.

Contract Stipulations

The “base” price parameters should be clearly set out, advising all parties that “only” the listed items (such as those shown below) are taken into consideration when compiling costs for each item.

1. All work is assumed to take place on the first floor.
2. All work is to be performed during normal working hours.
3. All work is to be performed no higher than 10 feet from finished floor.
4. All work is to be performed in a continuous manner.
5. Unit price does not include any engineering costs.
6. All work is figured using manpower presently available at jobsite.



7. Specify that certain minimum quantities must be applied to all prices.
 8. Specify that all prices are based on “present values” and may be escalated.
 9. Specify that your costs only include “your” trade or trades.
 10. Work is not to be encumbered by other trades or space limitations.
 11. Access to work areas previously covered by construction is to be provided by others at no cost.
3. Working conditions (See Bulletin PD 2):
 - a. Adverse working conditions (i.e., weather; height from slab; interference from other trades; tight spaces, etc.)
 - b. Impact on schedule and size of work force.
 - c. Overtime performance.
 - d. Stacking of trades.

Correction Factors

The following aspects of the change should be considered in establishing the “Correction Factors”.

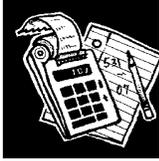
1. Size of change:
 - a. If the change is severe and large quantities of similar items are being changed, a multiplier less than 1 might be appropriate.
 - b. Conversely if the change is small, a multiplier higher than 1 (such as 2 or 3) might be appropriate.
2. Location of change within building:
 - a. All costs should be modified to reflect added material and equipment distribution to floors above first floor (such as 1–2% per floor above the third floor and 2–4% per floor above the 20th floor). Refer to MCAA Labor Estimating Manual for correction factors.
 - b. Lost time for manpower to arrive at work stations should be included (for example: multiplying by a ratio of paid hours/productive hours).

4. Retesting and recertification of systems:
 - a. Add a correction factor to piping unit prices for retesting piping systems.
 - b. Add to all sheetmetal unit prices a correction factor for rebalancing air systems.
 - c. Add a correction factor to all unit prices for refiling of drawings with building departments.
 - d. Add a correction factor to temperature control unit prices for readjusting control systems.
 - e. Add a correction factor to thermal insulation unit prices for patching and repair to existing piping and duct insulation if changes are to be done after base job insulation has been completed.

PITFALLS

In the formulation and finalization of the unit price schedule, many pitfalls can be avoided by insisting on recognition in your contract of factors such as those listed above. The following are some of the common traps a contractor might encounter.

1. A request for unit pricing typically reads like this: “All unit prices shall include all items that comprise a complete installation and shall be in accordance with the specifications and the intent of the draw-



ings.” This puts the full responsibility on the contractor to include items of work (such as offsets) even if not shown on drawings. This clause should be eliminated during final negotiations.

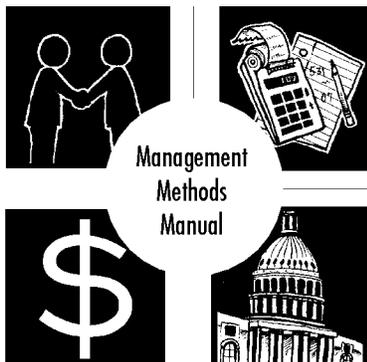
2. The stipulation that piping unit prices shall include “all fittings” is very common and will result in added cost when encountering offset and coil hook-ups, etc.
3. The contract requirement that the unit price schedule be used for added and deleted work should be eliminated. Deleted work should be credited at the cost used in “winning” the base job. There will be considerable variance between this “cost” and the “unit price.” The variance might be high when it involves layers of sub- and subcontracting. The contractors and subcontractors (on all levels) should seek to retain their overhead and a portion of the profit on deducted items.
4. The buyer should not be allowed to have a choice of using the unit price schedule to determine an “upset” price and then proceed on a time and material basis. This method of awarding changes is extremely unfair to the seller as it affords

the buyer the opportunity to select the lowest possible price after the work has been completed. The contractor should insist on a definite commitment, at the outset, to one pricing method.

5. Changes in quantities due to coordination and other unforeseen conditions should be considered as adds to the original quotation. The increases should be clearly identified and a revised price submitted as soon as the change is discovered. Do not proceed with the work under the assumption that the buyer will understand. Most likely, he will not.

CONCLUSIONS AND RECOMMENDATIONS

Unit prices are, at best, difficult to establish and even more difficult to utilize to establish a fair and equitable price for changes to contract work. Any attempt to short cut comprehensive estimating and evaluation of work usually will be arbitrarily in the favor of the buyer. Always try to resist the use of “unit pricing” and press for evaluation of changes using your standard estimating procedures, etc. If the buyer insists on “unit prices” then make sure guidelines such as those contained in this bulletin are included in the contract.



Bulletin

Factors to Consider in Establishing a Piping Fabrication Shop

INTRODUCTION

Prefabrication in the mechanical contracting industry is not new, but it is only recently that external economic and material-handling considerations have combined to encourage more contractors to engage in prefabrication on a larger scale. Although larger contracting firms have been the major users of prefabrication processes to date, smaller companies also can use the principles of prefabrication to reduce field crew size (and associated supervision), and to reduce the time required for materials handling on the jobsite. Other benefits of prefabrication include working in controlled conditions and minimizing the amount of excess material to be stored on the job.

This bulletin is not intended to be a complete encyclopedia on prefabrication, but it will serve as a guide to the procedures involved.

There are some lessons that can only be learned first-hand in the field. Contractors

interested in establishing a piping fabrication shop should visit as many existing fabrication shops as they can, using this bulletin as a checklist and as a source of questions when visiting other shops. Ask the operators not only how they do the work now, but what would they do differently if they were to build a new shop from scratch.

Equipment vendors and material suppliers also can be good sources of information. Talk to more than one vendor for each piece of equipment and record where they agree and disagree.

Finally, there are things that will only be learned from experience. Keep notes on these ideas and share them with the other members of MCAA.

WHY PREFABRICATION?

Time, cost, and quality requirements of commercial and industrial construction projects are an ever-increasing challenge to



mechanical contractors today. Fabricating and assembling piping modules and other subassemblies in a fabrication shop will result in greater efficiency, higher quality craftsmanship, and a lower total cost than assemblies made at the jobsite.

Since few projects requiring capital investment are undertaken in this day and age without justification, the decision to set up a fabrication shop, which can reduce on-site labor costs by 20 to 60 percent, must be done by considering the following factors.

1. Speed. Work in a pipe fabrication shop is done more quickly than work done in the field. Automation in machinery and the assembly line process will produce layout, cuts, and welds faster than is possible in the field. Once a module or subassembly is assembled and tested at the shop, it can be transported safely and conveniently to the jobsite and quickly installed as a single unit. Faster installation improves job work flow all along the line.

2. Quality. Applications for such industries as food, pharmaceutical and chemicals must not only meet the highest workmanship standards, they must also comply with strict government and industry guidelines. Pre-assembly allows fabrication to more critical tolerances. Inspection and testing can be performed more efficiently in the shop and any problems can be corrected before installation in the field.

3. Scheduling. The fabrication shop allows more people to work on a project than is possible at the jobsite. Instead of loading a job-site with men working elbow-to-elbow getting in each other's way, work is done at the fabrication shop and shipped to the project site for installation. In addition, work can be

done in advance of a critical project such as a weekend shutdown of a process line. Every hour that the process is shut down costs the customer money. Prefabricating 50 to 90 percent of the installation before the process is turned off will save the customer money. This sharpens the competitive edge that can result in more work for the contractor.

PLANNING THE PREFABRICATION

One great advantage of prefabrication is that it allows the contractor to step back and consider the whole job and then decide on how to proceed in a way that will allow as much cost control as possible and leave as little as possible to chance. In effect, it encourages the contractor to plan and schedule the job in great detail. No matter how big or small the job, the contractor must approach it with one question in mind: What steps need to be taken so that material can be sent to the jobsite to minimize field installation costs?

Planning is typically done by the job foreman and the project manager, with adequate communication with the estimator who bid the job. At the very least, the estimator must advise how the job was conceptualized, what assumptions were made, what alternates are included, exactly what is in the contract, whose equipment and auxiliary accessories must be used, etc. After learning all there is to know about the job specifications, the foreman and project manager will perform the following steps.

1. Fabrication Layout. Decisions are made on what portion of the work is to be done in the fab shop. These decisions will be based on many factors: pipe size, weld type, access to the site for finished fabrication, and how quickly the work is needed.



After a decision is made on what to fabricate, the foreman and a draftsman decide how to fabricate the project.

2. Field Measurements. The foreman and draftsman will take and record field measurements. These measurements may be the most critical step in the fabrication process. If the measurements are wrong the fabrication will not fit, meaning the fabrication will need to be cut and rewelded in the field at a very high cost to the project. The most accurate tools and instruments should be used for this critical step.

3. Fabrication Drawings. The draftsman prepares a spool sheet drawing based on the field measurements, equipment cuts, and pipe dimensions. Plan view or isometric drawings are included with the spool sheets as a reference for the shop supervisor. The drawing may be of any convenient size, but the typical drawing is on 11†- 17† isometric paper.

Figure 1 contains six examples of typical drawings.

The fabrication drawing should contain the following information:

- a. Title block with drawing number, job name, job number, name of the draftsman, date prepared and any reference to plans and specifications.
- b. Spool sheet drawing of the fabrication work indicating fittings, cut lengths of pipe, valves or other specialty items and dimensions.
- c. Bill of material listing all the components that are shown on the spool sheet drawing. Type of pipe, material of pipe, type of joint and any special instructions.

- d. Piece mark indicating where the fabrication fits into the project. NOTE: All draftsmen should use the same format in submitting drawings to the fab shop. It will reduce time if fabrication shop personnel do not have to learn how to read each draftsman's drawings on an individual basis.
- e. Other considerations:
 - Flange orientation
 - Flow arrows
 - ASME/ANSI requirements
 - Nondestructive testing
 - Weld procedure
 - Sandblast/painting
 - Weight of spool
 - Revision ballooning
 - End protectors
 - Double check spool dimensions

4. Material Ordering. Simply stated, someone needs to order the material. The material can be supplied by the owner, or purchased by the contractor. Several different people may be involved in the process of ordering material, so it is absolutely necessary that a process be developed to make sure that all required material is ordered on time, but ordered only once.

Material must be ordered before drawings are submitted to the fabrication shop. It is very frustrating to the shop foreman to be handed a fabrication drawing that needs to be built immediately and be short of material. Time is wasted if a partially completed piece of fabrication is set to the side because one jitting is back ordered.

5. Job Submission. Only after the fabrication has progressed through layout, field measurements, drawings and material ordering can it be submitted to the shop. The



shop foreman needs to be told when the finished fabrication is needed so the work can be scheduled.

LOCATING THE FACILITY

The location of the building is very important to the overall efficiency of the fabrication process. There needs to be a smooth flow of material into the shop and finished product out of the shop. The following outside material handling steps need to be considered in the planning process:

1. Delivery of material to the fabrication shop. The delivery trucks are typically long flatbed trailers that require room to maneuver.
2. Unloading and transfer of the material to the storage yard and storage rooms. Material can be moved with a fork truck or a deck crane, depending on size.
3. Transfer of material to the fabrication shop. This transfer from storage is typically done with a fork truck. A fork truck requires one person, whereas a deck crane will require two.
4. Transfer of finished fabrication to holding boxes. A box-truck box is ideal for storage for larger fabrication jobs. The finished fabrication can be loaded into the box until needed for direct pick up by the delivery truck. This will eliminate the double handling of finished fabrication.
5. Pick-up and delivery of finished fabrication to the jobsite. Since the delivery truck will typically be a box truck or a flat bed truck, it will need room to maneuver.

Other material handling suggestions include never handling material twice when once will do and keeping the travel distances

as short as your site will allow. Also, remember that all of the above material handling steps may have to occur simultaneously, so make sure conditions outside the walls of the fab shop are well-planned and spacious. It is important to perform material handling as far removed from welding and cutting operations as possible.

PHYSICAL REQUIREMENTS OF THE FAB SHOP BUILDING

The shape of the fabrication shop building is determined by the rule of “Form Follows Function.” No single shape will be appropriate for every contractor’s site and fabrication needs. The shape of the building will be determined by the fabrication material flow inside and outside the building as described in the previous paragraph. The number of work stations and the type of equipment the contractor decides on will also contribute to the shape of the building.

The fabrication shop building should be a simple structure. The walls need to be of a durable material and the roof needs to shed water. The roof structure needs to be a minimum height of 20 feet above the floor. The structure of the roof should be designed to support the type of crane the contractor has selected. This can be an overhead rail crane or a simple jib crane.

Two overhead doors are an absolute minimum for access to the shop. If possible, it is a good idea to have several more doors. They will contribute to flexibility in moving material and can also be opened in good weather for maximum ventilation and natural lighting.

The contractor must decide what kind of work stations the shop will contain and the equipment to be purchased for each type of work station before the building can be de-



signed. However, it is important to be flexible here, since market conditions change and so does a contractor's work. A contractor who puts money into high-quality, durable, long-lasting fundamental resources will not be making a mistake, but it is important to remember that the best layout for a shop is one that allows the layout to be shifted to meet current market needs.

Lighting for the shop area should be in the range of 100 foot-candles. This is typically furnished by high pressure sodium or metal halide fixtures that are suspended in the roof structure.

Heating and ventilation should be designed as integral parts of the new building and not added after the fact. Welding and cuffing processes can emit great quantities of smoke and fumes, so a good exhaust system supplying fresh make-up air is absolutely necessary. One solution to the need for both heating and ventilation is a direct-fired natural gas make-up air heater which will provide heat and a constant supply of fresh air. Some shops use gas infra-red heaters mounted high on the support steel, using multiple speed overhead fans to exhaust smoke and welding byproducts.

A substantial electrical service will be needed. The size of the service will be based on the quantity and type of equipment installed.

A simple locker room with toilets should be provided close to the work areas. A clean lunch room away from the shop floor can be in the same area. Drinking fountains on the shop floor will help keep the workers at their stations.

Of course, compliance with local building, OSHA, and ADA regulations must be taken into consideration when planning the facility.

WORK STATION REQUIREMENTS

The number and type of work stations will be determined by each contractor's type and quantity of work, but the following list will give you an idea of the basic work stations that a fab shop will use:

1. Pipe Feed Rack and Conveyor. The pipe feed rack is where lengths of pipe from the pipe storage yard are loaded to supply the pipecutting station. It should be as close as possible to the pipe storage yard and should be large enough to hold a full day's work for the cutting station. A pipe feed rack that is 40 feet wide will hold enough pipe to keep a cutting station and a shop crew of 20 men busy for a full day.

Figure 2 shows an example of a pipe feed rack.

2. Cutting Station. The primary device for cutting pipe is the straight-line flame cutter. A cutter that can handle up to 24-inch pipe is typical. A conveyor loads pipe from the feed rack to the torch head. The operator positions the pipe and monitors the automatic cutting procedure. The cut lengths of pipe are picked off the cutting rack with an overhead or jib crane and set on pipe stands. The crane should have a minimum capacity of two tons. The pipe stands should be fully adjustable and on wheels for movement from station to station and easily positioned for welding. Quick and easy disposal of pipe offal should be planned.

Figure 3 depicts a layout of a cutting station.

It is important that the shop have a cutting operation that produces good consistent high-quality bevels. It is not as important to buy expensive, sophisticated equipment as it is to buy something that is accurate and



easily maintained for the basic operations of straight cutting and beveling. An accurate bevel is the beginning point for producing high-quality welds.

The cutter requires electrical service and will have an hydraulic power unit. Acetylene and oxygen are needed for cutting carbon steel pipe and a plasma arc torch is required for stainless steel. The plasma arc torch requires nitrogen, compressed air and an additional electrical power connection.

A ventilation hood should be positioned over the torch to capture and exhaust the majority of fumes from the cutting process.

A band saw will be needed for cutting anything that cannot be cut by the gas cutter, such as structural shapes, steel plate, and stainless steel pipe. The band saw will require a pipe feed rack similar to the gas cutter's.

Figure 4 presents a typical band saw station.

3. Layout Station. The layout station is where assembly of the fabrication starts. There are typically two workers at each layout station. The cut lengths of pipe and pipe fittings are brought to the layout station where the workers position and tack-weld the pipe and fittings together according to the fabrication drawing.

A simple piece of fabrication will be at a layout station only once. A complicated piece of fabrication may be at a layout station twice. The first time at the layout station, only pipe and fittings that can be roll-welded are tack-welded together. When the initial roll welds are completed, the fabrication returns to layout a second time so the complete fabrication assembly can be tack-welded together. The final welds are typically position welds.

The following list of equipment and tools is very typical of the tools needed at the layout station on any jobsite to complete a weld:

Arc welder	Gloves
Grinder	Nylon chokes
Levels	Jib crane
Squares	Acetylene gas
Two hole line-up pins	Argon gas
Work table	75/25 argon/ CO ₂ gas
Bench vise	Compressed air
Files	Welding screens
Hammer	Floor fan
Face shield	Ladder
Welding hood	

4. Welding Station. The welding station, typically manned by one worker, finishes the work started at the layout station. As described above, as many welds as possible are rolled. Position welds take longer and should be kept to a minimum.

The welding station typically has a MIG welder. The welder should be a dual-head type that will hold two spools of wire for welding carbon steel and stainless steel. The same equipment used to do MIG welding can be easily and inexpensively adapted to do flux cored welding if it fits into a particular application. If flux cored welding is planned, however, the contractor must plan for the fact that this kind of weld results in more slag and requires more grinding and power brushing between welding passes and after the weld is completed.

Submerged arc welding is sometimes used to fill up pipe welds that have already had the root pass put in by another method, since root passes that will pass radiographic inspection are hard to do with the submerged arc process. Submerged arc welding is sometimes restricted to larger diameter pipe



(8-inch and above) because it is not as cost-effective to move smaller diameter pieces between operations and, in fact, it is sometimes more cost-effective to MIG weld 6-inch and smaller pipe completely by hand.

Automated welding systems are sometimes used for larger bore pipe welding (8-inch and above), since they allow a quality weld at a reasonable cost. A typical automated system is comprised of a 600-amp power source, a manipulator for x, y axis adjustment, dual schedule wire feeder, twin welding torches (MIG for the root pass, submerged arc for all subsequent passes), all mounted on a single manipulator. The positioner for this system is outfitted with a chuck that will hold pipe from 2-1/2-inch to 48-inch, supplemented with a smaller 2-inch to 14-inch chuck that can be inserted quickly into the larger jaws for quicker size changes. The positioner is outfitted with adjustable outboard turning rolls that are kept in alignment by a track system allowing quick, easy adjustment for longer pieces. The manipulator assembly with the power supply, welding torches, wire feeders, and sub-arc equipment are all mounted on a mobile deck which is, in turn, mounted on a track system to allow quick movement down the length of pipe while providing for accurate alignment and spacing of the equipment as it is moved down the track.

Jobs requiring thin wall, high purity and sanitary welding can benefit from orbital welding, but the equipment is expensive and not very versatile, therefore, a contractor needs to consider just how much it would be used before investing in this equipment.

The welding station, of course, also has a positioner. It holds the fabrication in the best position to complete the weld and rotates the fabrication during the welding

process. A typical positioner will hold 3-inch to 20-inch pipe. Depending on the contractor's work load, one or more of the welding stations should have a positioner that will hold up to 36-inch pipe. This station may also have an automatic welder, as described above. Figure 5 presents a typical layout/welding station arrangement.

The following is a typical list of equipment and tools needed on any jobsite to complete a weld:

Grinder	Jib cane
Files	Acetylene gas
Hammer	Argon gas
Face shield	75/25 argon/ CO ₂ gas
Welding hood	Compressed air
Gloves	Welding screens
Nylon chokes	
Arc Welder	
Floor fan	

5. Module Fabrication Station. Module or skid fabrication is another important market for the fabrication shop. The module not only requires pipe and fitting fabrication, but may also include valves, heat exchangers, pumps, meters, steam traps and just about any other device normally installed in the field. A steel frame is built and all the components are assembled onto the frame at the fabrication shop.

A large, level layout table is needed to assemble the skid frame. Once the frame is assembled, it is commonly painted. The frame can be sent out to be painted or a spray painting area can be set up at the fabrication shop. If a paint booth is set up in the shop, it must comply with all local codes for ventilation and fire safety.

The completed and painted frame is then sent to the module fabrication station where



the pipe and specialties are mounted and connected. Because the pipe on the skid can be welded or threaded, a pipe threading machine should be set near this work station. It should be capable of threading up to 4-inch pipe.

Tools required at the module fabrication station include all the tools of the pipe fitter's trade. One very useful tool that is not typical is a magnetic base drill. It is faster and more accurate than a hand drill for the holes needed on module fabrication frames to anchor the pipe and components.

Some modules will require electrical wiring and/or insulation. Since the module may be worked on by outside contractors, this area should not interfere with the normal shop process.

6. Hydraulic Punch Station. A hydraulic punch is used for making holes in steel plate, typically for bolt holes in anchor base plates. The hydraulic punch is more efficient than a drill press when the work is repetitive. If there are only one or two copies, a drill press is a better choice. The hydraulic press should have the capacity to cut a 1-1/2-inch hole through 3/4-inch carbon steel or stainless steel. The hydraulic punch requires an electrical connection.

7. Tee Pull Station. A tee puller is used to pull a nozzle from the side of a section of pipe. The nozzle is connected to a branch pipe and is used in place of a tee fitting. Pulling a tee saves the expense of a tee fitting and the labor to weld the fitting into the pipe. The tee puller is especially economical when working with stainless steel.

8. Grooving Station. Grooved pipe with mechanical joints is very common in the building heating and cooling market. It is very common for pipe fabrication to be a combination

of welded and mechanical joints. A cut grooving machine and or a roll grooving machine is needed to groove the ends of the pipe to accept mechanical joints.

9. Storage. A neat fabrication shop will promote neat work. To promote neatness, ample storage is needed for the following items:

- | | |
|---------------------|--------------------|
| Pipe fittings | Paint |
| Cutting templates | Extension cords |
| Small tools | Chokes and chains |
| Welding wire spools | Ladders |
| Welding rod | Anything else that |
| Welding cables | ends up on the |
| Cutting oil | floor |

10. Final Check Station. The final check station does not require a fixed location like layout or welding stations do. The final check is where the fabrication drawing is checked against the finished fabrication to make sure it is complete and accurate. The checking process must be done by a person who was not involved in the layout of the piece of fabrication, since more mistakes or deletions will be found by those taking a first and fresh look at the work. Absolutely no piece of fabrication should leave the shop until it has been checked.

GAS SERVICES

Several types of gas are used in the cutting and welding process. All of these gases are supplied from high pressure tanks or lower pressure liquid refrigerated tanks. The size and type of tank will depend on the quantity of each gas used by the fabrication shop.

Gas can be supplied to the work stations by two methods. Individual high pressure tanks can be located at each work station or



central tanks can feed into a piped distribution system. Individual tanks are appropriate for a small lab shop with only two or three work stations. Larger fabrication shops should invest in central tanks, since too much time will be spent moving individual tanks in and out of the work stations.

The gases typically used in the fabrication shop are:

1. Oxygen. The most economical way to purchase oxygen is in a liquid refrigerated tank. This tank is at a lower pressure than the smaller capacity high pressure tanks. The liquid oxygen tank is hooked up to a pressure regulator set to supply approximately 60 psi pressure to the shop. A high pressure oxygen tank is hooked up to a different regulator that is set to supply 50 psi. When the liquid oxygen tank runs out, the high pressure tank automatically maintains a continuous flow of oxygen until the liquid oxygen tank is changed.

2. Argon. The most economical way to purchase argon is also in a liquid refrigerated tank. The liquid argon tank is hooked up to a pressure regulator set to supply approximately 110 psi pressure to the shop. The high pressure argon tank is hooked up to a different regulator that is set to supply 100 psi pressure. When the liquid argon tank runs out, the high pressure tank automatically maintains a continuous flow of argon until the liquid tank is changed.

3. Carbon Dioxide. Carbon dioxide is supplied from high pressure tanks, typically from a three-tank manifold. The manifold is hooked to a pressure regulator that is set to supply 140 psi gas to the shop. Carbon dioxide is used in a mixture with argon as a shield gas. A gas mixer is used to supply the gas in

the required proportions. Typically the mixture is 75 percent argon and 25 percent carbon dioxide.

4. Mix Gas. Another shield gas used in the welding process is a mixture of 90 percent helium, 7.5 percent argon and 2.5 percent carbon dioxide. This gas is furnished in high pressure tanks.

5. Propylene Base Gas. The gas used for cutting is liquefied petroleum gas. A three-tank manifold is typical. The manifold is connected to a pressure regulator that supplies 120 psi to the fabrication shop. A flash-back arrester is used before the supply enters the shop.

NOTE: Be sure to comply with safety and OSHA codes for tank storage and separation.

6. Compressed Air. Compressed air is needed for tools and machinery throughout the fabrication shop. The size of the air compressor needed will depend on the quantity and type of tools that use compressed air. A 5 hp air compressor will supply the needs of a 20-person fabrication shop. The cost of a back-up air compressor is very small compared to the cost of ten pipefitters standing idle.

ESTABLISHING THE FABRICATION PROCESS

The above discussion involves the physical components that make up a piping fabrication shop. However, the key to a successful and profitable fabrication shop lies in blending all the components into a process that produces a continuous smooth flow of finished fabrication. This is an elusive concept to describe, but there are some basic steps that contribute to proper fabrication flow.



1. Scheduling. The drawings, materials and manpower must all be available at the same time. Starting and stopping an assembly process due to the lack of any one of these components greatly reduces the efficiency of the shop. Once an assembly is started, it should not stop moving until it is loaded for shipment.

2. Handling. Again, don't handle anything twice when once will do. Putting an assembly on the floor almost guarantees that double handling will be necessary. Keep the work on wheels and roll it from one station to the next.

3. One-Way Traffic. The fabrication shop should have an IN door and an OUT door, with the assembly moving from station to station in one direction. Any backing up will provide an opportunity for interference with other assemblies.

4. Emergencies. It is unlikely that a week will go by when the shop foreman does not get a panicky call from a jobsite in need of an assembly "right now?" The emergency can be accommodated, but not at the expense of disrupting the entire shop flow. Before the first emergency occurs, develop a strategy that will allow the current fabrication to flow uninterrupted while a fast track fabrication process flows "on the side." The side fabrication may not be as efficient as the normal shop procedure, but this way, the normal shop procedure is not penalized for the emergency. This helps keep the cost where it belongs.

CONCLUSION

A decision to set up a piping fabrication shop is a major one, requiring much thought and commitment. Before spending the amount of money required, a contractor should thoroughly explore local union agreements that may limit what can be fabricated and should also try to involve crafts people in the planning of the fabrication process, so any possible negative attitudes they may have had at the onset may be mitigated.

The values, perceptions, and attitudes of management personnel will also have a strong influence upon what kind and size of fabrication shop is possible. Management decisions can establish limits on a shop faster than anything else. If management attitudes are positive—that is, if managers believe that anything that can be measured can be dimensioned, and that anything that can be dimensioned can be fabricated—then a contracting firm interested in fabrication is off to a good start and will probably experience good utilization of the shop.

Once labor and management are on board, the decision to fabricate can have a positive effect on the bottom line. Fabrication can be considered at the estimating and job planning stage and will become commonplace. The ability to prefabricate, as well as preplan the job will add to a contractor's overall profitability.

Note: For additional information on Shop Fabrication, refer to the MCF (Mechanical Contracting Foundation) manual, "Guideline For Drafting, Prefabrication and Material Handling," 1994.

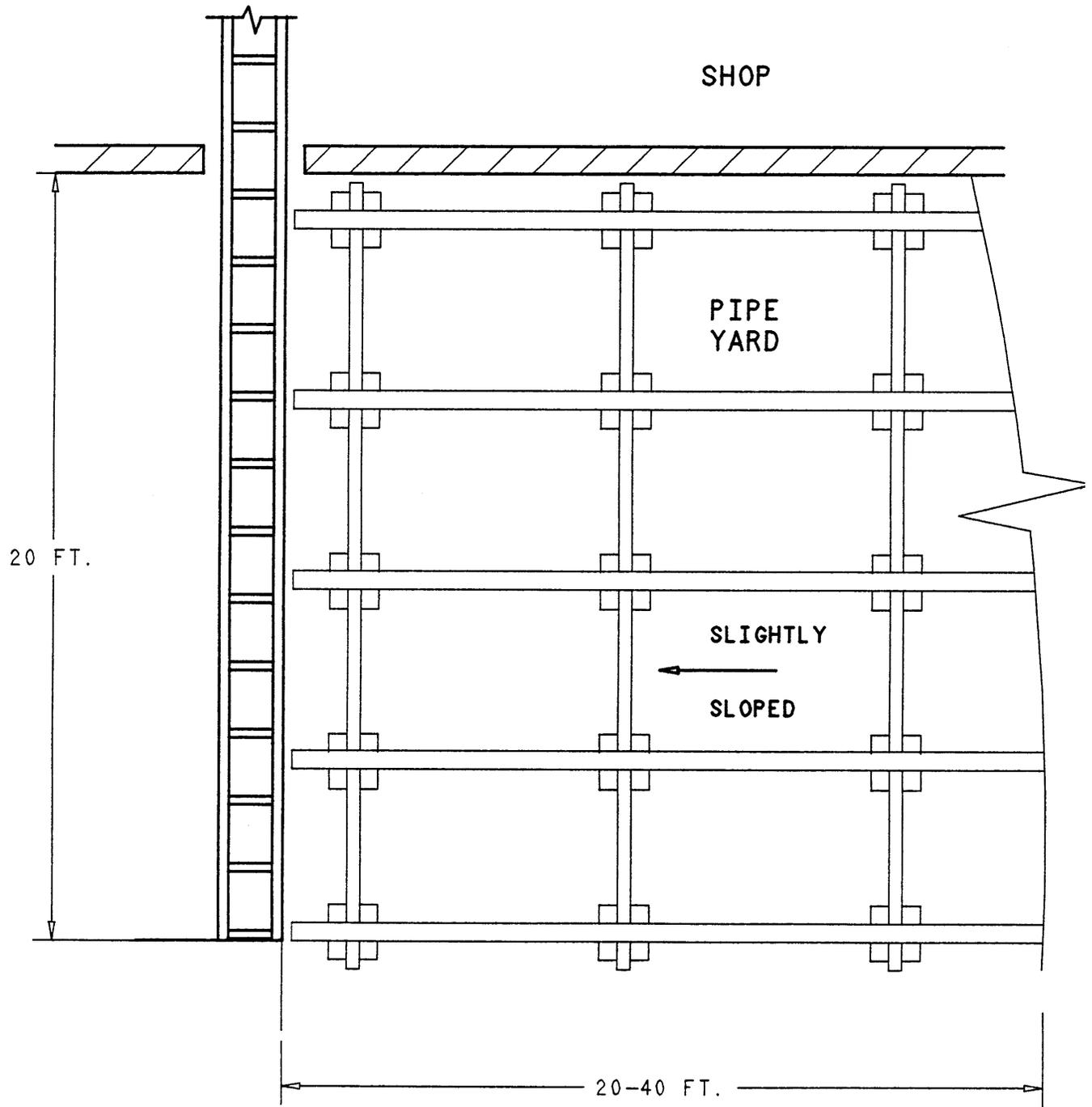


Figure 2. Typical Pipe Feed Rack

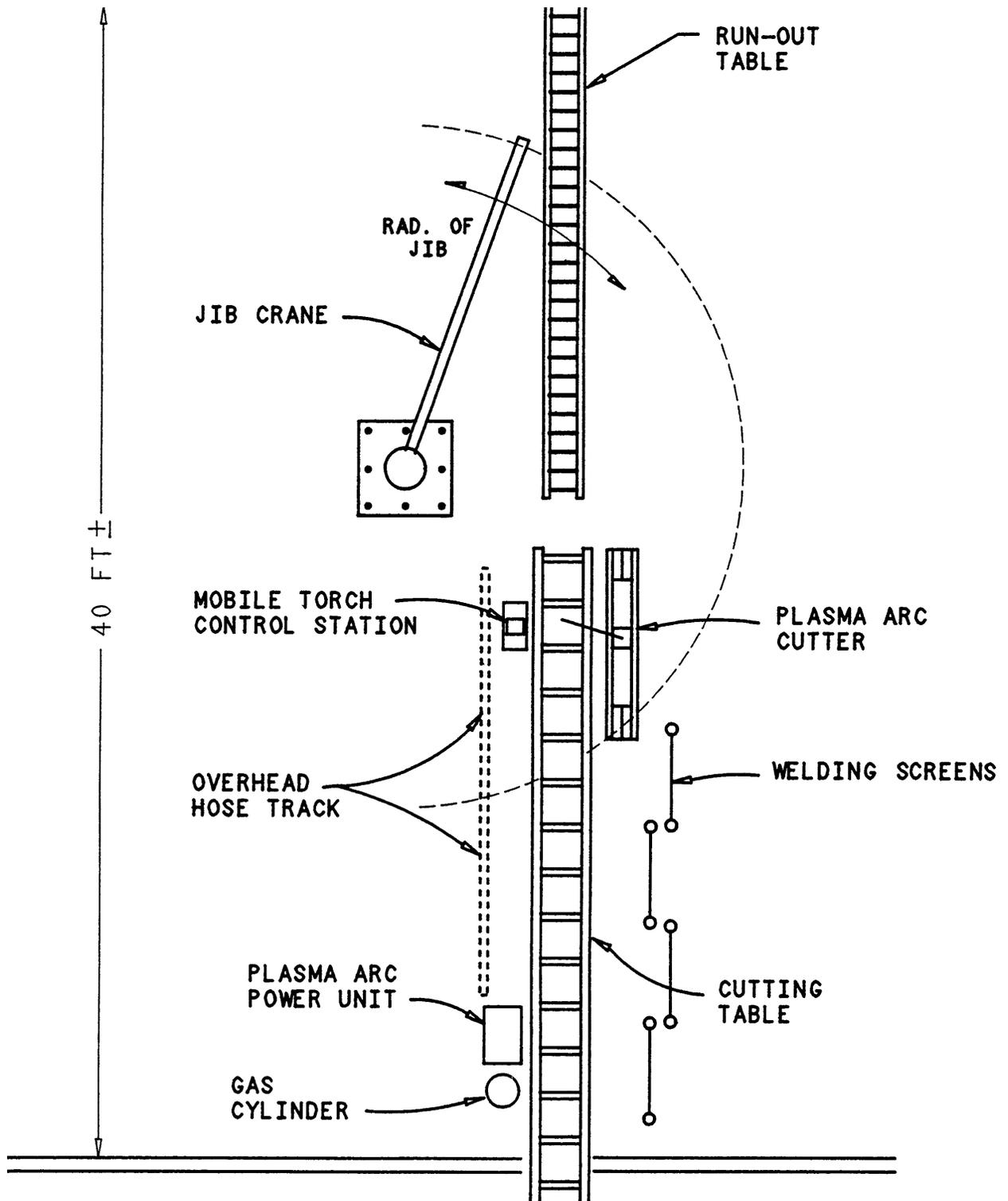


Figure 3. Cutting Station Layout

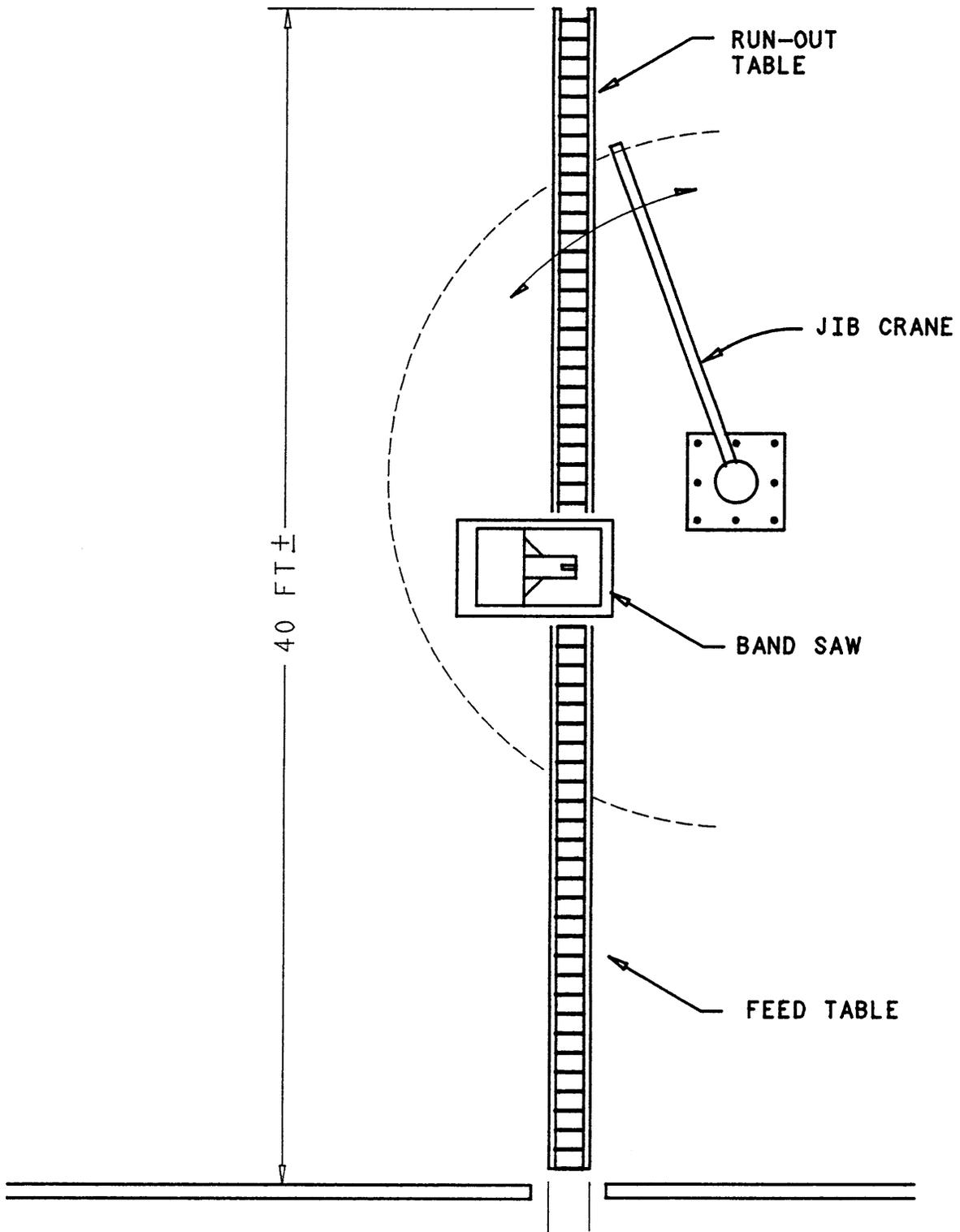


Figure 4. Band Saw Station Layout

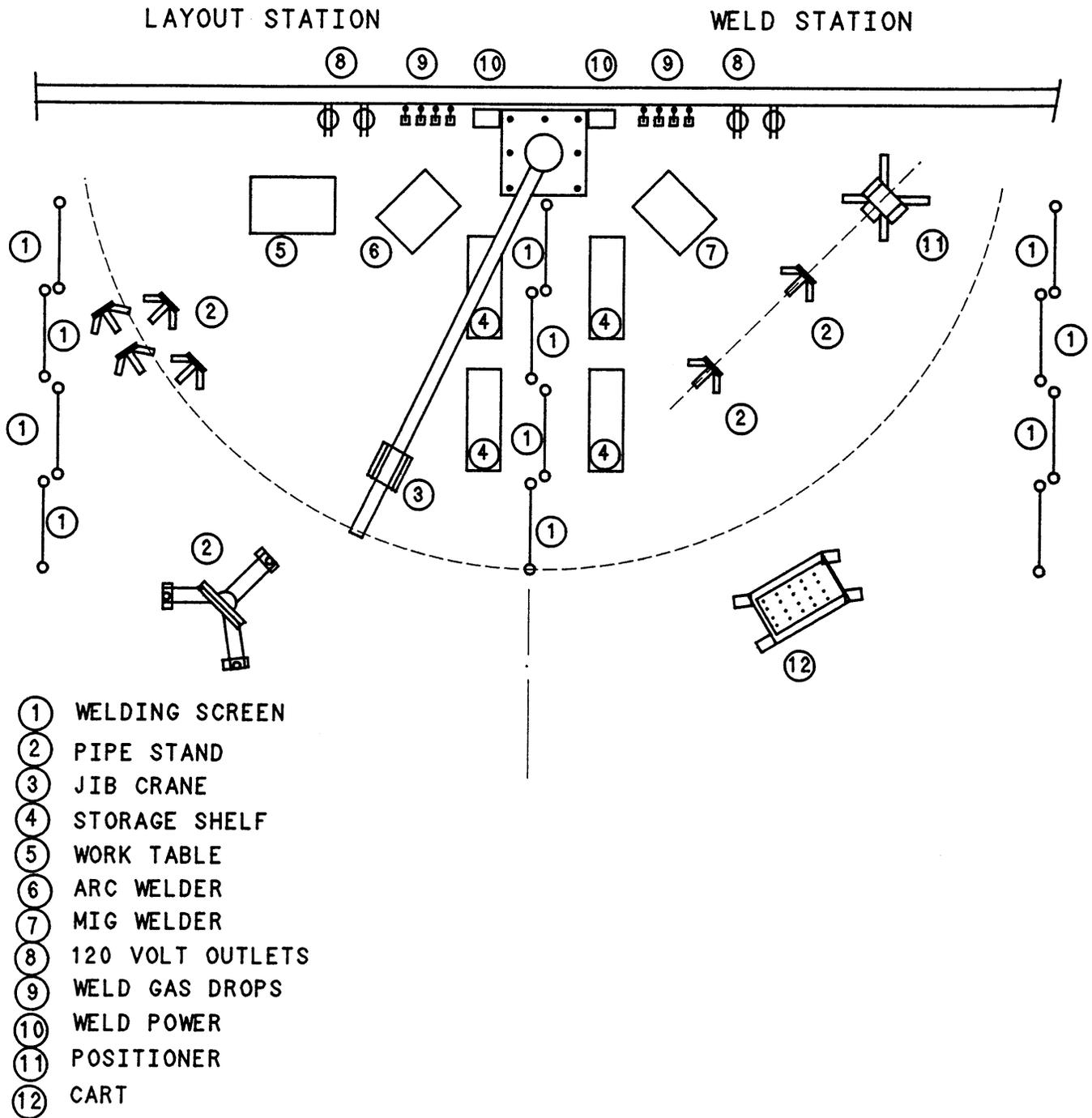


Figure 5. Layout Station/Weld Station Layout



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Bulletin

How to Find, Hire, and Manage Student Interns

Introduction

Finding good help these days is tougher than ever, especially for companies in the specialty construction business. Companies that are recruiting for professional positions (i.e., project managers, estimators) are challenged by unfavorable demographics; the “baby boomers” (those born between 1945 and 1965) with experience are reaching retirement age and recent college graduates with technical degrees are declining in number each year.

Companies are finding that one way to ensure that their recruiting goals are achieved is to plan and act ahead by hiring summer interns. Companies in our industry (and others) are hiring college students majoring in relevant academic programs for summer or temporary jobs to fill a short-term personnel need now AND a possible full-time professional need in the future.

This bulletin is designed for those companies interested in hiring student interns either as a part of a recruiting strategy for full-time professional employees or as a way to fill a temporary shortfall in project staffing. Either way, this guide will acquaint you with the concept of a student intern, help you plan a successful strategy to recruit an intern for your company, and suggest

an approach to managing the intern to ensure the experience benefits and fulfills everyone involved.

What is a Student Intern?

Student interns are professionals in training. They are college students majoring in the academic disciplines that apply to the careers or professions that they wish to pursue. An internship provides the student with practical experience working in the profession that they hope to enter after finishing their education. The internship should augment the student’s book learning, the practical application of theory. An internship also provides the employer with the opportunity to evaluate the student as a potential future candidate for full-time employment.

For the mechanical construction industry, interns may be majoring in construction management, mechanical engineering, mechanical-electrical engineering, or architectural engineering. Colleges and universities structure their academic programs differently, so be sure to ask about the courses that the intern candidate has taken that pertain to the position that he/she is competing for. Student internships typically occur during the summer months (May through August) when regular classes at

colleges and universities are in recess. However, some internships occur during the entire year; in those situations, students work out a part-time arrangement with their employer and arrange their class schedule around their internship schedule.

When considering several applicants for an intern position, it is recommended that the students have at least one year of college behind them and that they are in good academic standing. You should feel confident that the student can meet the challenges of the position and its responsibilities.

Also, be aware that some academic programs require students to complete an internship as part of their education. In some situations, the student earns academic credits for successful completion of an internship.

In some professions, interns are not paid. Students work for the experience, the exposure to a potential employer, and to build their resume. The interns that are associated with MCAA members, however, are paid. The association also provides a program to help its members cover the cost of an intern. (See section IV).

Paying interns will help your company stay in compliance with the Fair Labor Standards Act (FLSA). (See section IV).

I. Recruiting

An intern program should be designed to be an important part of a company's overall recruiting strategy. The recruitment of interns should be treated as the first step in recruiting well-qualified professionals.

The Search Begins . . .

The process involved in recruiting interns is not much different than it is for recruiting full-time employees. You may

want to prepare a brief description of the position, its responsibilities, skills requirements, and compensation, if appropriate, evaluation, and follow-up. If you are the primary contact for intern candidates, be sure your name, address, telephone, and e-mail address are included with the position information.

Start Early

Students often begin searching for intern positions as soon as the fall term begins, so plan your search accordingly. If you wait until the first of the year or the spring to begin your intern search, you may miss the best candidates.

Target Relevant Schools

Begin your search by targeting colleges, universities, and community colleges offering academic programs that are relevant to your business and, if possible, that are close to where your business is located.

MCAA Can Help

MCAA is as anxious as you to bring well-educated young college students into our industry. The following provides resources and tips to help you find the right person for the job.

1. MCAAGreatFutures.org

MCAA has available a website designed for students who are seeking employment as an intern, coop or full-time position. The website, www.MCAAGreatFutures.org, allows students to post their photos, profiles with contact information, skills listings and previous relevant experience along with a resume and a brief video highlighting their knowledge and skills.

MCAA members are encouraged to begin their search for a temporary intern or coop or full-time entry-level professional by scanning this site for possible recruits. The site is searchable by location, school or key words.

2. MCAA's Careers website

Go to (www.mcaa.org/careers) and you will find a link to a list of current MCAA student chapters. The list also provides the name, address, phone, fax, and e-mail address of the current faculty advisor for each chapter. Faculty advisors are usually very willing to recommend students for internships and to help you connect with potential candidates. If your local association sponsors a student chapter, be sure to contact the chapter's faculty advisor recommendations. For a more expanded list, check the website for the Associated Schools of Construction (www.ascweb.org).

3. Go Back to School

Once you have identified the schools you want to target for intern candidates, you may consider planning a visit to the campuses as a key element of your search. The visit puts a face and a name behind a corporate image and personalizes the recruiting process.

4. Contact Career Centers

Make the most of the campus visit by contacting the careers center first. Ask about registering your company with the center, which usually involves providing promotional literature and other information. Be sure to schedule a visit to the career office and meet the counselors. They may be more inclined to steer good candidates to a company that's taken the time and effort to establish a relationship with the college or university.

If a visit to campus is not possible,

- 1) Call the school's career center to request resumes from interested applicants;
- 2) Search online for the school's career center and request resumes by e-mail.

Career centers are motivated to cooperate with prospective employers

because their success in placing graduates reflects well on the school and helps attract well-qualified new students.

5. Career Fairs

When you contact and/or visit the career center, inquire about the next career fair and how to participate. Students like career fairs as a first step in their career development because the atmosphere is casual and less intimidating than a formal interview. Schools often schedule career fairs in the fall and the spring, and individual disciplines or colleges often have their own career fairs.

6. Recruit From Within . . .

If time and resources are limited, organize your search from within your company and among family and friends.

Post a notice on the company bulletin board that lists the requirements of the position, the term of employment, contact information, and other details as you consider pertinent. Advertise the opportunity with your church, synagogue, or membership organization to which you belong. And, if you know of a promising candidate from among your circle of friends, advise them of the position opening.

It is suggested, however, that should a candidate emerge from this in-house recruiting effort, the interview with that person should be conducted by someone other than yourself to keep the recruiting process objective.

The Interview

If your search began on campus with a career fair, you may wish to return to campus for more formal interviews with promising candidates. The career office can help schedule the interviews and may have facilities especially intended for that purpose. Be aware of the

school's schedule before you make appointments; holidays, breaks, exam periods are times to avoid.

Alternatively, consider scheduling the interview at your office when the school is out of session for a recess, holiday, or break. This is a more personal approach that enables the students to focus on your company and get a feel for its work environment. Again, the career office may help you arrange the visit with selected students. If you choose this approach, be prepared to cover the student(s)' travel costs.

During the interview, be sure to:

- Acquaint the student with the company's history and the services it provides;
- Explain the position requirements, responsibilities, goal, and objectives;
- Clarify the term of the internship;
- Explain who will supervise the intern and make sure the intern meets his or her prospective supervisors; and
- Explain the intern's prospective salary.

Even though an intern position is temporary, you are still obligated to conduct the interview in accordance with all applicable federal, state, and local laws. When interviewing female applicants, do not ask questions that are gender-biased. Do not ask questions of either sex when they are irrelevant to an applicant's ability to perform the duties required of the job.

Allow some time for the student(s) to ask questions. Conclude by informing the student about the follow-up process, when you will contact them about the results of the interview.

At the conclusion of each interview, jot down some notes and your impressions. If you let too much time go by, you may forget important points that could sway your decision regarding a candidate.

II. Hiring

Once you have selected a student for an intern position, get in touch with him or her as soon as possible. Students often consider several internship offers, and you will want to be sure your offer is considered. You may also want to choose an alternative, in case your first choice takes another offer.

Be sure to follow-up the offer with a written proposal that outlines the intern's responsibilities and requirements, beginning and ending dates, and salary. Also be sure the intern knows when and who to report to on his/her first day. Finally, be sure to contact the career office about your hiring decision and the student(s)' response. Career offices keep track of where students land jobs, whether they are internships or full-time positions. That information helps the school recruit new students.

III. Managing

Student interns are temporary employees, but they are also professionals in training. Their experience with your company may influence their long-term career development choices. Therefore, their work assignments should be meaningful, contribute to the accomplishment of a project or task, and ultimately benefit your company.

Before the intern arrives, plan an assignment schedule that spans the intern's term of employment. It is suggested that the intern be assigned to a project that will expose him or her to the tasks and activities that are typically undertaken by either a project manager and/or an estimator. The tasks assigned should be appropriate for the intern's knowledge and skill level. A rising senior will be able handle more responsibility and more complex assignments than a rising sophomore.

Orientation

In planning the intern's schedule, be sure to set aside time for the intern to become acquainted with your company, the staff, and the protocols and procedures that are necessary for him or her to perform the tasks assigned. On the intern's first day:

- Show the intern his or her work space, including a safe place for storage of personal items.
- Review the operation of basic office equipment, such as the phone system, the copier, the fax machine, and most important, the computer system. Make sure the intern has an e-mail address, voice mail greeting, and knows the standard telephone greeting for the company.
- Go over your company's personnel policies, rules and procedures, and prohibitions as appropriate. Be sure to cover rules about unacceptable behavior, attire, and other related matters.
- Introduce the intern to your staff members and set aside some time for he/she to meet with the person(s) assigned as his/her supervisor(s).
- Take the student out to lunch with a couple of staff members with whom he/she will be working most closely, including his/her supervisor(s).
- Make sure the intern knows where the staff eats lunch and takes breaks and include him/her in those activities.

If the intern is expected to use special computer software or other tools to perform the assigned tasks, assign a staff person to teach him/her the proper operation of those tools.

During the first few days of the internship, set aside a few minutes each day (if possible) to meet with the intern and discuss any issues or questions.

The Project

Interns want to work and to learn while they work. As their employer, you need

to assess the tasks that need accomplishing and whether the intern is capable of accomplishing them, based on his or her skill and knowledge level. Also, keep in mind that the intern will only be on the job for a few weeks. The intern should be able to complete the project before his/her internship ends.

As you consider possible projects, keep in mind:

- Interns are using new technologies (i.e., the latest computers, tablets and software, Smartphones, etc.) and are learning new techniques to tackle common challenges of this industry.
- Interns can take on tasks that will allow full-time professionals to tackle other challenges.
- Interns may view a task or challenge from a different, fresh perspective and, therefore, may come up with a different, workable, possibly more efficient solution than would have occurred to you or other staff.
- Interns have very few, if any, preconceived notions about how to accomplish tasks, making them easier to train and teach.

Once you settle on a project for the intern, meet with the intern and his/her supervisor to go over:

- The tasks involved
- Deadlines and deliverables
- Other staff assigned to the project
- Who to ask questions (other than the intern's supervisor)

Be clear about what the project is and what is expected of the intern. Be sure the intern understands and encourage him/her to ask questions.

Meetings

Staff meetings, project meetings, customer meetings are also excellent opportunities for interns to learn and make a valuable contribution to your company.

Invite your intern to participate in meetings, as appropriate, but take a couple of minutes to brief the intern on the meeting's purpose and agenda. If you expect the intern to actively participate in the meeting discussion, make sure he/she knows of your expectations. If you expect him/her to listen and observe only, make that clear as well.

Feedback

An internship is a learning experience for a professional in the making. Feedback on the work performed by an intern – positive and negative – is, therefore, welcome and encouraged. That's how the intern learns and develops his/her professional skills. How the intern responds to feedback provides you with insight on his/her character and potential as a professional you may want to hire.

When the work performed is incorrect or not up to expectations, advise the intern of the shortcoming and instruct them on the proper procedure.

When the intern performs good or excellent work, be sure to tell them so. Reassurance from the boss or the supervisor helps relieve the intern's anxiety and builds their confidence.

IV. Distinguishing Interns from Employees

Internship programs are very beneficial to student interns and the companies that employ them. An internship is not a job per se and, therefore, interns work under a different set of rules governing their compensation and entitlements.

Compensation

First, companies are not required to pay their interns. In those situations, employers must be aware that under the terms of the Fair Labor Standards Act (FLSA) (which applies to companies with at least two employees that are

directly engaged in interstate commerce and that earn annual sales of at least \$500,000), companies that do not pay interns must structure their programs to be essentially educational in nature. Otherwise, the U.S. Department of Labor (DOL) would consider your interns to be employees who are entitled to the federal minimum wage. To be legal, your unpaid intern(s) must meet the DOL's criteria for a leader/trainee:

1. Interns may be trained using equipment and procedures that are commonly used within the industry.
2. The training is for the benefit of the trainees or students.
3. The trainees or students do not displace regular employees, but work under close supervision
4. Interns are not guaranteed jobs at the completion of their internship.
5. Interns are not entitled to wages during the internship.
6. The company should derive no immediate advantage from the activities of the intern.

It is recommended that employers pay their interns, if possible. A paid internship formalizes a professional relationship between the employer and the intern and it assigns a tangible value to the work performed by the intern. Paying interns also increases the employer's chances of recruiting good candidates for internships in the future.

A suggested average salary for interns is \$15 - \$20 per hour. This is a range based on salaries paid interns by recipients of MCAA student chapter grants.

If your company pays its interns, be sure to determine any federal and state income tax requirements affecting intern compensation.

MCERF Internship Grants

MCAA members that employ interns do pay them. MCAA has also established a

program through the Mechanical Contracting Education & Research Foundation (MCERF) that offers grants to members who employ interns to help cover their salary. The foundation determines the amount of the grant each year, which is announced in January. For more information, visit www.mcaa.org/careers or www.mcerf.org.

Rights and Benefits

Employers should also be aware that interns, whether paid or unpaid, are entitled to the same legal protections against discrimination and harassment as full-time employees. Interns are not, however, entitled to the same benefits as full-time employees (such as unemployment compensation, medical insurance, and termination procedures), but employers may consider seriously covering interns for workers' compensation to protect the intern and the company should the intern incur an accident or injury while on the job.

V. Evaluation

An evaluation process provides valuable feedback to the intern and to the employer. Throughout the intern's employment, the intern should have received feedback on his/her performance to be sure the experience is positive, meaningful, and that the project outcome is acceptable. T

At the conclusion of the internship, the employer should provide an opportunity for a final evaluation of the intern's experience. The evaluation may be in the form of a written survey and/or a formal exit meeting. The information resulting from the evaluation may help the company to improve its internship program for future interns, and the intern will, hopefully, have learned new technical and professional skills that will aid his/her professional development.

At a minimum, the intern should complete a brief written form that allows him/her to evaluate the experience. The form should be added to his/her file and a copy provided to the intern. The school's career office may require a copy or a separate evaluation that should be completed before the intern departs. Always secure the intern's permission to disclose an evaluation.

Conclusion

Internship programs can be highly beneficial to students and their employers. Each should be motivated to gain as much as possible from the experience; students enhance their knowledge and skills about the profession and industry which they have chosen for a career and the employer gets the opportunity to preview a potential future employee.

Remember, the intern can help promote your company back at school. If his/her experience is positive and constructive, future prospective candidates will hear the good feedback and seek out your company for future internships or full-time employment opportunities.

Resources

The following resources were used to develop this bulletin:

Fair Labor Standards Act Advisor, U.S. Department of Labor, (www.dol.gov/elaws/esa/flsa/scope/er15.asp)

Intern Guidebook: An Easy-to-Follow Guide to Hiring Interns, Mechanical Contractors Association (Chicago, IL)

Other sources:

Recruiting and Managing Student Interns, Center for Leadership and Service,

[www.leadershipandservice.ufl.edu/
community/tips/managing
student_interns](http://www.leadershipandservice.ufl.edu/community/tips/managing_student_interns)

Ten Tips to Effectively Manage Interns, LookSharp™,
www.internmatch.com/guides/ten-tips-to-effectively-manage-interns

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Model Internship Program

The following *suggests* a program for a 12-week student internship. It is designed to provide the student with an overview of how a mechanical contracting firm operates and a meaningful experience in performing the work of a mechanical contracting firm. Every firm is unique in terms of its operations, policies, procedures, and management approach to projects and administrative processes. Therefore, employers are expected to adjust this model program to the specifics of their operations, project procedures, and needs for a professional-in-training.

Day 1

Human Resources:

- Meeting with Human Resources Director
- Sign-up procedures
 - Employee information forms
 - Tax forms
- Corporate overview
- Policies/procedures orientation
- Office assignment/equipment orientation
 - voice mail
 - computer passwords and access
 - computer use guidelines, instructions
- Office equipment use orientation
- Staff introductions

Supervisor/Mentor

- Introductions
- Internship schedule
- Projects orientation
- Skills orientation
- Team introductions/orientation

Safety Orientation

- Policy orientation
- Equipment demonstration
- Hazard abatement procedures
- Emergency procedures

Days 2 – 10

Estimating Process

- Analysis of project:
 - bid specifications
 - CAD drawings
 - equipment requirements
 - code requirements
 - labor loading
 - general conditions
 - other
- Estimating software orientation and use
- Assist with development of estimates for
 - Design-Build projects
 - Plan and spec
 - Replacement projects

Days 11 – 17

Fabrication Shop Processes

- Process orientation
- Safety procedures
- Process management instruction
- Assignment

Days 18 – End

Project Assignment

- Purchasing procedures
- Daily logs
- Subcontracts
- Job tracking procedures
- Tool inventory
- Equipment approvals
- Invoicing
- Accounting

Commissioning and Testing

- Commissioning and testing orientation
- Equipment testing
- Balancing
- Punch list

Last Day

Human Resources

- Exit interview



Bulletin

Do's and Don'ts of Effective Employment Interviews

Introduction

The job interview is a powerful tool for most organizations to use in hiring new employees. A candidate's references and work experience provide important factual information, and that information should be checked and incorporated into the candidate's overall assessment for a position. However, the interview provides valuable information about a candidate's personality, demeanor and suitability for the position and culture in which he/she will perform. Assuming that other staff will interview the candidate, the interview process helps other employees "own" the new employee who joins your organization.

Get Organized and Plan

Before you begin the actual recruiting process, arrange a planning meeting for all of those who will be involved in finding and selecting the candidates for the position(s) available.

Your agenda for this meeting may include the following steps:

- Plan a recruiting strategy which could involve announcing the position in local news or national trade publications, retaining the

services of a search firm and participating in career fairs;

- Develop a list of the qualifications sought in a candidate (i.e., what skills, education, training, experience and credentials does the position require?); and
- Draw up a list of staff who will interview the candidates and the topics they should cover

This planning meeting and the recruiting activities that result from it will improve your employee selection process.

Selecting Candidates to Interview

Begin by reviewing each candidate's resume and cover letter. When faced with a large number of resumes, it helps to have techniques that allow you to select the best candidates from the pile. Those techniques will also help you prepare your list of questions to use during telephone and personal interviews.

For example, decide what's important, whether it's the candidate's education and/or training credentials, duration of previous employment situations, responsibilities, etc. And, those priorities should relate to the position being filled and qualifications you require for that position. Remember, you are searching

for a person who will best fit your needs for that position.

Narrow your priorities for a first run-through of resumes and cover letters to reduce the pile. Then look more carefully for lesser qualifications that still add to the candidates' overall suitability for the position. And, review candidates' information with an eye to how well the information is presented (i.e., errors, grammar mistakes, overlooked details and good summaries, selling points).

Once you have a good selection of candidates, contact each of them to arrange a telephone interview.

The Telephone Interview

The telephone interview or candidate screen allows you to determine if the candidate's qualifications, experience, workplace preferences and salary needs are appropriate for the position and the organization. Most important, is the candidate still interested in the position and available for hire? The telephone interview saves managerial time and eliminates unlikely candidates.

Keep the interview time brief—no more than 15 minutes—and focus on the most important issues concerning the candidate's qualifications and suitability for the position. Prepare questions prior to the interview to make the most efficient use of the time spent.

Preparing for the Personal Job Interview

Prior to the scheduled in person interviews, make sure the interview team members have the following information:

- Each candidate's resume and cover letter;

- Description of the position to be filled; and
- Questions that must be covered.

When a candidate arrives, put him or her at ease with a warm greeting, a beverage and an escort to the interview location. If the interview process requires the candidate to complete an employment application, provide a quiet, comfortable location (a sample application is provided as an attachment to this bulletin). First impressions count for you and your company too.

Be careful, however, not to jump to conclusions based on first impressions. Sometimes the best employees may give the worst first impressions. To make sure you don't overlook these diamonds in the rough, withhold judgment until you've had the chance to thoroughly evaluate a candidate's capabilities and potential.

The Interview

The following suggestions are offered to help guide you in conducting an effective personal employment interview:

Begin with the job description. Start with a brief summary of the position, including the prime responsibilities, reporting structure, key challenges, and performance criteria. This will help the candidate provide relevant examples and responses.

Improvise. Plan your questions, but don't feel you must ask only those you've chosen in advance.

Listen. Let the candidate do most of the talking which allows you to obtain necessary information about the candidate's true competencies.

Take notes. While you will not want to transcribe everything the candidate says, write down important points, key

accomplishments, good examples, and other information that will help you remember and fairly evaluate each candidate. An interview guide, prepared in advance, will make note-taking easier and give you a structure for capturing key information.

Invite candidates to ask questions. This can be the most valuable part of the interview. Why are they interested in this position or this company? Is it the challenge of the job, advances in the industry, or something specific about your company that interests them? Or is the candidate fixated on salary, benefits, and time off? If the candidate has no questions, this should be a red flag, especially for senior-level employees. Make a note of what the candidate asks, and be sure to follow up with answers to questions you cannot provide immediately.

Questions to Avoid

It is critically important that every interviewer at your company, from HR clerks to top executives, understand and follow legal hiring guidelines. Eliminate the potential for bias by not introducing questions or scenarios that will elicit irrelevant information.

Questions about an applicant's age, birthplace, appearance, marital status, child care arrangements, ethnicity, religion, financial status, etc. almost never have a specific bearing on the individual's ability to perform a job. They should, therefore, be strictly avoided.

Indirect questions regarding these issues are just as improper as direct ones. For example, "How many years before you plan to retire?" is no different than asking the candidate's age. "What religious holidays do you observe?" is no better than directly asking a candidate to identify his or her religion. Both have the same

legal repercussions. If these questions are asked of a candidate who is not hired, inferences can be drawn that discrimination may have occurred.

For a more thorough discussion of illegal interview questions, consult the U.S. Equal Employment Opportunity Commission (<http://www.eeoc.gov>).

After the Interview

Inform candidates about next steps. End the interview on a positive note and with information about follow-up. For example, "We enjoyed meeting you and appreciate your interest in our company and the position. We will be conducting interviews over the next week, and will notify you within 10 days of our intentions. Will you be available?" If the candidate is a good fit, you may want to be more specific and deliberative. For example, "When will you be available for a second round of interviews?" And, if the candidate is not a good fit? Always end the interview on a positive note, but do not tell the candidate to call you if you don't mean it.

Assess Candidates Following the Job Interview

Provide a standard format for each interviewer to use to assess each candidate following the job interview. You should have several candidates who you'll want to ask back for a second or third interview.

Compare notes and reach consensus: The post-interview evaluation is the time to compare notes and advance the hiring decision. Each interviewer should be prepared to back up remarks and recommendations with specific examples and notes from the interview.

Deepen the questions as you narrow the field

Subsequent interviews with finalists are valuable opportunities to learn more about them. Consider adding "show me" exercises such as a strategic planning exercise or a "walk me through what you'd do" activity involving a real business challenge the individual would be facing.

"Red Flags"

Recruiting new employees carries risk. Will the new employee live up to your expectations that he or she will perform as well or better than promised? Here are seven warning signs that the candidate is not all that he or she claims.

1. The candidate is big on adjectives but cannot back them up. You ask, "What's your greatest strength?" and the candidate says, "I'm dependable and hard-working." Press him. Ask him if he works harder than his peers. Listen to the way he forms his answer—you want to hear details of *how* he gets more done in a day than others do, not just that he stays late at the office night after night. Ask for concrete proof of results, such as consistently brings in projects on time and on or under budget or the candidate produces commendations letters from satisfied customers. If the candidate cannot come up with any good, concrete examples, then the candidate is telling you what he or she thinks you want to hear.

2. Your questions take the candidate by surprise. A well-prepared candidate should anticipate most of your questions. He or she should be able to describe her unique strengths, and, as before, be able to back up her descriptions with specific examples of how he or she used those qualities to create a better bottom line for his or her current employer.

If the candidate gives you an immediate,

confident response, pay close attention. You may have found your next hire.

3. The candidate will not admit to any flaws or weaknesses. Be wary of the candidate who does not admit to a skill or work habit that could use some improvement.

And, watch out for candidates who are just the opposite, who want to confess every flaw and are seemingly clueless about how to correct them.

Look for candidates who are willing to admit "flaws"—but who are actively working to correct them. For example, you might hear, "I haven't learned the finer points of BIM yet, but I am planning to attend a conference next month dedicated to practical applications of that technology."

4. The candidate cannot identify the most crucial function of his/her current position. If a candidate cannot relate his or her current job to the company's overall mission, that candidate may not be best suited for the job, regardless of his or her qualifications.

For example, an answer like, "Well, if I submit a flawed estimate, I could lose my job," should throw up the biggest, reddest flag you can find. But, a candidate who says, "Client satisfaction is crucial to our success in the market. There are dozens of companies that provide similar services. If the service we provide is not flawless and does not meet client needs, we'll lose market share. By preparing accurate estimates, I help the company retain its competitive edge"—now this is a candidate you should snatch up and quickly.

5. The interviewee says his present company "doesn't offer enough room for growth." Be very careful. This is often a euphemism for "I want to make more

money, and they won't give me a raise." Ask the candidate to define precisely what kind of growth opportunities he's looking for. Then listen to how he describes his current situation. Is he objective? Is he concentrating on what he can do for the company? Or, is he fiercely opinionated and concerned only with what you can give him? "No one appreciates my contributions" is a bad answer. "I'd like to see my contributions have a more direct impact on the company's success" is a better one—but make sure the interviewee has a real plan for *how* he will make a difference.

6. The candidate “really wants to work for your company” but cannot articulate why. A candidate should not arrive for an interview without knowing something about your company. Ideally, the candidate should be aware of your competition and the other major players in your industry, your company's reputation, and what characteristics distinguish it from others. And a good answer to, “Why do you want to work here?” will focus on those differences. If the candidate has obviously not bothered to research your company or is incapable of conveying that research, he or she may be only interested in securing a means to a better salary. The candidate might be able to learn the ropes and perform well, but he or she will never be a superstar.

7. None of the candidate's references can offer specific details on job performance. This is a touchy subject. Some companies have policies—official or otherwise—that prevent supervisors from making specific comments. But, if a supervisor or co-worker genuinely likes the candidate, he should be able to say something that gives you enough confidence to make an offer. If comments about a candidate are general and superficial in regard to specific questions about work performance, read between the lines.

Look closely at *whom* the candidate offers as references. It is acceptable to include one peer, but most references should be from persons who are in positions that are one or more levels above. If the candidate does not permit you to contact a current employer, that is a signal that the candidate is job searching secretly. Do you really want to hire someone who might someday leave you in the lurch?

References often require you to make a judgment call, and then you'll have to rely on your instincts. Obviously, if one reference is wildly out of step with the others, you may just have a personality clash on your hands. But, if none of the candidate's references will give you specific reasons to hire the candidate, maybe you shouldn't.

Deciding on new hires is never an easy task. But if you learn to listen to what the candidate says—and doesn't say—and *how* he or she says it, you'll have a better chance of making hires that work out.

Disclaimer: This information is derived from a variety of sources and is provided for guidance, ideas, and assistance only. Please seek legal advice or assistance from state, federal, or international government resources to make certain your legal interpretation and decisions are correct.



Bulletin

Avoiding Potential Liability from Employees' Use of Company Vehicles

Introduction

Contractors that allow employees to use company vehicles for business (or even home-to-work travel) are exposed to potential liability should an accident occur involving that vehicle. Passenger vehicles used primarily for sales calls and that do not display the company's name and/or logo—rather than logo-bearing trucks, vans or service vehicles—are the main focus of this bulletin.

This bulletin describes the most common types of liabilities that could affect your company should an accident or incident occur involving a company vehicle driven by an employee. The bulletin also offers suggestions to help you reduce the resulting liability to your company.

This bulletin is a general discussion and is not and should not be relied upon as technical legal advice. Consult with your insurance agent and your attorney about steps you should take to minimize your company's exposure as much as possible.

Accidents Happen...

Determining who is at fault for an accident establishes who is responsible for the consequences and associated costs. But, if the vehicle driver (who caused the accident) is not the owner, the question then becomes, "who pays?"

There are at least four ways that your company may be held liable for a vehicular accident.

1. Vicarious Liability

One kind of liability occurs when an employee causes an accident while driving the company vehicle. Even though the contractor did not cause the accident directly, liability for the accident and all its associated costs could fall to the contractor, the vehicle owner.

In most states, the law holds employers liable for wrongful acts committed by their employees, if those acts were committed within the *scope of employment*, otherwise known as the doctrine of *respondeat superior liability*. In other words, if an employee negligently caused an accident while driving a company vehicle to a jobsite (or perhaps during home-to-work travel), the employer could be held liable for the resulting damages. (1) Also the attraction of greater company liability insurance would make the company an attractive defendant for the plaintiff's personal injury lawyer.

The key to managing your company's liability exposure is in the phrase, "within the scope of employment." Answering a claim typically involves one of the following options:

- **Determine whether the employee committed an *intentional* wrong.** Generally, if an employee deliberately commits a wrongful act that results in an accident—such as running a traffic light or a stop sign—it is unlikely that he or she was acting within the scope of employment. However, that defense may not always hold. While running a stop light is an intentional wrong, if the employee did so to reach the hardware store before it closed to purchase items for work, a liability issue could arise. (4)
- **Establish that your company had a policy prohibiting employees from committing the act that resulted in the accident.** This defense may be your best option, but only if it was established *prior to the accident*. A policy that clearly requires employees to obey all traffic laws at all times—regardless of the circumstances—*could* be useful in a case where an employee caused an accident by speeding or running a traffic light. (4)

Enforce preexisting policies.

Otherwise, they are meaningless. (2)
If a suit comes up, and the plaintiff can show you did not enforce policies in the past, that defense is diminished.

- **Make sure your company’s vehicle insurance is adequate to cover damages from accidents.** Accidents do happen while employees are using the company vehicle on the job. Adequate insurance coverage, therefore, can help protect your company from a devastating financial loss. (2)

2. Negligent Hiring or Retention

A company could be held liable for an accident involving its vehicle if it was known that the employee who caused the accident had a condition or a tendency (i.e., a behavioral, medical or physical condition) that could cause the accident.

In other words, if the employee had not been hired or was fired after the problem was discovered, the accident would not have happened. (4)

Make sure you can prove one or more of the following:

- Your company performed a background check on the employee.
- The background check revealed no problem with your employee.
- There was no way of knowing the employee had a problem that affected his/her operation of a vehicle.

3. Negligent Lending of a Vehicle

Your company could be held liable for an accident if the employee who caused the accident was allowed to drive the company vehicle even though it was known that he/she was unfit to drive. (4)

To reduce your liability from negligent lending suits:

- **Obtain adequate insurance on all of your vehicles.** Also, enroll employees who drive company vehicles in a safe driving program recommended by your insurance agent.
- **Make sure that employees who use your vehicles have all the licenses and permits required to operate those vehicles and proof of insurance on their vehicles.** Keep these documents filed separately from other personnel records.
- **Enforce vehicle policies when an employee is not fit to drive.** Do not allow an employee to drive a company vehicle if you know or if the employee tells you, that he or she unfit to drive. (4)
- **Establish and enforce a policy prohibiting family members from using a company-owned vehicle.** If a family member is involved in an accident while driving a company-owned vehicle and is found to be at

fault, liability will attach to the vehicle owner (the contractor) and the claim may escalate. The insurance company will likely pay the claim, but will subrogate the costs to the party that caused the accident.

Enforcing such policies could prove challenging, but one suggestion is to have employees sign a form acknowledging and agreeing to the policy prohibiting family members' use of a company vehicle.

4. Negligent Maintenance of a Vehicle

A company will be liable for an accident if the company vehicle was unsafe to drive (*i.e.*, *faulty brakes or a bad tire*) and its condition contributed to the accident. In this situation, the employee *and* anyone injured in the accident could sue your company. (5)

This type of negligence generally is of two types:

Negligence per se is when a vehicle is driven in an unlawful condition. In other words, if a vehicle has faulty brakes or brake lights, bald tires or broken window wipers, it is unsafe or in an unlawful condition. (5)

In many states, once the unlawful condition of a vehicle (negligence per se) is established and that it contributed to the accident, the vehicle owner (your company) becomes *automatically* liable. To reduce your liability, **never allow your company vehicle to be operated in an unlawful condition.**

"Ordinary" negligence. Even if your vehicle is not in a condition that makes it unlawful to drive, it may give rise to an "ordinary" negligent maintenance claim. All of the following must be demonstrated to prove "ordinary" negligence:

- **A reasonable person would have spotted and repaired a given condition in the vehicle that made the vehicle less safe (but not necessarily unlawful) to drive.** For example, maybe a tire showed uneven tread wear and had a small bald spot. **The condition was not corrected or repaired.** The tire was not changed because it was not known that the tire had a bald spot. Remember, it's not what is known, but what a *reasonable person* should have known. (5)
- **The condition contributed to an accident causing bodily or property injury.** If the tire blew out and caused the employee driving the vehicle to lose control, the company could be held liable. On the other hand, if the accident was caused by someone who ran a red light, the fact that there is a bald spot on one tire is less relevant, but perhaps not completely irrelevant. (It could be argued that the employee would have avoided the vehicle that ran the red light if the company vehicle had been equipped with properly maintained tires. (5)

Reduce the likelihood of successful negligent maintenance claims by making sure that your vehicles are adequately maintained and *document* those actions. In addition to having adequate insurance coverage on all your vehicles:

- **Establish vehicle policies that require employees to report any problems with your vehicles immediately, and direct them not to drive any vehicles in an unlawful or unsafe condition.** Take steps to correct the reported problems as soon as possible.
- **Conduct periodic maintenance and safety checks on your vehicles.** Even better, have a qualified third party — such as a certified mechanic — do the checks. Keep files documenting those inspections. (5)

Protecting Your Company ...Next Steps

At a minimum, here are some actions that you can take to minimize your company's liability exposure from employees' use of its vehicles.

1. Establish a vehicle use policy for your employees. First, check out ***MCAA's Guide to Human Resources Policies***. The publication not only outlines a specific set of policies governing employees' use of company vehicles, but also suggests reimbursement schemes for fuel, repairs and other associated costs.

2. Regularly maintain all your company vehicles in a safe, lawful condition. Doing so will help protect your employees as well as your company. Document service orders and repairs.

3. Maintain adequate insurance coverage on all your vehicles. Consult with your insurance agent on coverages for repairs, medical expenses and liability.

4. Require your employees who drive company vehicles to take a safe driving course. Even if your employees have been driving a while, they may benefit from learning road safety techniques that could help them prevent or survive an accident.

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Bulletin

Guidelines to Using Social Media in Your Business

INTRODUCTION

About 10 years ago, a new form of communication came about that made our shrinking world even smaller and more connected. Social media has allowed people to easily, quickly and inexpensively connect with and stay on top of the lives of friends and family locally and around the world. Social media has also greatly expanded opportunities for businesses to promote their products and services at minimal or no cost to an audience as small or as large as they wish and can reach. It's a brave new world of communication!

As with any new phenomena, however, traps await the uninitiated and unaware, generally resulting from the fact that making available and sharing too much information is not always a good thing. All of the social networking services available grow and thrive because they encourage users to openly promote themselves, their daily activities, social relationships and their opinions about people and issues. Depending on the situation, that openness may work for or against you.

This bulletin provides guidance to those companies who choose to use social media services to promote their

business or connect more closely with employees, clients and customers.

Before using social media in your business, however, it is strongly recommended that you consult with your company's attorney to be sure you fully understand the legal concerns and how to avoid potential liability. Using social media in employee selection or performance evaluation or disciplinary proceedings is fraught with legal issues and companies should proceed with utmost caution.

WHAT IS SOCIAL MEDIA?

Social media are Internet-based services that allow users to exchange personal information, photos and videos and messages with other users, usually family and friends, or in a business situation, or with employees and customers.

Facebook

In February 2004, a Harvard University undergraduate student created a powerful new way for people to connect and communicate socially. **Facebook** became almost an overnight sensation by offering users an easy, convenient way to stay on top of each other's lives

through the Internet. The service allows users to post personal information in a “personal profile,” photos and videos and exchange messages with their group of “friends.” Facebook also offers users the option of joining common interest groups, such as through work, school or sports teams. Today, Facebook has over one billion users worldwide.

(<http://en.wikipedia.org/wiki/Facebook>)

Twitter

In 2006, **Twitter** entered the social networking arena. It allows users to send and receive brief messages—up to 140 characters—called “tweets.” Unlike Facebook, Twitter allows unregistered users to read tweets, and registered users can post tweets on the Twitter website or through several cell phone applications or “apps.” The service is gaining popularity rapidly; it currently has 140,000,000 users.

(<http://twitter.com/about>)

LinkedIn

LinkedIn is a social networking service for professionals; in a sense, it transforms a person’s professional network into an online network. Created in 2002, it allows users with common business interests or connections to link up and stay in touch about business issues, new job opportunities and more. Subscribers receive invitations from other subscribers to join their network. Currently, LinkedIn has more than 150,000,000 subscribers.

(<http://learn.linkedin.com/what-is-linkedin/>)

MARKETING IS ALL NEW AGAIN

When it comes to marketing a company’s brand, products and services, the Age of Aquarius is upon us. Social media marketing is a lot cheaper and more nimble than print, radio and television advertising, but it

also requires more hands-on maintenance to keep the message fresh and engaging for the intended audience.

If you decide to point your company’s marketing strategy in the social media direction, it is strongly suggested that you hire an expert in this area, or an agency of experts, to help you. Be aware of the opportunities and limitations that social media offers, and have ready some ideas about who you want to reach and what actions you want the audience to take to guide the experts’ thinking about how best to represent and promote your company’s interests. Consider these simple guidelines when you’re starting to plan your strategy:

- **Define your audience:** Most users of social media tend to be younger (teens to 30 somethings), but the older generation is catching on. Deciding on who you want to reach—the demographics of your audience—and what actions you want your audience to take will quickly define the options for your marketing plan.
- **Do your homework:** Social media is one of the places where one size does not fit all. Different audiences use different sites and different marketing strategies work differently with different audiences. Once you’ve defined your audience, then investigate what kinds of content and presentation approaches work best for them.
- **Care about sharing:** Keep an open mind about different ways to present your message that will inform and...yes, let’s be up front about it...entertain your audience. Social media users like to share intriguing information—that’s why videos of dancing cats and giggling babies get a lot of attention on morning television

talk shows—but a clever video or a colorful graphic that shows off the best characteristics of your company and/or its products and services will get the kind of attention from your current and potential customers that can build your business. The word will get around.

- **Interact with your audience:** Unlike traditional print and broadcast advertising, social media ads can and do invite immediate comments from users. Their interactive features are what make them so powerful as a marketing medium. Supposing you decided to announce your company's latest product or service offering. A flat statement may draw interest from your audience briefly, but including a video demonstrating the new product or service *and* inviting comments make that ad more engaging and interesting.
- **Blogs are ads too:** Blogs are online diaries authored by a single person, usually around a theme. The best blogs invite comments from viewers, which keeps the blog interesting and provocative. If you choose this option to promote your company and its offerings, be prepared for good and not so good comments. Use the good comments as testimonials on the quality of your offerings, and use the criticisms to guide improvements. By welcoming and acting positively and proactively on all comments, you will build relationships and trust with your intended audience.
- **Keep your cool:** You can control the message going out, but you can't control the input from your audience...or who else they may be sharing that input with. Know this going in and be

prepared should you receive an unfavorable comment about your company, its offerings or its performance. Have a plan in place that clearly spells out what steps who should take by when...and enforce it.

- **Decide who “speaks” for your company:** Not every employee of your company is best equipped to represent it in a social media advertising campaign. Decide what qualities about your company you wish to project and who is best suited by knowledge, experience, temperament and other characteristics to fill the spokesperson role. Once the decision is made, stick with it. That person will become the “gatekeeper” of what goes out and comes in to the company's social media sites.
- **Fresh is best:** Do not let your company's social media site and/or message become stale and stagnant. Keep new ideas and information flowing to keep your audience engaged and coming back for more. Remember what you've learned about your intended audience and what kinds of messages and approaches work best on them. Your media experts will know best how often to change messages or content delivery options to keep audience interest peaking.

These are just a few basic tips to help you sort out what needs to be done should you decide to take the plunge into social media to market your business. At the end of this bulletin, several online sources are listed to provide you with even more information and guidance in this area. For more information, go to <http://www.topRankblog.com/2011/12/20-social-media-dos-donts>

EMPLOYEE RECRUITING ISSUES

Current news is replete with stories about how employers are using social media sites to vet job applicants' personal and professional backgrounds. Those stories become even more interesting when an employer discovers unflattering or conflicting information about an applicant that may affect his/her suitability for a position. Depending on how those background searches are conducted and how the resulting information is used, the employer could face legal difficulties.

Background checks using social media sites are legal if they are job-related and are conducted in accordance with the provisions of the Fair Credit Reporting Act (FCRA). If negative information about a job applicant is uncovered in a background check using social media, the employer must:

1. Notify the applicant should he/she lose the position as a result of that negative information; and
2. Identify the source of that negative information (i.e., Facebook, Twitter, LinkedIn) so that the accuracy and completeness of the information may be verified by the applicant.

Other considerations when using social media as a recruiting practice or applicant screening or evaluation device:

- **DON'T** require a candidate to provide passwords to a social media site or "friend" the employer or other company staff. The practice is not currently illegal in most areas of the country, but the legal landscape is beginning to change. Maryland has a

measure prohibiting employers from requiring such information of job applicants and employees, and other states are considering similar proposals. Nevertheless, the privacy considerations make this an area that's best left alone.

- **DON'T** use false identification to gain access to a candidate's social media site.
- **DO** assign another staff person to conduct the social media background check on the applicant and direct him/her to *report only job-related information* after the applicant's qualifications for the position have been verified.
- **DO** a complete background check on the applicant using sources other than the social media network.

Consult with legal counsel on any planned use of social media for recruitment, applicant screening and evaluation or current employee performance as the law is rapidly changing in those areas with respect to privacy and other employment policies. For example, some employee postings about the company could be construed as protected concerted activities under the labor laws. Also, form responses to recruiting may be considered applications for employer recordkeeping requirements.

For more information, visit <http://www.hrmtoday.com/>.

EMPLOYEE USE/MISUSE OF SOCIAL MEDIA

When an employee chooses to publicly "vent" his or her opinions about a company's products, services or business practices on a social media site, it is not unexpected that he or she may face disciplinary actions, especially if

such behavior is expressly prohibited in a company's human resources policies. From the perspective of the employee, consider that free speech is protected in the U.S., and the National Labor Relations Board (NLRB) is in place to investigate employment actions that may impinge on an employee's rights, including when an employee speaks openly about his or her employer on a social media site.

The NLRB has taken an aggressive position when investigating these cases. See an NLRB statement issued on January 25, 2012

(<http://www.nlr.gov/news/acting-general-counsel-issues-second-social-media-report>):

- Employer policies should not be so sweeping that they prohibit the kinds of activity protected by federal labor law, such as the discussion of wages or working conditions among employees.
- An employee's comments on social media are generally not protected if they are mere gripes not made in relation to group activity among employees.

Below are some considerations as you shape your company's social media policies:

- **Employees' free speech is protected...**When employees complain about working too many hours of overtime or being overburdened with tasks and impossible deadlines, their right to voice those complaints in the office or on Facebook is a basic right that's protected by our Constitution
- **...with limitations:** Employee comments posted on a social

media site that disparage or slander other employees or disclose confidential company information are not protected.

- **Think before you act.** Whether you are an employer or an employee, think about the possible consequences of acting rashly. If you are an employee, venting your frustrations with your employer online for all the world to see may not be protected. And, if you are an employer, terminating that employee may prove more costly than less harsh disciplinary actions.

Below is a thoughtful article about some related employee social media issues. (<http://jobsearch.about.com/od/onlinecare/ernetworking/a/violating-company-social-networking-policy.htm>)

EMPLOYER...PROTECT THYSELF

If your company's employee policies have not been reviewed and updated recently to address its use of social media, now is the time to get it done. Work with an attorney who specializes in this area to determine whether the policies address employee use of social media, actions that are allowed and when, and those that will result in disciplinary action.

If you determine that your company's employment policies need to address social media use or they need adjustment in this area, consider whether the following is addressed

- Employees' social media interaction that is subject to company policies;
- Who has responsibility for accessing social media for recruiting actions and when;
- Posting of professional references on social media sites ... or not;

- Monitoring of employees' electronic communications using company equipment;
 - When or if social media access is allowed during working hours;
 - When or if social media access is allowed using company equipment;
 - Legal restrictions on use of social media regarding discrimination, harassment and confidentiality of company information;
 - Investigation of claims made on social media sites concerning harassment or discrimination;
 - Security procedures to address employer-sponsored blogs;
 - Procedures to protect the company logo or brand when used on social media to promote products and services;
 - Employees authorized to represent the company on social media sites; and
 - Conduct, practices or procedures used in social media that will result in disciplinary action.
- Consult legal and insurance counsel regarding the development and adoption of all electronic communications policies.
 - Consult with your insurance broker about coverages for electronic and social media concerns, particularly as they relate to unfair employment practices.
 - Ensure your supervisors and managers are informed about and trained on policies and procedures relating to employee use of electronic and social media.

For more information, visit the following online resources:

<http://socialmediagovernance.com/>

<http://www.topRankblog.com/2011/12/20-social-media-dos-donts>

<http://jobsearch.about.com/od/employeeerights/a/fired-for-facebook.htm>

<http://getworksimple.com/blog/2011/12/05/social-media-the-workplace-the-dos-donts>

http://humanresources.about.com/od/careernetworking/a/social_media.htm

<http://www.vistage.com/content-and-connectivity/vistage-library/ten-dos-and-donts-of-social-media.aspx>

http://www.sebrisbusto.com/publications/getEmploymentLawNotes.asp?employmentlawnote_id=0512

CONCLUSION

As stated earlier, social media is a powerful new communications tool that allows us to share our lives and our thoughts with anyone anywhere. It has reshaped the way we think, act and relate to one another, but we should be careful how and when we do so. This is especially true for those in business who choose to bring their company closer to their employees and customers through this communications medium.

Before you embark on this journey, take some cautionary steps to protect yourself and your company along the way:



Insurance Punch List

INTRODUCTION

Insurance is an integral part of a contractor's business. The need is driven in part by contractual requirements as well as statutory obligations. Insurance can be costly so it's important to understand how and why premium dollars are spent. The intent of this punch list is to assist mechanical contractors in indentifying insurable risks supplemented with a general discussion of the types of available insurance.

It's important to note that insurance is merely a method to transfer the risk of financial loss to another party in exchange for a premium. The overall risk management process includes risk identification, analysis and control. As risks of loss are identified and analyzed, various measures should be considered and implemented in an effort to prevent a loss from occurring. Although there may be insurance available to fund a loss, losses are disruptive to the business and can cause damage to the relationship between a contractor and customer.

The checklist at the end of this bulletin is intended simply as a working checklist to assist in discussions with your company's insurance agent or representatives. It does not purport to

be a complete list to cover every possible situation of insurance with which contractors might be faced.

Consult your insurance broker, attorney, and/or other business and insurance advisors regarding your company's specific needs. Items included on the list, depending upon the particular circumstance, location, or experience of the individual contractor, may not be available in the insurance market at this time.

MCAA is in no way stating or recommending that all of the clauses or provisions contained in this checklist be in every contractor's policies. The matter of insurance is highly individualistic and dependent upon the needs and desires faced in individual situations by individual members.

We thank CNA and International Risk Management Institute, Inc. for their contributions to this bulletin.

For additional information, see the booklet entitled *Insurance for Contractors* by Walter T. Derk of Fred S. James Company, 1 North LaSalle Street, Chicago, IL 60602.

INSURABLE RISKS

A contractor's insurable risks generally can be categorized as:

1. **Bodily injury or property damage to a third party arising out of the contractor's acts**, or the acts of others for whom the contractor is responsible, i.e. subcontractors, vendors. This risk can arise from:

- Work in progress
- Products
- Completed operations
- Operating mobile equipment
- Operating motor vehicles
- Rigging
- Design/engineering services

2. **Physical damage to property owned or leased by the contractor**, including property of others in the care, custody or control of the contractor – for example:

- Buildings
- Business personal property (furniture, fixture, office equipment, inventory)
- Contractor's equipment
- Vehicles
- Installation materials and equipment

3. **Statutory obligations – workers' compensation benefits**

The following are not insurable risks:

- **Breach of contract** (business risk)
- **Intentional acts** (against public policy)

CASUALTY INSURANCE

The following describes some of the major features of commercial casualty insurance. To determine precisely what

is and is not covered by your casualty insurance policies, there is no substitute for reviewing the policy contracts. Casualty insurance programs vary considerably, and only the provisions of your policies determine the scope of your insurance.

Workers' Compensation Insurance and Employers' Liability

Workers' compensation and employers' liability insurance both apply to employee injury or disease arising out of and in the course of employment. They are commonly provided under a single policy designed as follows:

1. Part One. Workers' Compensation Insurance (WC)

Workers' compensation insurance provides for payment of statutory benefits to employees who suffer work related injury or disease. Benefits payable include the cost of medical care, income, death and dismemberment. The insurer also promises to defend any claim or suit against you for benefits payable under the policy. Since payments are prescribed by law, there is no policy limit for workers' compensation.

2. Part Two. Employers' Liability Insurance (EL)

Employers' liability applies to claims brought by employees who are excluded from state workers' compensation laws. It also applies to claims brought against you by the spouse of an injured employee. Under employers' liability, the insurer agrees to pay all sums you legally must pay as damages because of bodily injury to your employees.

In contrast to Part One, the policy

has specific limits for employers' liability. The standard limits are \$100,000 bodily injury by accident, \$100,000 per employee for disease and a policy limit of \$500,000 for disease. These limits can be increased for an additional premium. (Most umbrella liability underwriters will require that the underlying employers' liability limit be at least \$1,000,000.)

3. Part Three. Other States Insurance

Standard WC & EL policies provide insurance only in those states listed in Item 3.A. of the information page – these are states with known exposure. Part Three “Other States Insurance” allows an employer to include coverage for states with no known exposure at the time of policy issuance. These states must be listed in Item 3.C. of the information page, and it is preferable that 3.C. not list individual states. Instead, a blanket statement such as “*all states except North Dakota, Ohio, Washington, Wyoming and states listed in 3.A.*” is recommended.

Although temporary insurance is provided, you must still notify your insurer at once if you begin to work in any state to which Part Three applies.

4. Endorsements

The WC & EL policy can be endorsed to amend the contract to fit your specific needs. There are numerous endorsements available which both extend and restrict coverage. Three of the more common endorsements are the following:

a. Voluntary Compensation Endorsement

Every state and territory exempts some employees from coverage under its workers' compensation laws. If such employees are injured, their sole recourse may be to bring suit against you. To head off such suits you can make statutory benefits available to your employees who would not otherwise be entitled to them, by adding a Voluntary Compensation Coverage Endorsement to your policy.

b. Longshore & Harbor Workers Compensation Act

The standard WC & EL policy excludes any federal workers' compensation laws or other federal occupational disease laws, so coverage for employee injury claims made under federal compensation laws, such as the Longshore & Harbor Workers Compensation Act, must be specifically endorsed to your policy. This act can apply to almost any employee who works on or travels near navigable waters. The act provides greater benefits than standard WC laws, so injured employees will likely choose to file a claim under the federal act rather than the state law.

c. Stop Gap

There are several states that do not permit private workers' compensation insurance. Referred to as monopolistic fund states, they currently include North Dakota, Ohio, Washington and Wyoming. Employers must purchase WC benefits through the state. Employers' liability is not provided by the state. If you are operating in any of these states, you can add coverage via

a “Stop Gap” endorsement to your WC & EL policy. If you only operate in monopolistic states, you can add the “Stop Gap” endorsement to your general liability policy.

Note – Alternate Employer Endorsement

This endorsement is beginning to show up in customer insurance requirements and may not be applicable. This endorsement should be considered when you are lending or borrowing employees. It serves to establish coverage under your policy for your employees while they are temporarily working for another employer. Conversely, if you are borrowing employees, you don't want to be liable for their WC benefits and, therefore, should be listed as an Alternate Employer under the regular employer's policy. By example, if you lease equipment to others with an operator, you would add the Alternate Employer endorsement to your policy. Examples of borrowing employees include renting equipment from others with an operator and hiring temporary employees from a temp agency. In such cases, you should look to the leasing companies to include you as an Alternate Employer under their policies.

5. Premium

A few comments regarding WC rating that may assist in your efforts to minimize your WC costs.

- a. The basis of the premium is per \$100 of payroll. In most states the excess portion of overtime

and double time is excluded from reportable payroll, provided that you maintain records that segregate the excess portion from the straight time wages.

- b. Most workers' compensation laws provide that a contractor shall be liable for WC benefits for employees of their uninsured subcontractors. The contractor will also be responsible for paying premiums on the payroll of the uninsured subcontractor. For that matter, if a contractor lacks proof of insurance for any subcontractor, the insurer can automatically charge additional premium to the contractor's policy. Therefore it is essential that you have certificates of insurance evidencing WC insurance on file before allowing subcontractor employees on your jobsite.
- c. For contractors, payrolls are divided between classifications for the various separate and distinct construction operations, provided you maintain payroll records adequate to permit such division. Operations for which separate payroll records are not maintained must be assigned to the highest rated classification applicable.

Auto Insurance

The vast majority of commercial auto insurance is written on the standard Business Auto Coverage Form. This widely used policy has the coverage flexibility needed to respond to the owned and non-owned auto liability and physical damage exposures of your business. The following coverage explanations will help you tailor your auto insurance to fit your requirements.

1. Liability Insurance

Coverage is provided for sums you are legally obligated to pay as a result of an auto accident. The insurer's obligation to pay is limited by a combined single limit of liability for bodily injury and property damage, subject to policy terms and conditions.

3.

The insurer also has the right and duty to defend an insured against any claim or suit which potentially falls within the policy coverage. Defense costs are paid in addition to the liability limit.

Generally, a combined single limit of \$1,000,000 per accident is considered adequate and will satisfy the underlying limit requirement of most commercial umbrella policies.

Consider deductible options when pricing your auto liability insurance. You can use a property damage only deductible, or property damage and bodily injury deductible.

2. Physical Damage

Physical damage to your vehicles is generally provided via comprehensive and collision coverage.

Collision coverage pays for loss to a covered auto resulting from collision with another object or the covered auto's overturn. Comprehensive coverage pays for damage to the covered auto caused by any peril except collision, overturn, or a peril specifically excluded.

Premium for collision and comprehensive is based on vehicle age and cost new. As vehicles age, their "actual cash value" declines, thereby reducing the potential return

on your physical damage insurance dollar. You should annually evaluate vehicle values in relation to your deductibles and physical damage premium. At what point you choose to discontinue your physical damage insurance depends upon how much risk you care to assume for physical damage.

3. Uninsured (UM) and Underinsured (UIM) Motorists

UM insurance provides you with bodily injury coverage if you are in an accident with an at-fault uninsured driver. UIM insurance responds when the at-fault driver is insured, but the liability limit is inadequate.

The coverage basics are relatively simple, however, the individual state coverage variances are extremely complex.

UM/UIM is required in some states, and optional in others. Consideration for rejecting coverage should include how vehicles are used (business only or business and personal), and the potential for duplicate coverage. Most bodily injury claims will involve employees who will likely be covered by workers' compensation. Employees may also maintain UM/UIM under their personal auto insurance.

Ask your insurance representative for assistance in evaluating your UM/UIM exposures and state requirements.

4. No-Fault or Personal Injury Protection (PIP)

Roughly half the states have enacted no-fault auto insurance laws which serve to compensate injured

persons in auto accidents without a need to prove fault.

In theory, these statutes provide benefits to injured persons without regard to negligence, and in exchange, the law limits the injured person's right to sue. In fact, the extremely complex no-fault laws vary greatly from state to state, as each state adds its own unique slant to the no-fault concept.

Ask your insurance representative for assistance in evaluating your no-fault exposures and state requirements.

5. Medical Payments (MP)

Medical Payment insurance pays without regard to liability for medical and funeral expenses arising from an auto accident. Covered expenses must be incurred within three years.

The desirability of the coverage depends to a large extent upon the legal status of your business (corporation, partnership, individual, etc.) and the occupants of your vehicles.

If you are an individual named insured, MP insurance can, subject to coverage provisions, apply to you and your family members. However, if your business is a corporation or partnership, any coverage MP provides for an individual and family has no applicability.

Your employees are specifically excluded from MP coverage since they are covered under workers' compensation for auto injuries arising out of their employment. MP insurance may be desirable if passengers are other than employees (customers, guests, etc.).

6. Covered Autos

The Business Auto Policy provides a great deal of flexibility in matching auto exposures (owned, non-owned and hired) and auto coverage. The flexibility results from the use of endorsements and covered auto designation symbols.

The standard provisions of the Business Auto Policy only include liability and physical damage coverage. Other coverage such as UM, no-fault, medical payments, etc., whether mandated by state law or voluntarily selected by the insured, are provided by policy endorsements.

After appropriate coverage is determined, the autos which are subject to each coverage are identified via the use of covered auto symbols. There are ten symbols, and each symbol stands for a specific description of autos. For example:

Symbol 1 = Any Auto
Symbol 7 = Specifically Described Autos
Symbol 8 = Hired Autos Only
Symbol 9 = Non-owned Autos Only
Symbol 19 = Mobile Equipment

Subject to Compulsory or Financial Responsibility or Other Motor Vehicle Insurance Law*

It's important to note that some symbols denote automatic coverage for newly acquired vehicles, while others require that new vehicles be reported to the insurer within 30 days. To the extent possible, you should seek the "automatic coverage symbols."

*Symbol 19 was added in response to changes in the definition of "auto" under the commercial general

liability coverage form (CGL). The definition of “auto” was expanded to include mobile equipment that is subject to compulsory or financial responsibility laws. While the operational use of the mobile equipment is covered under the CGL, over the road use is not and must be scheduled under your auto liability policy to avoid gaps in coverage.

7. Vehicle Classification

With regard to correct premium determination, make sure that your vehicles are properly classified. If your vehicles are parked at job locations for the majority of the working day, “service,” the lowest rated truck class, is appropriate.

Key elements of proper premium development are vehicle cost new, gross vehicle weight and vehicle radius of operation.

8. Conclusion

Commercial auto insurance can be complicated, particularly for multi-state risks. Work closely with your insurance agent to identify your optimum combination of auto exposure, coverage and premium.

Commercial General Liability Policy (CGL)

The CGL policy provides broad coverage for damages you are legally obligated to pay to third parties arising from your acts or the acts of others for whom you are legally liable.

There are two forms of the CGL policy in use today, “occurrence” and “claims made.” The major difference between the two is the “trigger,” or means of activating

coverage. The “occurrence” policy covers claims arising from injury or damage which occurs during the policy period. Generally, the “claims made” policy covers injury or damage that occurs after the “retroactive date” and for which a claim is first made during the policy period.

The policy is basically divided into three coverage parts, plus Supplementary Payments (defense costs):

- Coverage A – Bodily Injury (BI) and Property Damage (PD)
- Coverage B – Personal and Advertising Injury
- Coverage C – Medical Payment

1. Coverage A

This coverage part is probably of most interest to contractors as it insures bodily injury and property damage to third parties arising from:

- Premises and operations liability
- Products and completed operations liability
- Broad form property damage liability
- Contractual liability
- Independent contractors liability
- Fire legal liability

There are currently 17 exclusions under Coverage A and it’s important to have a general idea of what those exclusions are:

- a. Expected or Intended Injury
- b. Contractual Liability (see below)

- c. Liquor Liability
- d. Workers' Compensation (insured under a separate policy)
- e. Employers' Liability (insured under a separate policy)
- f. Pollution (see below)
- g. Aircraft, Autos, and Watercraft (insured under separate policies)
- h. (Transportation of) Mobile Equipment (refer to auto insurance)
- i. War
- j. Damage to Property (see below)
- k. Damage to your Product
- l. Damage to your Work (applies to completed operations; exception for subcontractor's work)
- m. Damage to Impaired Property or Property Not Physically Impaired
- n. Recall of Products, Work or Impaired Property
- o. Personal and Advertising Injury (refer to Coverage B)
- p. Electronic Data
- q. Distribution of Material in Violation of Statutes (against public policy)

Exclusions are intended to further define coverage and in some cases serve to provide limited coverage. Following is some additional information for your consideration:

- 1) Contractual liability exclusion – there is an exception for the assumption of tort liability of another party with respect to third party BI and PD. This is the provision applicable to indemnity and hold harmless agreements contained in many construction contracts, equipment leases, etc.
- 2) Pollution exclusion – with the exception of contractors involved

in the monitoring, testing or clean up of pollutants, the standard pollution exclusion affords some limited off-premises protection for injury or damage arising from completed operations, ongoing operations (provided you do not bring the pollutant or contaminant to the site), and accidental discharge of fuel or lubricants from mobile equipment. There are assorted endorsements that an insurer can use to further restrict or eliminate this limited protection. There are also exclusion endorsements specific to asbestos, mold, and silica. The definition of "pollutant" and "contaminant" under the CGL policy is very broad – consider the intended use of the systems you are installing or the materials and products used in your work. If there is exposure for discharge, release or escape of "pollutants" or "contaminants" during the course of construction or after a system is put to its intended use, you may want to consider purchasing a separate contractor's pollution liability policy.

- 3) Damage to Property exclusion – this excludes property damage for six types of property during the course of construction:
 1. Property you own, rent or occupy
 2. Premises you sell, give away or abandon
 3. Property loaned to you
 4. Personal property in your care, custody or control
 5. That particular part of *real* property on which you or any contractors or subcontractors working

directly or indirectly on your behalf are performing operations

6. That particular part of *any* property that must be restored, repaired or replaced because your “work” was incorrectly performed on it (often referred to as the faulty workmanship exclusion)

Generally speaking most of these exposures can be insured under builder’s risk, installation floater, or other forms of property insurance. With respect to care, custody or control, consider adding a rigging liability endorsement to your CGL policy if you are lifting property of others – you can also include rigging liability under your installation floater, but it will only provide coverage for physical damage to the property, not loss of use which is provided under the CGL.

- 4) Professional liability – the list of exclusions noted above does not include professional liability, however, it is not the intent of the CGL to insure damages arising from professional services you may provide to others as an engineer, architect or surveyor, or for independent professional services you may hire for engineering, architectural or surveying services in conjunction with your work. Accordingly, most contractor CGL policies include an exclusionary endorsement for professional liability. The exclusion should make an exception for means and methods. Separate policies are available for professional liability.

2. Coverage B

This coverage protects you from claims arising from “Personal and Advertising Injury Liability.”

Coverage is triggered by an “offense” committed during the policy period (as compared to an “occurrence” under Coverage A). Covered offenses include:

- False arrest, detention, or imprisonment
- Malicious prosecution
- Wrongful eviction
- Wrongful entry
- Invasion of privacy
- Libel or slander of a person, organization, product, or service
- Advertising infringement (including Internet ads)
- Copyright infringement in advertisements
- Consequential “bodily injury” arising out of any of these offenses is considered “personal and advertising injury”

There are currently 16 exclusions for this Coverage B. Most of the exclusions pertain to knowledge that the offense would violate the rights of another. An exclusion to note is “personal and advertising liability” assumed under contract. “Bodily injury” and “personal injury” in an insurance contract have distinct definitions. By comparison, attorneys have a tendency to use “personal injury” in lieu of “bodily injury” and this could create a gap in coverage since “personal injury” liability assumed under contract is excluded under the CGL. Unless your insurer agrees to delete the contractual liability exclusion for “personal and advertising injury,”

make sure that the indemnity and hold harmless agreements you are accepting include “bodily injury,” and not just “personal injury.” There is also a total pollution exclusion to preclude any possibility of claims under Coverage B.

3. Coverage C

Medical Payments coverage pays the medical expenses of others resulting from bodily injury caused by an accident on your premises or arising from your operations. Payments are made without regard to fault, which means that the injured party does not have to prove negligence. The expense must be incurred and reported within one year of the accident. The purpose of the coverage is to allow an insured the opportunity to cover medical expenses incurred by a member of the public or customer in a timely manner. Such a gesture could serve to avoid litigation.

Exclusions to this coverage part include injury to the insured, the insured’s employees, subcontractors, persons covered by workers’ compensation or similar laws, and persons injured in the course of athletic activities.

Supplementary Payments – Coverage A and B

In accordance with the insuring agreements, your insurer has an affirmative duty to defend claims made against you for bodily injury, property damage, and personal and advertising injury covered by the policy. Defense expense is paid as Supplementary Payments, which means the payments are in addition to the policy limits.

Your insurer also has a duty to defend an additional insured if you have a contractual obligation to provide a defense. Subject to policy terms and conditions, the defense of an additional insured will either qualify as Supplemental Payments or as “damages.” Defense costs paid as “damages” are within the policy limit which serves to reduce your limit of liability.

The insurer’s obligation to defend an additional insured and to pay Supplemental Payments ends when the limits of insurance have been exhausted by payment of judgments or settlements.

Limits

The following chart summarizes the six policy limits under the CGL policy, including an indication of typical limits. There is no guideline for selecting adequate limits of insurance, but it is common practice to purchase a primary commercial general liability per occurrence limit of \$1,000,000. In some cases, purchasing a limit of \$2,000,000 will result in significant savings in your umbrella policy premium – possibly enough to recognize a net reduction between the two policies.

Limit Type	Typical Limit	Description
General Aggregate Limit	\$1,000,000	This is the most the policy will pay for the sum of medical expense, bodily injury and property damage (other than damages under products-completed operations), and personal and advertising injury.
Products-Completed Operations Aggregate Limit	\$1,000,000	This is the most the policy will pay for bodily injury and property included under products-completed operations.
Personal and Advertising Injury Limit	\$1,000,000	Subject to the general aggregate, the most the policy will pay for any one person or organization.
Each Occurrence Limit	\$1,000,000	Subject to the general aggregate and the products-completed operations aggregate, this is the most the policy will pay for bodily injury, property damage, and medical payments arising out of any one occurrence.
Damage to Premises Rented to You	\$100,000	Subject to the occurrence limit, this is the most the policy will pay for fire damage to premises you rent (\$100,000 is standard, can be increased).
Medical Expense Limit	\$5,000	Subject to the occurrence limit this is the most the policy will pay for all medical expenses incurred by any one person.

6. Conclusion

Commercial general liability is a valuable part of a contractor's insurance portfolio. Insurers have many endorsements they can use to both expand and restrict the standard CGL policy, so it's very important to work closely with your insurance and legal advisors to ensure that your policy is structured properly to cover your operations as well as the liabilities you are assuming under contract. Keep in mind that separate policies may be required to cover exposures involving professional services and pollution liability.

Umbrella Liability Insurance

An umbrella is a blanket policy used to provide additional limits of liability above several underlying primary policies, and may also provide broader coverage than what is provided by the primary liability insurance. Typical lines of insurance that are scheduled under an umbrella policy include:

- Commercial general liability
- Automobile liability
- Employers' liability
- Foreign liability

By contrast, "excess" liability policies provide additional limits of

liability above a single policy. These excess liability policies typically do not provide broader coverage and merely follow the terms and conditions of the underlying policy. Excess liability policies are commonly used above an umbrella policy to achieve higher limits.

As a matter of reference, certain types of policies cannot be scheduled under an umbrella. Examples include professional liability, pollution liability, directors and officers, and employment-related practices liability. Generally speaking, reasonably high limits can be purchased within the individual policy.

There is no insurance industry standard for umbrella forms – no advisory organization dictates the policy wording or scope of coverage. At a minimum the scope of coverage under your umbrella should be as broad as your scheduled primary policies. Following are some additional considerations:

- 1) The umbrella should “drop down” as primary insurance in the event limits of insurance on your underlying policy are exhausted by payment of judgments or settlements.
- 2) Defense expense should be in addition to the policy limit.
- 3) In cases where you have a loss that is not covered by a scheduled underlying policy, but is covered by the umbrella, you will be responsible for a deductible or self-insured retention, which is typically \$10,000.
- 4) It is important that your

scheduled underlying policies and your umbrella policy have the same effective dates. Without concurrent policy dates, you may end up with gaps in coverage.

- 5) Premium for an umbrella policy is generally based on a percentage of the scheduled underlying policy premiums. The umbrella premium can be a flat cost or subject to audit.
- 6) Conclusion

The umbrella policy is a good way to increase your liability insurance protection. Selection of limits should be based in part on your assessment of operational liabilities such as the nature and volume of work, how much and what type of work you subcontract, business conditions in the states in which you operate, the size of your fleet, etc.

Bear in mind that no casualty insurance program is without exclusions. Umbrella coverage is generally broad, but not all inclusive. In fact, umbrella policies include many of the same exclusions contained in your scheduled primary policies, so don't expect the umbrella to fill your need for professional, pollution, aircraft, etc.

Owner/Contractor Controlled Insurance Programs

No discussion of contractor insurance can go without mention of wrap-up type insurance plans. These plans are a method to provide owners and contractors with reasonably broad protection for liabilities

arising from construction operations on designated projects. They are touted as an advantage for subcontractors but successful participation is dependent on several factors including:

- Agreed-upon terms for insurance credits
- Understanding any obligation for deductibles or self-insured retentions
- Coordinating provisions under your own insurance program to supplement deficiencies or insolvency of insurance provided under wrap-up type plans

Insurance typically provided under a wrap-up type plan is workers' compensation, general liability and umbrella liability. Some plans, particularly residential work, may only provide general liability and umbrella liability. Builder's risk may or may not be included in the wrap-up.

Most contractor general liability and umbrella liability policies include an endorsement that excludes operations and completed operations for work performed under wrap-ups. It is important to negotiate "excess" and "difference in conditions (DIC)" exceptions into these exclusions so that your policies can respond in the event there is a loss that is not covered by the wrap-up but is covered by your insurance, or in the event the limits of insurance under the wrap-up are exhausted by payment of claims – these plans have a single limit that is shared by all the participants.

PROPERTY INSURANCE

When evaluating contractor property exposures it is necessary to distinguish between property at "fixed locations" as compared to property that is intended to move from location to location, or is in the course of construction. Commercial property insurance is designed for "fixed locations," which include the facilities occupied by the contractor and the contents contained within. By comparison, contractor's equipment is insured under a "floater" policy, as are materials and equipment intended for installation. These floater policies include coverage for the transportation of the equipment and materials, whereas a commercial property policy has very limited coverage for property in transit or at another location.

Commercial Property Insurance

This is the form of insurance used for buildings and contents. There are limitations with respect to property outside of the building, so if you have property in storage trailers or in open yards, check with your insurance advisor to see which type of policy best covers the risk – commercial property, contractor's equipment, or installation floater.

1. Perils Insured

Property is insured against risks of direct physical loss for perils as defined in one of several causes of loss forms. The broadest form is the "special causes of loss form", which covers most perils including theft. The perils of earthquake and flood are excluded. Coverage may be available by endorsement to the property policy or through purchase of "difference in conditions" policies. The National Flood Insurance Program is

another option for flood.

2. Replacement Cost and Depreciation

Any loss adjustment begins with determining the cost of replacing the damaged property. If your coverage is written on a replacement cost basis, the policy will pay the cost to replace your building or contents with a new building or contents of the same type. If your coverage is written on an actual cash value basis, the adjuster will reduce the replacement cost by a reasonable allowance for physical depreciation. Note – under a replacement cost policy, if you do not replace the damaged property, the loss will be adjusted on an actual cash value basis.

Do not confuse physical depreciation for insurance with depreciation for tax purposes. Generally speaking, property in active use will not depreciate more than a maximum of 50% to 60%; this depreciation is taken over the reasonable life of the property. Tax depreciation is almost always taken as fast as possible, and the asset may be completely used up from a tax depreciation standpoint. Using the latter depreciation can cause disastrous underinsurance and result in substantial coinsurance penalties.

Regardless of the valuation basis, you will not be able to collect more than the limit of insurance.

The difference in premium between replacement cost valuation and actual cash value

is the amount of insurance that you will need to purchase.

3. Coinsurance

Coinsurance is a common provision in property policies and requires the policyholder to insure their property to a specified percentage of the total value, generally 80%, 90% or 100%. In the event of a partial loss, if the property is underinsured, there will be a penalty in the loss recovery. Coinsurance does not affect loss recovery in the event of a total loss.

4. Ordinance or Law Coverage

Certain building codes, particularly in large cities, require that all new construction be of fire resistive materials. Construction with this type of material may be considerably more expensive than your present frame or brick building. If your building is damaged to a certain extent, the code in your city may require you to demolish your entire building, and, if you wish to rebuild, to rebuild with fire resistive materials. The commercial property policy covers damage caused by the fire or other peril, but it does not cover the undamaged portion that must be demolished. Using the Ordinance or Law endorsement you can add a limit of coverage for the demolition and a limit for the increased cost of construction.

5. Green Building Insurance

Some insurance companies now offer coverage to rebuild a building to higher environmental

standards after a partial or total loss.

6. Items Not Insured

Property policies exclude items such as underground piping, land and paved surfaces that would not usually be affected by a loss. The value of this type of item should be excluded from your building insurance valuation. Foundations are also excluded. If you purchase earthquake insurance consider endorsing your policy to include the building foundation.

7. Valuable Papers and Records

The commercial property policy provides limited coverage for valuable records. It covers only the cost of the paper, plus the cost of writing or typing the information on the paper. The major loss, the cost of recovering or restoring the lost information, is not insured. Separate coverage can be purchased for the following:

a. Accounts Receivable

If your records of accounts receivable are destroyed and you deal with a large number of clients, you may have difficulty ascertaining the amount that each client owes you. Therefore, you may have difficulty in collecting on these accounts. The amount you are unable to collect may be insured under accounts receivable insurance. The cost of this coverage can be materially reduced by storing your records in a special fire resistive container. The cost may also be reduced by

duplicating your records monthly and storing the duplicate copy at another location.

b. Valuable Papers Insurance

Tax records, engineering notes, estimate sheets, plans and many other records of information may be insured by this type of insurance. You are insured for the cost of redeveloping the information contained on the stored record, almost regardless of the manner in which the record was destroyed or lost.

8. Time Element

When a building is damaged by a covered cause of loss and cannot be occupied for a period of time, the insured may suffer a loss of income and incur additional expenses for setting up temporary facilities. These damages can be insured by adding business income or extra expense insurance to your commercial property policy.

Generally speaking contractors will not suffer a loss of income because operations will continue. Loss of rental income may be an exposure for owned buildings with tenants. Otherwise, the risk of loss a contractor might consider insuring is extra expense.

9. Cost Saving Possibilities

- If you own more than one location, look into multiple location rating or blanket coverage.

- A special causes of loss form may be more insurance than you need for certain types of property – consider purchasing fewer covered perils under an alternate causes of loss form.
- If you have property that you will not replace if damaged, insure for actual cash value rather than replacement cost.
- Consider large deductibles.
- Do not purchase insurance on property such as glass where there is little, if any, catastrophic exposure.
- Talk to a competent fire safety engineer before constructing your building.

Equipment Breakdown Insurance (formerly Boiler & Machinery)

Specialized coverage is necessary on boilers and other pressure vessels, because explosion of these vessels is excluded under most property insurance policies. It is necessary on certain types of compressors, motors and other machinery because these objects are subject to types of losses that are not included under the property policies. Mechanical breakdown, short circuit, and so on, are excluded by property policies. Specialized coverage is also necessary on this type of equipment because it provides for expert examination of these objects on a regular basis; the inspection helps to prevent breakdowns, explosions and other losses by uncovering problems before they result in a loss. Generally speaking, if any

of these objects are owned by you, located in your part of the building, or are maintained by you, you should consider equipment breakdown insurance.

Inland Marine

Inland Marine refers to forms of insurance that cover property that is moving over land. Contractor's equipment, installation floater and builder's risk are examples of inland marine insurance that cover common contractor risks.

1. Contractor's Equipment policies provide broad coverage for a contractor's tools and equipment wherever they may be located, including in transit. The policy can also include coverage for rented or borrowed equipment.
2. Installation Floater insures materials and equipment while in transit, while in temporary storage and while awaiting installation at the project site. Materials for a particular project that are stored at your facility can also be insured under the installation floater, but may require an endorsement to the policy. Coverage includes property of others in your care, custody or control.
3. Builder's risk is generally arranged by the owner or general contractor to insure property in the

course of construction and may include subcontractors as insureds under the policy.

- Confirm that you are included as a Named Insured on the policy, and verify covered perils and deductible obligations.
- Builder's risk policies don't generally include coverage for property while in transit or in temporary storage, so you may still need to rely on your installation floater for certain coverage.
- Confirm that any insurance placed by the owner or general contractor protects you for property after it is installed (prior to acceptance), as well as before it is installed.
- Insurance on property being tested following completion of construction is vague and sometimes difficult. Discuss this exposure with your insurance advisor and the owner.
- If you are working in an existing building and are relying on the owner's property insurance, you must have your name added to the owner's insurance policy as a Named Insured, or get a letter from the owner relieving you of responsibility for damage to the owner's property.

Crime Insurance

Crime insurance coverage includes the following:

- Employee dishonesty coverage
- Forgery or alteration coverage
- Money and securities coverage
- Money orders and counterfeit paper currency coverage
- Theft, robbery, burglary, or safe burglary coverage for property other than money and securities
- Computer fraud coverage
- Funds transfer fraud

Theft of property and money is probably the largest risk to a contractor. Most of your property is insured for theft under contractor's equipment and installation floater policies, and if you use a special causes of loss form for your commercial property policy, your contents are insured for theft as well. Most policies exclude money and securities and theft by employees, so the crime coverage of most interest will likely be employee dishonesty.

Employee dishonesty coverage is written with a limit per loss, regardless of the number of employees involved. Loss may be the result of bookkeeping manipulation, forgery of checks, misappropriation of materials, collusion with suppliers, etc. Coverage is generally written to cover all employees, although it may

be possible to insure specified employees.

It is important to note that any dishonest act of an employee which comes to the knowledge of management (even one committed prior to the current employment) immediately cancels employee dishonesty insurance for future acts of that employee. If you want to give an employee a second chance, you must first get the permission of the insurance company.

Services contracts commonly require that the property owner be included as a loss payee under the contractor's employee dishonesty insurance. Be sure to have your agent review such requirements as your policy may require further amendment to provide coverage at a client site.

The following section is reprinted from *Construction Risk Management* with permission of the publisher, International Risk Management Institute, Inc. Original printing, November 1984.

CONSTRUCTION INSURANCE CHECKLISTS

The checklists offer valuable assistance to the construction risk manager/ insurance buyer in properly evaluating the insurance program of his or her firm. Checklists aid in identifying and evaluating the loss exposures of the firm and enumerate various insurance coverages and risk management techniques which can be used to avoid unintentional gaps in coverage.

Checklists are also helpful to the agent/broker who currently has construction accounts or is attempting to produce such an account. By using checklists to analyze and review a current client's insurance program on a regular basis, numerous additional coverages can be brought to the client's attention for consideration. Using checklists to properly review the insurance program and offer coverage suggestions during the initial meeting with a prospective client would seem to enhance the probability of the agent/broker producing the account by reinforcing the agent's knowledge and professionalism. The use of checklists is also a good quality control procedure, and completed checklists can provide valuable documentation of coverage recommendations and the insured's decisions.

Checklists also facilitate communication between the risk manager/insurance buyer and the agent/broker by providing a common base from which these people can work in designing the insurance program. When using a checklist during the insurance review, use this top ten list of questions to consider:

1. What are my exposures to loss?
2. How much risk am I willing to assume myself with respect to my exposure?
3. Is this coverage presently carried for this exposure?
4. If this particular form of coverage is not currently carried, should it be?
5. If coverage is currently provided, can/should coverage be reduced or dropped?
6. If it is desirable to purchase this

coverage, what will be the cost?

7. Is it advisable to utilize deductibles and, if so, what would be the effect on cost?
8. What areas of exposure to loss remain for which no insurance is presently carried?
9. What alternative risk management techniques should be used in conjunction with those exposures?
10. Do I have the right insurance broker and carrier who understand contracting risk and can help answer these questions?

While these checklists are intended to be comprehensive, they are not all-inclusive. There may be special forms for coverage not listed which may have special application to a particular construction operation. Individual exposures do vary, and the insured should be careful when selecting limits, deductibles, and the like based on the organization's loss history and equity position.

IRMI GENERAL LIABILITY COVERAGE CHECKLIST

To navigate between form fields, use TAB and SHIFT+TAB, *only*.
Please **do not** use the arrow keys as it may fill in a form field you have not selected.

Insured _____

Insurer _____

Policy Period _____

Completed by _____

Date _____

Check All That Apply	Recommendations/Comments
----------------------	--------------------------

ENTITIES/OPERATIONS INSURED

- Named insured
 - First named insured
 - Other named insured(s)
- Automatic insureds (list)
 - _____
- Additional insured(s) (list)
 - _____
- Blanket additional insured endorsement
- Scheduled additional insured endorsement
- Additional insured status for completed operations
- Joint ventures

LIMITS OF INSURANCE

- Occurrence
- General aggregate \$_____
- Aggregate per project \$_____
- Aggregate per location \$_____
- Personal/advertising injury \$_____

IRMI GENERAL LIABILITY COVERAGE CHECKLIST

Check All That Apply	Recommendations/Comments
<input type="checkbox"/> Medical payments \$_____ <input type="checkbox"/> Damage to premises rented to you \$_____ <input type="checkbox"/> Products/completed operations aggregate limit \$_____	

DEDUCTIBLES

<input type="checkbox"/> Each claim bodily injury \$_____ <input type="checkbox"/> Each occurrence bodily injury \$_____ <input type="checkbox"/> Each claim property damage \$_____ <input type="checkbox"/> Each occurrence property damage \$_____ <input type="checkbox"/> Each claim property damage/ bodily injury combined \$_____ <input type="checkbox"/> Each occurrence property damage/ bodily injury combined \$_____	
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COVERAGE DETAILS

<p><i>Insuring Agreement</i></p> <input type="checkbox"/> Trigger <ul style="list-style-type: none"> <input type="checkbox"/> Occurrence <input type="checkbox"/> Claims-made <input type="checkbox"/> Defense <ul style="list-style-type: none"> <input type="checkbox"/> In addition to limits <input type="checkbox"/> Defense of indemnitees <input type="checkbox"/> Coverage territory <ul style="list-style-type: none"> <input type="checkbox"/> U.S. territories and possessions, Puerto Rico, Canada <input type="checkbox"/> International waters and airspace enroute to and from <input type="checkbox"/> World-wide for products liability 	
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IRMI GENERAL LIABILITY COVERAGE CHECKLIST

Check All That Apply	Recommendations/Comments
<input type="checkbox"/> World-wide for business travel	
<input type="checkbox"/> World-wide for Internet liability	
<input type="checkbox"/> Owned watercraft liability	
<input type="checkbox"/> Description	
<input type="checkbox"/> Length	
<input type="checkbox"/> <i>In rem</i> coverage	
<input type="checkbox"/> Other insurance—excess over policy with additional insured status	
<input type="checkbox"/> Built into policy	
<input type="checkbox"/> By endorsement	
<input type="checkbox"/> Waiver of subrogation	
<input type="checkbox"/> Blanket coverage	
<input type="checkbox"/> Pollution liability	
<input type="checkbox"/> Standard broad form exclusion	
<input type="checkbox"/> Total pollution exclusion endorsement	
<input type="checkbox"/> Total pollution exclusion with hostile fire exception	
<input type="checkbox"/> Total pollution exclusion—hostile fire and building heating equipment exception	
<input type="checkbox"/> Pollution coverage extension endorsement	
<input type="checkbox"/> Named perils coverage	
<input type="checkbox"/> Short-term pollution event coverage	
<input type="checkbox"/> Designated pollutant coverage	
<input type="checkbox"/> Product withdrawal expense coverage	
<input type="checkbox"/> Electronic data liability coverage	

IRMI GENERAL LIABILITY COVERAGE CHECKLIST

Check All That Apply	Recommendations/Comments
<input type="checkbox"/> Employee benefits liability	
<input type="checkbox"/> Stop gap employers liability	
<input type="checkbox"/> Contractual liability coverage for personal injury perils	
Products/Completed Operations	
<input type="checkbox"/> Coverage for joint ventures	
<input type="checkbox"/> Current	
<input type="checkbox"/> Past	
<input type="checkbox"/> Products/completed operations redefined	
Policy Exclusions	
<input type="checkbox"/> Exclusionary endorsements	
<input type="checkbox"/> Explosion, collapse, underground property damage (X, C, U)	
<input type="checkbox"/> Personal/advertising injury	
<input type="checkbox"/> Amendment of liquor liability exclusion	
<input type="checkbox"/> Amendment of liquor liability exclusion with scheduled exception	
<input type="checkbox"/> Medical payments	
<input type="checkbox"/> Employment-related practices	
<input type="checkbox"/> New entities	
<input type="checkbox"/> Employees as insureds	
<input type="checkbox"/> Intercompany products suits	
<input type="checkbox"/> Restrictive definition of "insured contract"	
<input type="checkbox"/> Products-completed operations hazard	
<input type="checkbox"/> Designated work or products	

IRMI GENERAL LIABILITY COVERAGE CHECKLIST

Check All That Apply	Recommendations/Comments
<input type="checkbox"/> Damage to/from subcontractor's work <input type="checkbox"/> Mold <input type="checkbox"/> Silica <input type="checkbox"/> EIFS <input type="checkbox"/> Prior work <input type="checkbox"/> Terrorism <input type="checkbox"/> Exclusion of certified acts of terrorism <input type="checkbox"/> Exclusion of non-certified acts of terrorism <input type="checkbox"/> Coverage limitation (nuclear, biological, chemical; aggregate limit) Specify ____	

OTHER PROVISIONS

<input type="checkbox"/> Notice of cancellation <input type="checkbox"/> Insurer time requirement ____ days <input type="checkbox"/> Nonrenewal notice ____ days <input type="checkbox"/> Material policy change notice ____ days	
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CLAIMS-MADE CONSIDERATIONS

<input type="checkbox"/> Extended reporting period (ERP) <input type="checkbox"/> Automatic 5-year available <input type="checkbox"/> Supplemental may be purchased <input type="checkbox"/> Available on insured cancellation <input type="checkbox"/> Available on insurer cancellation <input type="checkbox"/> Aggregate reinstatement option	
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IRMI GENERAL LIABILITY COVERAGE CHECKLIST

Check All That Apply	Recommendations/Comments
<input type="checkbox"/> ERP for specific accident, product, work, location <input type="checkbox"/> Retroactive date <input type="checkbox"/> Concurrent with first claims-made policy <input type="checkbox"/> Exclusion of specific accident, product, work, location ("laser beam" endorsement)	

RATING/PREMIUM CONSIDERATIONS

<input type="checkbox"/> Exposure basis <ul style="list-style-type: none"> <input type="checkbox"/> Payroll <input type="checkbox"/> Sales <ul style="list-style-type: none"> <input type="checkbox"/> Review intercompany sales <input type="checkbox"/> Cost <input type="checkbox"/> Units <input type="checkbox"/> Experience rating <ul style="list-style-type: none"> <input type="checkbox"/> Credit modifier <input type="checkbox"/> Debit modifier <input type="checkbox"/> Schedule rating <ul style="list-style-type: none"> <input type="checkbox"/> Credit <input type="checkbox"/> Debit <input type="checkbox"/> Dividend <input type="checkbox"/> Deductible credit <input type="checkbox"/> Credit(s) for coverage limitations(s) <input type="checkbox"/> Review "A" rates <input type="checkbox"/> Immature claims-made discount	
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IRMI GENERAL LIABILITY COVERAGE CHECKLIST

Check All That Apply	Recommendations/Comments
<input type="checkbox"/> Premium payment schedule <ul style="list-style-type: none"> <input type="checkbox"/> Scheduled payments <input type="checkbox"/> Audits <ul style="list-style-type: none"> <input type="checkbox"/> Semi-annual <input type="checkbox"/> Quarterly <input type="checkbox"/> Monthly <input type="checkbox"/> Retrospective rating <ul style="list-style-type: none"> <input type="checkbox"/> Loss limitation <input type="checkbox"/> Excess loss premium factor <input type="checkbox"/> Basic <input type="checkbox"/> Tax multiplier <input type="checkbox"/> LCF 	

ASSESS NEED FOR SEPARATE POLICIES

<input type="checkbox"/> Automobile <ul style="list-style-type: none"> <input type="checkbox"/> Business automobile policy (BAP) <input type="checkbox"/> Garage liability <input type="checkbox"/> Garagekeepers liability <input type="checkbox"/> Craft <ul style="list-style-type: none"> <input type="checkbox"/> Aircraft <input type="checkbox"/> Watercraft <input type="checkbox"/> Professional liability <ul style="list-style-type: none"> <input type="checkbox"/> Professional/E&O liability <input type="checkbox"/> Fiduciary liability <input type="checkbox"/> Directors & officers liability 	
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IRMI GENERAL LIABILITY COVERAGE CHECKLIST

Check All That Apply	Recommendations/Comments
<ul style="list-style-type: none"><input type="checkbox"/> Protective liability<ul style="list-style-type: none"><input type="checkbox"/> Railroad protective liability<input type="checkbox"/> Owners & contractors protective liability<input type="checkbox"/> Principals protective liability<input type="checkbox"/> Other miscellaneous liability<ul style="list-style-type: none"><input type="checkbox"/> Bailee liability<input type="checkbox"/> Liquor liability<input type="checkbox"/> Pollution liability<input type="checkbox"/> Products recall<input type="checkbox"/> Foreign liability<input type="checkbox"/> Employment practices liability<input type="checkbox"/> Electronic data/Internet liability	



Management
Methods
Manual



Bulletin

Bulletin No. IN 2
File: Insurance/Bonding

Risk Management

FORMAL "POLICY" IMPORTANT

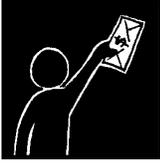
The key to establishing concrete goals and formalizing a program to protect the assets of your firm is a written statement of company policy on risk management. Depending on the structure of your organization, a number of executives may be involved in developing this policy. It might, for example, be prepared by the insurance manager, reviewed by the chief financial officer, and approved by the board of directors.

Your risk management policy should be short and uncomplicated and establish broad principles rather than specific courses of action. It should leave sufficient leeway for the person who interprets it to exercise discretion, use initiative and develop judgement in deciding what should be done in a particular situation. This will allow the individual responsible for carrying out the program the latitude he needs to function effectively; but at the same time, establish a framework within which company objectives can be achieved. As your company policy is written, keep the

basic principles of risk management in mind. Stated simply, any risk management program should:

1. Identify and evaluate all sources of significant risk of loss.
2. Eliminate or minimize such risk wherever possible.
3. Self-assume a portion of the remaining risk within established guidelines.
4. Insure against loss only in excess of the self-assumed amount or where required by law or where insurer services are needed.

The question of whether or not you should include dollar amounts in your corporate policy, i.e., specify maximum retention of self-insurance figures, should be given serious consideration. As a general rule, your written statement of policy should set forth the types and levels of risk to be assumed, those to be formally self-insured, and those to be transferred to insurance companies. Top management should establish the maximum



amount of any loss the firm is willing to absorb without insurance. This amount may vary depending upon the particular line of insurance involved. If your firm is involved in operations for which placing insurance coverage is difficult, and maximum retention have been set forth in corporate policy, the risk or insurance manager may have to request specific authorization to exceed those established retention limits. Drug manufacturers, for example, have to contend with an unstable Product Liability insurance market. They may be forced to accept larger deductibles or higher rates, or both. A risk manager limited by outdated retention amounts could be locked into an undesirable insurance program.

ASSIGNMENT OF RESPONSIBILITY

An essential part of any risk management policy is the assignment of responsibilities. In many firms, the overall authority for risk management falls to the financial vice president or treasurer. In fact, he may administer the risk management program himself. Actually, the title, and the duties of the person responsible for risk management vary considerably. In many companies the insurance manager handles all of the "risk" functions.

INSURANCE MANUAL

Many firms find that an effective tool for the implementation of their corporate policy on risk management is an "insurance manual". In fact, the risk management policy statement often becomes a part of the insurance manual. This manual, most effective when in loose-leaf form, has two basic purposes:

1. To inform operating management how the risk management program affects their operating areas and what their responsibilities are for carrying out the pro-

gram. Specific instruction for reporting losses, handling claims, and submitting other reports to the risk manager should be included.

2. To provide a composite reference *summarizing* all of the insurance coverages in force. If copies of the insurance manual must be distributed to a large number of locations, you may want to modify it somewhat. In this case, a summary of coverages and reporting instructions for each location could be distributed only to the location concerned.

At first glance, compiling a manual of this magnitude may appear to be a gargantuan task. If you don't have one now, it obviously can't be put together overnight. But you can *begin* with little effort. One risk manager told us, for example, that he began by simply gathering together existing insurance memoranda, job descriptions, and field procedure directives.

One point we should emphasize here: It is essential that your insurance manual carry the weight of top management's endorsement. In many cases, the manual will be directed to executives high on your firm's organization ladder, perhaps to individuals at the helm of separate profit centers. The importance of proper field administration of their task management responsibilities must be made clear to them.

ANNUAL REPORT

Another effective administrative tool is an annual report prepared by the risk manager for the information of top management. This report should restate corporate policy, give a brief description of current insurance coverage, and outline developments occurring since the last report that could affect insurance planning.



In addition, the annual report should include a summary of losses for the year, a comparison of current costs and exposures with prior insurance costs, projected budgets and plans, problem areas, such as particular products that are generating a serious number of claims, exposures for which insurance has *not* been purchased, and any general recommendations for the use of larger deductibles, consideration of self-insurance, major loss prevention installations, etc.

What records do you need? There are no hard and fast rules, but consider records necessary if they accomplish any of the following:

1. Enable you to measure an exposure and determine whether or not a need for insurance exists.
2. Identify the kind, amount, and term of insurance coverage you buy.
3. Measure the effectiveness, in terms of losses covered and *not* covered, and the cost of your program.
4. Help you to maintain loss and accident prevention activities.

REVIEW OF EXPOSURES

To list all the possible exposures to loss that your firm has, of course, would be an almost endless project. You may want to begin with a review of the *basic* exposures faced by practically all firms—automobile losses, liability claims, Workmen's Compensation obligations, damage to property, etc. Your next step is to identify any *unusual* exposures. One insurance manager we talked to suggests that you develop this information by means of a "flow diagram", charting the course of your company's products from research and development to the ultimate consumer.

For example, while making a jobsite inspection, using your own diagram as a sort of road map, you may see expensive material-handling equipment. Later you learn that your company is leasing this equipment and has assumed liability for damage to it, and you hadn't been aware of this exposure.

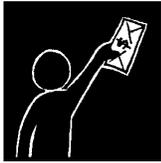
ACCURATE LOSS INFORMATION VITAL

Of all the records for which you may be responsible, probably none is more important than your loss records. One function these records perform is to alert you to danger spots in your operations. By tracing accident patterns, you may find a single source of trouble for, say, a high frequency of Compensation claims within your organization. Zeroing in on loss prevention techniques for this problem area could improve your experience modification or retrospective rating costs.

Another result of properly maintained loss records could be your decision that a certain technique, such as retrospective rating or use of a larger deductible would be to your advantage. Or perhaps your loss record would indicate that you should self-insure a particular exposure. One firm, for example, had always carried Collision coverage on its fleet of 30 trucks without a second thought. After a review of their seven-year loss history, they became convinced they could save money by self-insuring this exposure.

Another benefit of having your loss records at your fingertips is the leverage you have in negotiating with your insurance company. If your loss experience is good, it's up to you to see to it that you're getting what you're entitled to, and put on the pressure for a reduction in premiums.

Along the same line, if you know the current status of reserves that your insurer has



established for Compensation and Liability claims, you can question any that seem high. Your loss experience, and premium costs, are based on figures that include these reserve amounts. If they're out of line, you could be paying higher premiums than you should.

SCREEN RECORDS

Don't make the mistake of failing to maintain adequate loss records because you feel the information you need is always available from other sources. If you receive computer printout loss runs from your insurance companies, hold on to them, set up your own files from these records. If loss runs are not made available to you as a matter of course, ask your insurance representative to provide you with the loss information you need.

On the other hand, remember that keeping *too many* records may be as disastrous as not keeping enough, being overwhelmed with superfluous loss data can detract from the essential information on which you should be concentrating. Unfortunately, the computer loss runs you receive from your insurance companies may be far too detailed, listing all claims filed regardless of size.

You should be concerned not only about the *nature* of the loss data provided by your insurers, but also about its *accuracy*. A seemingly insignificant coding error or one extra digit in a loss reserve could have a most adverse affect on your premium costs. So, if you do think it necessary to review individual claims, you will want the data presented in a manner that will enable persons familiar with the cases to substantiate the entries.

Where Worker's Compensation insurance is involved, another source of loss information is bureau data used to compute your experience modification. Check this out care-

fully, compare amounts of paid out claims and reserves against the data provided by your insurance company.

PROPERTY LOSSES

To record property losses, you will have to rely more on your own resources. Remember that the primary function of loss data is to alert you to *exposures*. So you will want to record certain losses even if not insured, whether because they fall within a deductible or because they are due to a noninsured peril. Keeping track of *all* losses is impractical; so, you should establish a *minimum amount* for recorded losses.

The minimum you set up should contemplate *frequency* as well as size. For example, don't record only those losses in excess of a deductible. You may never learn of a number of losses which, in the aggregate, total more than your corporation expects to assume. Such knowledge could cause you to change your deductible.

What information should you include in your record of losses? Property loss data can be made most effective simply by answering these questions:

1. What was the *cause* of the loss?
2. What was the *amount* of the loss?
3. Was the loss *insured* or *uninsured*? If it was insured, was coverage adequate to satisfy company policy?
4. Can *recurring* losses be eliminated?

HANDLING CLAIMS

Be sure that divisions or branches are advised how to report losses and potential claims. Your insurance manual should include



specific instructions as to persons responsible for reporting a loss, what size losses should be reported, to whom the report is made, on what form, steps to be taken to preserve property, authority to utilize local repair and salvage sources, etc.

SUMMING UP

Handling risk, regardless of the size of your company, is a demanding responsibility. We do not pretend that the operational guidelines we have suggested in this bulletin encompass all the activities necessary for a successful program of risk management. Quite the contrary, what we have *not* said could and has, in fact, filled dozens of books on the subject.

We have not even attempted to get into the *technical* aspects of a risk management program, how to evaluate the feasibility of self-insurance, how to arrive at the right choice of deductibles, how to achieve an effective loss control program, investigating and comparing insurance markets, how to get the best coverage for your money, and so on. But these are all things that cannot be accomplished until other, more basic steps have been taken.

First of all, none of these more sophisticated actions can be taken until you have established what your *objectives* are.

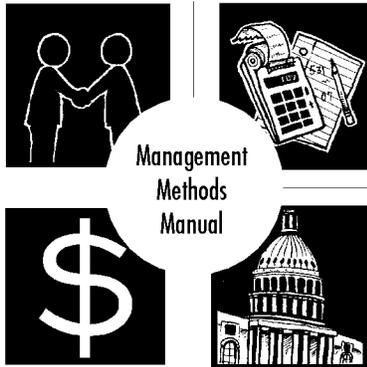
What is your purpose in having a program for risk management? As basic as it may seem, a corporate plan for protecting against risk of loss can never get off the ground until

these objectives are *reduced to writing*. They can be framed within the basic, simple principles of risk management: identification, elimination, minimization, self assumption and insurance of risk.

The second step is to provide the mechanism that will translate these generalities into actual operation. Responsibilities should be clearly defined. Primary to making the program work, of course, is the person responsible for its execution. His technical qualifications and his ability to utilize the principles set out in corporate policy are fundamental to the program's success.

One key to success is his ability to put the program into operation, the nuts and bolts administrative procedures and tools that will turn a philosophy into a pragmatic program. This does not mean that he has to burden himself with a lot of wheel-spinning reports and records. On the contrary, one of his most important concerns is to *reduce* administrative efforts to only the essential tools. His insurance manual, for example, should not be so weighted down with descriptions of all coverages in force that field personnel just ignore it. It should be brief, and contain only the information each branch or division needs to discharge its own risk management responsibilities.

Finally, and for the risk manager this is most important of all, he has to get the information he needs. Communication is vital, and he should have a formal program that will assure that information flows to him from every department.



Bulletin

Hold Harmless Agreement

The formal transfer of risks by contract is an important element of risk management. Risk is transferred through the use of Hold Harmless clauses. One party, the indemnitor, agrees to hold harmless the other party, the indemnitee, against liability arising out of the project described in the contract.

The amount of risk assumed by the indemnitor varies in accordance with the terms of the contract. Ideally, the indemnitor assumes liability which arises solely from its own acts or omissions. Too often, however, the indemnitor is contractually obligated for liability arising from the acts or omissions of both the indemnitor and indemnitee.

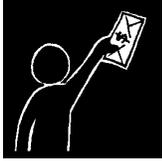
It's the party to the contract who has the superior bargaining position who usually is the indemnitee. The indemnitor finds it necessary to assume liability in order to get the work. Nevertheless, you should make every effort, including acquiring legal counsel, to avoid inequitable contract provisions.

Your Commercial General Liability (CGL) policy automatically provides "blanket" contractual liability insurance. That is, any business contract under which you assume

the liability of another to pay damages to a third party is an insured contract. But, the contract must be enacted prior to the loss, and the liability assumed must fall within the scope of CGL coverage. The CGL does exclude certain contracts or agreements from coverage—e.g., contracts relating to architects, engineers and surveyors and contracts relating to fire at rented premises. See your CGL policy for these important contractual restrictions.

Much has been said and written about the potential danger in Hold Harmless clauses in contracts. Yet, subcontractors continue to sign subcontracts assuming liability for just about every loss the general contractor may face. Many subcontractors are unaware of these clauses, erroneously believing they could not be held responsible for anything other than their own negligence. However, some courts have upheld the validity of such clauses despite their inequities.

A typical Hold Harmless clause, and one which is deceptively simple and should be avoided by subcontractors altogether, reads as follows:



“The subcontractor agrees to assume entire responsibility and liability for all damages or injury to all persons, whether employees or otherwise, and to all property, arising out of, resulting from or in any manner connected with the execution of the work provided in this subcontract, and the subcontractor agrees to indemnify and save harmless the contractor, his agents and employees, from all such claims, including, without limiting the generality of the foregoing, claims for which the contractor may be, or may be claimed to be, liable.”

A good illustration of the breadth and unhappy legal consequences for the subcontractor in the use of such a clause is provided in the case of **Christy v. Menasha Corporation**, 211 N.W. 2d 773 (Minn., 1973). In that case an employee of the general contractor dropped a board on the head of one of the subcontractor’s employees. As is typical, the employee could not sue the subcontractor directly and was limited to Workmen’s Compensation. However, the employee sued the general contractor based upon the negligence of the general contractor’s employee. The general contractor then sued the subcontractor for indemnification pursuant to the above-quoted clause.

The court held that although the injury to the plaintiff was caused solely by the negligence of the general contractor, the subcontractor was nonetheless required to indemnify the general contractor in accordance with the Hold Harmless clause in the contract. Hence, the subcontractor was stuck with the liability that was in no way his fault and was even beyond his control.

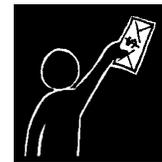
The standard A.I.A. subcontract form contains a Hold Harmless clause which reads:

“The Subcontractor shall indemnify and hold harmless the Contractor and all of his agents and employees from and against all claims, damages, losses and expenses, including attorney’s fees arising out of or resulting from the performance of the Subcontractor’s work under this subcontract, provided that any such claim, damage, loss or expense is: a) attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting therefrom; and b) caused in whole or in part by any negligent act or omission of the Subcontractor or anyone directly or indirectly employed by him or anyone for whose acts he may be liable, regardless of whether it is caused in part by a party indemnified hereunder.”

This language is fundamentally unobjectionable, since it simply restates the liability that would be imposed upon the subcontractor by law, at least, in those situations where the loss arose from the sole negligence of the subcontractor or his agents. However, this clause poses the question of whether the subcontractor should be made liable for the entire loss, where the loss was caused in part by the negligence of the general contractor. This exposure can be altogether eliminated by modifying the clause so that it limits the subcontractor’s liability to losses caused *solely* by his negligence or that of his agents.

A third example of a Hold Harmless clause:

“The Contractor and Subcontractor agree to indemnify and save harmless each other from and against any and all suits, claims, actions, losses, costs,



penalties and damages of whatsoever kind or nature, including attorney's fees, arising out of, in connection with or incident to, each party's performance of his particular portion of this contract. The parties may agree to arbitration pursuant to the procedures adopted by the American Institute of Architects, the American Arbitration Society or applicable law."

Such a clause was construed in the case of **Prociw v. Baugh Construction Co.**, 9W App. 750 (1973). In this case, the evidence showed that there was negligence on the part of the general contractor in failing to provide an injured employee safe scaffolding on which to do the work. The court also found undisputed evidence that the injured employee was engaged in work under the subcontract at the time of the accident. Both the general contractor and the subcontractor argued that the clause quoted above required the other to bear the loss.

The Court of Appeals rejected the contentions of both parties and construed the clause to require that the loss be shared equally between the two parties. Subcontractors will note, however, that the subcontractor was required to bear half the loss, even though there was no showing of negligence on the subcontractor's part, simply because the loss occurred during the performance of the subcontractor's portion of the work.

Seemingly inconsequential differences in language and factual patterns can lead to drastically different legal results. Therefore, your own lawyer should be consulted with respect to Hold Harmless language in any contract proposal. Any unreasonable clause should be discussed with the general contractor and a request made for modification. Your ability to have this clause modified will depend upon your bargaining power, but

armed with a legal opinion will place you in a stronger position to bargain.

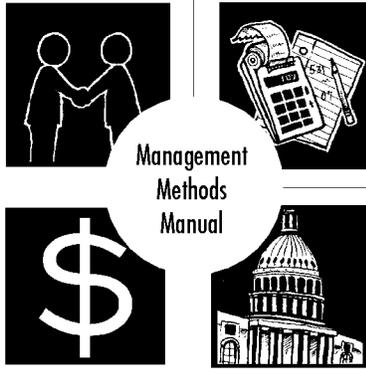
With the aid of legal counsel, you may wish to design a form which could be used as a standard rider to contracts which you feel include an objectionable Hold Harmless clause. Several contractors have instituted the following form and find it works very well.

Rider to be attached to said subcontract as alternate to Paragraph _____ to which exception has been taken.

Subcontractor agrees to save and indemnify and keep harmless Contractor against all liability, claims, demands or judgements for damages arising from injury to persons or damage to property occasioned by, or claimed to have been occasioned by, the negligence of Subcontractor, his agents or employees, and will defend any and all suits brought against Contractor on account of any such occurrences, and will pay any judgment rendered in any such suits, and will reimburse and indemnify Contractor for all expenditures or expenses, including court costs and reasonable fees made or incurred by Contractor by reason of such occurrence.

You might find it easier to convince the general contractor to attach this rider to a contract than to negotiate for elimination or rewording of the clause.

The most important point to remember is to know exactly how much obligation you are assuming by signing a contract. Do not assume that a clause will be interpreted to mean anything other than exactly what is written. Finally, remember that subject to exclusions, your CGL policy provides coverage for assumed bodily injury and property damage liability, but liabilities assumed that fall outside the CGL coverage grant are solely the indemnitors responsibility.



Bulletin

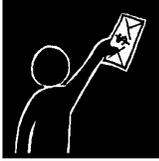
How Large Should Insurance Deductibles Be?

For many years, deductibles have been used by insurers to avoid the costs arising from the handling of relatively small, nuisance type claims. Policyholders accept such losses as a cost of doing business, in return for a modest premium savings. In theory, this is as it should be since neither the insurer nor the insured benefit from “swapping dollars” over losses which present no financial hardship to the policyholder.

With the acceptance of modern risk management techniques, deductibles have increased substantially in size, and they are more frequently applicable to lines of insurance which are noted for loss severity, rather than loss frequency. By assuming more risk, policyholders receive larger premium credits, but deductible affordability becomes a major concern. Remember, without an aggregate deductible (a predetermined annual maximum deductible amount payable—e.g., \$5,000 per claim deductible subject to a \$25,000 aggregate), a policyholder may be subjected to deductible payment repeatedly.

A question often asked is, “How large an insurance deductible should I consider?” That determination is a matter of ascertaining the size of the financial impact in the form of a deductible a contracting firm can sustain during a given period of time. It is also a matter of determining the most economical deductible to take given the reduction in premium the insurer will grant when the deductible is used.

Determining the largest permissible financial “hit” a contractor can absorb requires an analysis of the firm’s financial position and the current phase of the construction business cycle. A large assumed loss through a large deductible in the downside of the construction business cycle can be devastating to a contractor who is thinly capitalized and whose job inventory is low. The firm’s financial analysis for deductible purposes should answer such questions as: “What reduction in earnings per ownership share can I withstand? What reduction in a percentage of working capital caused by the assumption of losses through deductibles can I afford? What impairment in



the firm's net worth caused by the assumption of losses can I expect?"

Answers to these questions only establish overall guidelines in the matter of determining deductible amounts. They are designed to arrive at the maximum permissible loss a firm can sustain over time, but they are not indicative of the absolute amounts of loss at any specific point in time the firm should retain. An analysis of the firm's previous losses is necessary to arrive at the specific deductible figure.

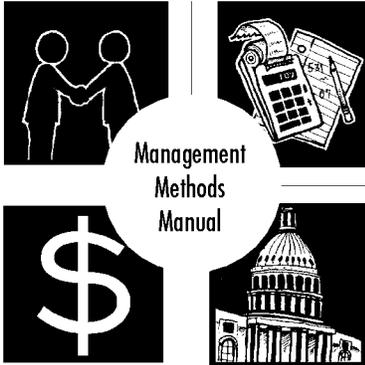
These additional questions need to be answered:

1. What has been the frequency and severity of losses within the contracting firm? High-frequency, low-severity losses tend to be more suitable for deductibles as opposed to few, but large amount losses. It is the frequency which tends to make the losses more predictable. For example, smaller frequent losses of physical damage to the contractor's vehicle fleet tend to be predictable and are good candidates for deductible treatment.
2. Is there a geographical concentration or a spread of the contractor's property values? If the contractor's equipment and vehicle fleet is consistently "bunched" in one or several locations, the impact of a per-unit deductible or even a per-location deductible (if there are many locations in a geographical area) could have serious financial effects on the contractor.

3. Does the firm have the capability to make damage repairs following a loss that falls within the deductible? Will the cost of repairs made by the contracting firm outstrip the deductible savings?
4. A key question is whether the assumption of loss through deductibles by the contractor is offset by appropriate premium credits. Deductibles must either make coverage available where it is not available without them, or they must result in premium savings. A point may be reached where a larger deductible may not be justified because of inadequate premium rate reduction offered by the insurer. But you should understand that insurers price deductibles in anticipation of the losses that will be avoided as a result of the deductible. So don't expect more than modest savings for deductibles which apply to high severity/low frequency exposures—i.e., credit is modest when likelihood of loss is slim.

Deductibles are used less in liability insurance than in property insurance, primarily because liability insurance does not generate a large number of smaller, frequent losses found in property insurance.

Deductibles, when used by contractors, are a cost-saving device; however, their size and use should not be determined without some attempt to relate them to the contractor's financial capabilities.



Bulletin

The Do's and Don'ts of Obtaining Bonding

INTRODUCTION

All of us in the construction industry are familiar with surety bonds. Surety bonding is an integral part of any contractor's daily business strategy. The ability, or inability, to obtain a surety bond may have a positive, or negative, effect on a contractor's chances to obtain work and to meet the company's financial goals.

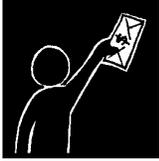
As in any worthwhile endeavor, advance planning and preparation are crucial in obtaining a surety bond or a surety bonding program for your company. It is most important for the contractor to keep in mind that a surety bond is basically an extension of a line of credit to the company. As such, obtaining a surety bond or a surety bond program is not much different from obtaining a personal or a commercial loan. Putting your best foot forward to the potential surety in the presentation of your company is essential, however, do not "gild the lily" but always make your presentation open, complete, and honest.

SURETY BONDS

Before we offer for your consideration a list of do's and don'ts in obtaining bonding, we

want to briefly describe the types of surety bonds typically available to the construction industry.

1. Bid Bonds guarantee that the bidder, if awarded the contract, will enter into the contract and furnish the required performance and payment bond(s).
2. Performance Bonds:
 - a. Construction Contract Bond guarantees faithful performance by the contractor of its contract.
 - b. Labor and Material Payment Bond guarantees that the contractor will pay all bills for labor and materials. It may be a separate bond or a part of the Construction Contract Bond.
 - c. Maintenance Bond guarantees that work done by the contractor will be free of defective workmanship and materials. It may be a separate bond or a part of the Construction Contract Bond. If a part of the Construction Contract Bond, it usually will only guarantee maintenance for one year after completion of the contract.



- d. Supply Contract Bond guarantees a contract to supply goods or materials.

Finally, it is important that the contractor understand that a surety bond is not an insurance policy. An insurance policy has only two parties to the insurance contract—the insurer and the insured. A surety bond has three parties to the contract—the principal, who is the party whose faithful performance is being guaranteed; the obligee, who is the party for whose protection the bond is being issued; and the surety, who together with the principal, jointly binds itself to the obligee for the faithful performance of the principal's obligation.

The most important distinction between insurance and a surety bond is the obligation of the principal to indemnify the surety for any damages it pays to the obligee which were caused by the principal. When obtaining a surety bond or a surety bond program, the contractor's company will have to sign an indemnity agreement with the surety, and if the contractor's company does not exhibit adequate financial wherewithal to the surety, personal guarantees will probably be required.

DO'S IN OBTAINING SURETY BONDS

1. Select a surety agent who is familiar with surety issues and mechanical contracting to represent you to the surety.
2. Try to select a surety with an A.M. Best Key Rating Guide of "A."
3. Plan your presentation to the surety thoroughly by:
 - a. Consulting with a certified public accountant who is familiar with construction accounting principles.

- b. Having fully audited financial statements for the most recent three fiscal year-ends of your company.
- c. If fully audited statements cannot be afforded, obtaining a CPA review of the statements.
- d. Preparing an honest set of comments while putting your firm in the most favorable light.
- e. Providing the nature and size of past projects, including successes and failures.
- g. Describing your current position in the marketplace.
- h. Providing an organization chart and resumes of key personnel.
- i. Describing your estimating, scheduling, project management, and cost control procedures.
- j. Providing a list of tools and equipment.
- k. Describing your history with claims and any litigation.
- l. Providing details of your insurance program.
- m. Giving a list of credit references.
- n. Providing a list of your professional advisors, such as lawyers, accountants, and insurance agents.
- o. Providing a current backlog report, including details on open contracts.
- p. Describing your operating budget.
- q. Including a detailed list of aged receivables and aged payables.



- r. Providing income tax returns which correspond with the financial statements provided.
- s. Describing outstanding loans and details of lines of credit.
- t. Making sure the foregoing information is complete, objective, logical, and understandable.

4. If the surety wants personal financial information, provide your own financial statement and income tax return for the year corresponding to your company's most recent fiscal year end.

5. Identify terms and conditions your company will not accept in contracts it is awarded.

6. Always provide timely and accurate responses to the surety's request for information.

DON'TS IN OBTAINING SURETY BONDS

1. Don't purchase a surety bond from a company that will sell to you based on a premium alone without having reviewed your company's financial status.

2. Don't forget that the surety will want interim information throughout the fiscal year.

3. Don't forget that surety bond underwriting decisions are made based on the thor-

ough review of your financial information and are predicated on the premise that there will be no losses by the surety.

4. Don't omit negative details.

5. As you approach your company's fiscal year end, don't:

- a. Maintain a low cash balance.
- b. Allow accounts receivable to age beyond 90 days.
- c. Make any sizable loans to stockholders.
- d. Permit your billings to fall behind.
- e. Underbill.
- f. Prepay expenses, if possible.
- g. Make large equipment purchases.
- h. Indicate an overdependence on short-term borrowing by increasing or tapping a line of credit.
- i. Permit intercompany balances, if any, to remain unpaid at fiscal year's end.
- j. Make large or unnecessary Subchapter 'S' withdrawals.
- k. Change banks or surety companies unnecessarily.



Bulletin

Insurance for Catastrophes

INTRODUCTION

When a business suffers catastrophic losses, its owners' first recourse is to file a claim with the company's insurer. When several businesses suffer similar catastrophic losses and file claims, insurance companies may take certain measures to prevent insolvency, such as canceling policies, significantly increasing premiums, or limiting certain kinds of coverage.

In recent years, businesses and their insurers have experienced catastrophic losses resulting from incidents involving terrorism, environmental impacts, mold, asbestos and defective workmanship. Adding to the insurance industry's financial pressures was the downturn in the stock market which negatively affected one of the insurance industry's safety nets, its investment income.

As a consequence, pressure has increased on business insurers to limit the availability of certain coverages, substantially increase the cost of others, and reduce claims.

TERRORISM INSURANCE

The September 11, 2001 terrorist attacks cost the insurance industry up to \$50 billion in insurance claims¹. As a

¹"Terrorism Insurance: Pray as You Go," Russ Banham, CFO Magazine (February 4, 2002, <http://www.cfo.com>).

consequence, thousands of companies with expiring commercial property and business owners insurance have received notices that their policies will not be renewed as written.²

Although the standard policy will still provide coverage for losses due to fire and smoke, theft, water damage, and general liability, insurers are either excluding coverage for losses due to terrorist actions or strictly limiting covered losses due to such incidents.³

If coverage is available, the price is substantial. A 40 to 50 per cent increase in premiums for policies with terrorism coverage included is not unusual. In areas close to the site of the terrorist attacks, premium hikes of 200 to 400 percent are common.⁴

The construction industry is not considered at high risk for terrorism, but is, nevertheless, experiencing the effects of a shakier marketplace. Lenders are reluctant to approve loans to businesses without terrorism coverage. Customers are refusing to consider project bids without the coverage or at levels considered adequate.⁵

² Ibid.

³ Ibid.

⁴ "Weak Foundation: Lack of Insurance Against Terrorism Hinders Existing Commercial Buildings and Future Construction," Newsday (9/16/02).

⁵ Ibid.

Solutions

The commercial real estate market is reportedly adjusting from the terrorist attacks in New York City and Washington, D.C., and transactions are going forward.

The federal government has also provided the insurance industry with a safety net in the event of a future terrorist-related catastrophic event. On November 26, 2002, President Bush signed into law legislation that established a temporary federal backstop plan for terrorism insurance coverage. This law provides financial assistance to insurers when a catastrophic act of terrorism causes insurers to exceed their deductibles. This will allow insurers to offer terrorism insurance to their insureds. The law does not, however, provide a reduction in the costs of purchasing insurance, but terrorism coverage will not be excluded from insurance policies. To learn more about the federal insurance backstop bill visit: <http://www.congress.org>.

While the market and the insurance industry adjust to the new reality, businesses can take the following steps to protect themselves:

1. Review your business's insurance policy for terrorism coverage. If your company is involved in projects that are sensitive and therefore have a high risk exposure (i.e., national defense, utilities, hazardous substances, financial services buildings), consider whether additional coverage is needed. Be prepared for possible significant costs associated with the purchase of this additional line of coverage.
2. If your insurer is unwilling to provide additional or any terrorism coverage, discuss options.

3. Assess new business terms of your company's associated exposure to terrorist-related risks and your existing insurance coverage for those exposures.
4. Continue due diligence in knowing the background on your existing employees and checking on new hires.
5. Create an emergency evacuation plan and daily attendance record for your employees. Preparing your project site for unexpected emergencies can reduce liability costs and exposure. If an incident should occur involving terrorism and your employees' lives are lost, your workers' compensation coverage will pay benefits to their families. (For further explanation of workers compensation benefits by state/jurisdiction you may visit: <http://www.dol.gov/esa/regs/compliance/owcp/wc.htm>).

ENVIRONMENTAL LIABILITY

Insurance coverage for environmental accidents, exposures, and liabilities is an important part of a business's insurance package. Although such incidents are infrequent, when they occur, the financial effects can be substantial and devastating to the principal companies involved. Fortunately, environmental insurance is readily available in a variety of packages at surprisingly affordable rates.

Contractors seeking new or additional coverage will find, however, that the insurance industry has yet to agree on terminology, standards, and policy forms for this kind of insurance.

Most policies are available in the following basic forms:

Environmental Impairment Liability (EIL) covers losses from active release of pollutants, sudden and gradual, from insured locations.

Property Transfer EIL Insurance is designed to be used when property is bought and sold. These policies may be used in place of the seller's indemnity for cleanup costs and third party claims for bodily injury and property damage when property ownership transfers.

Secured Creditors Environmental Insurance was designed to back collateral interest lenders. The policy pays if the borrower defaults on a loan and there is an environmental incident at the insured location.

Storage Tank Insurance, required by federal law (Resource Conservation and Recovery Act), owners/operators of fuel or hazardous materials storage tanks must demonstrate their financial ability to pay damage costs if the tank should leak. Insurance provides one kind of demonstrated financial responsibility. Underground storage tank insurance covers third party liability claims for bodily injury, property damage, offsite as well as on site cleanup costs and legal costs.

Contractors Environmental Impairment Liability Insurance provides coverage for contractors performing environmental remediation services on contaminated sites. However, this kind of policy also insures against environmental losses of traditional contractors as well, and covers their operations and completed operations.

Environmental Professional Errors and Omissions Insurance resembles traditional E&O policies, but should contain a coverage grant or the definition of loss for damages and cleanup and eliminate or modify the pollution exclusion.

Remediation Stop-Loss Insurance (also known as cost cap coverage) insures remediation costs that exceed the projected or anticipated costs. The policy pays the cost overrun expenses that exceed the deductible that the insured incurs in completing a remediation project at a specified location. To limit a company's exposure to environmental risks, the company should establish an environmental compliance program that may exist in the storage and disposal of hazardous wastes, previous and present uses of property, underground storage tanks, and contractual obligations.

MOLD

Mold is everywhere and lately, it's become a major cause of claims against contractors in several areas of the country. The problem concerns the appearance of mold in residential, commercial and public buildings due, in large part, to modern building materials and techniques that have made these structures "air tight" and more energy efficient, but also vulnerable to mold infestation.

In addition to the property damage concerns, an increasing number of recent claims are blaming molds for serious health problems, such as coughing, congestion, shortness of breath, respiratory infections, nausea, headaches and skin rashes. Further, there are more serious health problems such as coughing of blood, lung damage, chronic fatigue, and even brain, kidney and liver damage. Medical experts have yet to confirm the relationship between these illnesses and molds, but the claims persist.⁶

The claims are not only increasing in number, but also in awards. In Texas, the Department of Insurance reported

⁶ "Don't be a Victim of Mold," William Atkinson, Contractor, August 2002.

that insurers in that state paid \$1 billion in mold-related claims in 2000 and 2001. In a particularly onerous case, a jury awarded a Texas homeowner \$32 million, including \$12 million in punitive damage, \$8.9 million in legal fees, \$6.2 million to replace her 22-room home and possessions and \$5 million for mental anguish.⁷

Root causes of the mold infestations are faulty installations, faulty repairs, release of mold spores during work or repairs, and improper clean-up and remediation.

Mold can exist where the following three criteria are satisfied:

1. Temperature climate (typically above 70 degrees Fahrenheit).
2. Existence of nutrient source such as wood, paper, or other cellulose, or carbon based material; and
3. Moisture is present (high humidity, rather than pooled or running/dripping water is sufficient.)

Note: When these criteria are satisfied, mold growth can begin within 48 hours.

To assume your General Liability (GL) Insurance policy will cover a mold claim may be a costly assumption. Coverage of a mold claim under a GL policy depends on how the claim is brought, the jurisdiction the claim was filed in and the “specific” policy language in the policy. Insurers often cite the “absolute” pollution exclusion as a basis for denying coverage for mold-related claims.

The “absolute” pollution exclusion excludes coverage for:

- a. bodily injury or property damage which results in any manner from the discharge, dispersal, release, or

escape of:

- i. vapors, fumes, acids, toxic chemicals, toxic liquids, or toxic gases;
- ii. waste materials or other irritants, contaminants or pollutants.

The standard GL policy insures against damages caused by the contractor’s operations or by the contractor’s past work or services performed in the past. They will not pay for or replace poor quality products or work. However, they will pay for damages to other property and “consequential damages” caused by poor quality work products or work.

Consequential damages are defined as follows:

Consequential Damages which flow from the loss or harm – consequential damages are of the same nature as special damages. These damages do not arise as a result of the wrongful act or omission itself, but arise due to the circumstances after the loss or harm has occurred. Special damages include out-of-pocket items that can be documented, such as the need to rent replacement property (such as a car rental) or the cost of services (such as the cost to have property valued or appraised).

An example of consequential damages: A mechanical contractor installs a piping system in a high rise office building. The piping system ruptures as a result of improper installation on the fifteenth floor. The leak floods a conference center on the fourteenth floor. The building owner had reserved the conference center for a national convention. The meeting that was to be held in the conference center had to be relocated to a nearby hotel. The hotel charged the building owner \$15,000 for the rental of a conference room and hotel coordination. In addition to the costs to repair the pipe line rup-

⁷ Ibid.

ture and the damage caused by the water, the building owner also sustained consequential damages when the national convention had to be relocated to a nearby hotel.

Consequently, if mold infestation results from defective or deficient contractor work, depending on the circumstances of the situation and the nature of the claim, the policy may or may not pay the claim.

Solutions

Because mold claims are increasing, insurers are either modifying the mold provisions in existing general liability policies, placing severe restrictions on those provisions, or excluding them altogether. Some insurers are canceling policies completely or pricing them so high that affected contractors are at risk of losing their business since state law requires that they carry these policies.

Contractors can take steps to protect themselves by:

1. **Avoid errors.** Double-check or even exceed the code, and take the extra steps necessary to be sure the job is right the first time.
2. **Use high quality materials.** Saving a buck on materials may cost you your business later, so buy good quality up front.
3. **Don't duck a problem.** If a client reports a problem, do the repairs and replace any damaged materials as soon as possible. Talk with your client and be sure you have agreement on steps to be taken and the schedule for completing them. Ignoring the problem may lead to far more expensive problems later.
4. **Offer a warranty.** If a client makes a claim under warranted work, fix it immediately to avoid a lawsuit.

5. **Monitor new installations.** Check back on new installations for leaks and evidence of moisture. If any occur, fix the problem, clean up the leak and replace the damaged materials as soon as possible.

6. **Review your insurance policies.** See if they include the "Pollution Condition." Below is the definition of "Pollution Condition" as provided by a leading pollution underwriter:

***Pollution Condition** "means the discharge, dispersal, release, seepage, migration, or escape of smoke, vapors, soot, fumes, ...or other irritants, contaminants or pollutants into or upon the land, or structures thereupon, the atmosphere, or any water-course or body of water including groundwater."*

Mold is still evolving as an issue for the contracting industry. Claims and costs will likely continue to rise because of mold remediation and the possible bodily injury claims associated with mold. Protect your business by reviewing your insurance coverage, and respond quickly to complaints from customers when water damage is involved.

It may be prudent to establish a business relationship with a restoration company. In the event of a water leak, restoration companies can provide emergency water clean-up with the utilization of commercial water extraction equipment and dehumidification devices, thus reducing the volume of damage and the environment for mold growth.

ASBESTOS

Asbestos cases are on the rise once again. Many claimants are pursuing previous employers/contractors since many of the manufacturers have filed for bankruptcy as a result of litigation and the award of lawsuits. Between January

2000 and August 2001, there were a recorded 41 asbestos-related Chapter 11 bankruptcies, including eight major firms.

Depending on how the claim is filed and the jurisdiction, a contractor may be liable for an asbestos claim/lawsuit based on the exposure period. Or depending on the jurisdiction, the claim/lawsuit can be filed against the last known employer. In some jurisdictions, claims can be apportioned among all employers or the claim can be isolated to just one employer.

The Asbestos Alliance, the coalition consisting of business interests, employers, insurers and plaintiffs' counsel, is lobbying Congress to change the way asbestos-related illnesses are handled. This organization is advocating legislation that would place a specific statute of limitations on the filing of asbestos-related claims, ban consolidations of claims that include many people that are not ill, and prohibit the filing of cases in jurisdictions that are not related to the claims.

To learn more about the Asbestos Alliance Coalition, visit its website at: www.asbestossolution.org.

Asbestos Claim Coverage

Typically, asbestos claims are covered under workers' compensation coverage and/or general liability coverage.

However, contractors performing asbestos and lead abatement are required by law to maintain appropriate insurance coverage for such work. In addition to Commercial General Liability insurance, a contractor can purchase Asbestos/Lead Abatement Liability Insurance. Contact your insurance broker to obtain rates for coverage. Insurance limits can be set based on an each-occurrence basis.

An insurance broker may request the following documentation when providing an Asbestos/Lead Abatement Liability insurance quotation:

- a. Asbestos/Lead Abatement Liability Application.
- b. Financial statement.
- c. Standard operating manual.
- d. Contractor certification.
- e. Employee training procedures.
- f. Listing of completed projects.
- g. Asbestos, Lead and General Liability (GL) claims information. Typically, Asbestos/Lead Abatement insurance is obtained by Asbestos/Lead Abatement Contractors, Property Owners and General Contractors.

Solutions

Since the incubation period for asbestos-related illnesses ranges from 30-40 years, it is difficult to prevent claims from arising for work performed years past. For current work, steps can be taken to prevent asbestos exposure:

1. Employ an Asbestos/Lead Abatement Contractor to remedy asbestos situations. Such specialty contractors are required by law to carry specific insurance coverage for the performance of their work.
2. Specialty contractors have the training, tools and equipment to abate the affected work areas without exposing your employees.
3. Discuss with your insurance carrier the types of coverage which can be offered to protect against asbestos claims.

SUMMARY

The catastrophic losses that businesses have experienced during the last few years due to terrorism, mold infestation,

environmental accidents, and asbestos exposure have shaken the climate under which the insurance industry and its clients do business. Business insurance coverage for catastrophic losses is more limited and much more expensive than it was and some basic coverages have become more strictly defined.

If you have not done so already, meet with your insurance broker to review your current business policy for the adequacy of coverage for such catastrophic events. Don't wait until tragedy strikes before determining what levels of losses your policy will/will not cover.



Bulletin

Subrogation Can Spell Trouble

INTRODUCTION

This article addresses loss problems resulting from the operation of subrogation clauses. If an insured waives its insurer's subrogation rights, the insured may have no coverage at all. Waiver of subrogation clauses can be attached to insurance policies to eliminate the potential problems stemming from subrogation.

Caution: Before signing any contract documents that address your firm's insurance coverage relating to a project, have your firm's insurance agent(s) review and approve the documents. Also, before signing any agreement to determine your firm's insurance liabilities and limitations, carefully review (or have your legal counsel review) the general contractors' contracts.

The following provides a few hypothetical examples of problems that can occur involving a variety of insurance coverages.

SUBROGRATION

Electrical Contractor, LLC (ECL) was working at a construction site. Because a worker improperly installed a circuit breaker board, a fire ensued. The fire

caused about \$300,000 in damage to equipment belonging to Rigging, Inc. (RI), another contractor working on the construction project. RI was surprised when its adjuster asked RI to sign papers authorizing RI's insurer to subrogate against ECL. At first, RI refused to sign the subrogation authorization stating that they had paid a premium to have their insurer pay for RI's losses, not to have another contractor pay for their loss.

RI's insurer then referenced the following provision from their insurance contract, American Association of Insurance Services' (AAIS) Contractors Equipment Form IM-7000 Ed 1.0:

Subrogation: If we pay for a loss, we may require you to assign to us your right of recovery against others. You must do all that is necessary to secure our rights. We do not pay for a loss if you impair this right to recover.

Because RI's owner was a friend of the ECL's owner, RI did not want to sign the necessary papers authorizing the insurer to subrogate. However, the company knew that it did not have the resources to pay for a \$300,000 loss, so it agreed to the subrogation authorization.

ECL submitted the subrogation claim to its insurer, fully expecting to have coverage for the subrogation claim. ECL was surprised when its insurer denied the claim. The insurer took the position that the damaged property was in the care, custody, and control of ECL and that, therefore, there was no coverage for the subrogation claim.

ECL did not have any insurance or the money to cover the \$300,000 claim. The subrogation against ECL caused the firm to file for bankruptcy. Several months elapsed between the subrogation filing and ECL's filing for bankruptcy. After the bankruptcy filing, even more time elapsed while the owner of the construction project obtained another electrical contractor to finish ECL's work.

Realizing that subrogation could significantly disrupt the construction process, the project owner had an addendum added to all of the contracts with the contractors for the project. The contract addendum required that all contractors have their insurers waive their subrogation rights. Once this change had taken place, the project owner did not expect any more problems resulting from subrogation.

WORKERS COMPENSATION SUBROGATION WAIVER

Shortly after the contracts had been amended not to allow subrogation by the insurers of any contractor on the job, a ready-mix cement truck backed over a worker's leg. Nothing happened while the injured worker's leg was healing. As soon as the worker's compensation claim was closed, a subrogation claim was presented against the ready-mix cement firm. The ready-mix cement firm objected saying that the construction contracts did not allow subrogation.

The workers compensation insurer replied that the subrogation waiver in the construction contracts did not apply. The clause from the National Council on Compensation Insurance's (NCCI) Form WC 00 00 00 A (04/92) that was cited states:

Recovery From Others. We have your rights to recover our payment from anyone liable for an injury covered by this insurance. You will do everything necessary to protect those rights for us and to help us enforce them.

The workers compensation insurer then proceeded with its subrogation claim. While that occurred, the contractors involved asked their insurance agents if there was any way to preclude subrogation by the workers compensation insurer. The underwriter referred them to NCCI's Form WC 00 03 13:

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.) This benefit shall not operate directly or indirectly to benefit anyone not named in the Schedule.

When using the Workers Compensation Waiver of Subrogation Endorsement, keep several things in mind. The most important concern is that the waiver applies only to those firms that are listed on the schedule in the endorsement.

For example, suppose that Cement Forms, Inc. (CFI) is working at a construction site where every firm is to waive subrogation. Initially, the insurer will list all of the contractors on the insurance contract. However, as is usually the case during the course of the project when additional contractors will be working at the site, CFI won't be told about the additional contractors and, therefore, they will not be added to the list of contractors against whom the subrogation rights have been waived.

A typical case might be where one of the original contractors (Carpenter, Inc.) hires a sub-contractor (Trim Finishing Contractor, LLC) to help finish the work. The project owner may not be aware that Trim Finishing Contractor is on the job. Trim Finishing Contractor has not been added to CFI's workers compensation policy waiver of subrogation endorsement. A CFI employee is negligently injured by a Trim Finishing Contractor employee. After paying the loss, CFI's insurer will subrogate against Trim Finishing Contractor.

Not having every contractor on the site added to all of the construction contractors' workers compensation waiver of subrogation endorsements will always be a concern.

COMMERCIAL AUTO SUBROGATION WAIVER

Assume that both Cement Forms and Redi-Mix Cement (RMC) had signed the contract waiving the subrogation rights of their insurers. One of Cement Forms' employees left some steel forms lying in the path of an RMC truck. A wheel hit one of those forms. The form twisted upward and sliced the oil pan on the large cement truck. In seconds, all of the engine oil drained out of the motor and onto the ground. The motor was

running at full speed and was under a full load. Because all of the oil had leaked out and the pistons were running in dry cylinders, the engine began to knock very loudly. Even though the truck driver turned off the engine as soon as he was aware that something was wrong, the engine was damaged at a cost of \$20,000.

RMC's insurer paid for the loss and immediately began subrogation proceedings. Upon the instigation of the subrogation proceedings, RMC's insurance agent objected, quoting the following from RMC's Insurance Services Office's (SO) Business Auto Policy, Form CA 0001 1293:

Transfer of the rights of recovery against others to us. If any person or organization to or for whom we make payment under the Coverage Form has rights to recover damages from another, those rights are transferred to us. That person or organization must do everything necessary to secure our rights and must do nothing after accident or loss to impair them.

Upon checking the construction contract documents, it was determined that RMC had not signed the contract addendum, whereby the contractors signed the subrogation waiver clauses. RMC said that it would have no problem with signing the subrogation waiver immediately. After learning of this, the insurer told RMC that if it signed the waiver after the loss, there would be no coverage for its loss.

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

As is typical at some construction sites, there were curious passersby (straw bosses) who would watch the

construction work. General Contractor, Inc. (GCI) had signed the subrogation waiver. At the same time that GCI was lifting something with a large crane, a truck for Lumber Yard, LLC was delivering lumber to the site. The truck came too close to the crane, hitting it and causing the crane to drop part of its load. Part of the load fell outside the fence that marked off the construction site. Several of the “straw bosses” standing outside the fence were injured and brought claim against GCI. Upon paying the loss, GCI’s insurer proceeded to process a subrogation claim against Lumber Yard. GCI objected to the subrogation.

Here is the clause from ISO’s Commercial General Liability Coverage Form CG 0001 01 96 that the adjuster quoted when explaining why they could subrogate:

Transfer of Rights of Recovery Against Others to Us. If the insured has rights to recover all or part of any payment we have made under this Coverage Part, those rights are transferred to us. The injured must do nothing after the loss to impair them. At our request, the insured will bring “suit” or transfer those rights to us and help us enforce them.

The subrogation waiver that had been signed applied to the contractors working on the job. Contractors such as electricians, mechanicals, heating and air conditioning, and carpentry who were on the site almost full-time had signed the subrogation waiver. No one thought to have the suppliers also sign the subrogation waiver as well. On any given day, one or more firms delivered items to the construction site. They had not signed the subrogation waiver. Various common carriers delivered material to the site. Some of these

trucking firms were bringing just one or two packages of materials. Others were bringing very large loads. For instance, the common carrier who was delivering the heating and air conditioning equipment brought in two full truckloads of equipment for the construction project.

The point is that, at many construction sites, there will be one or more firms that have not signed any waiver of subrogation form. It is because of this type of situation that insurers will not give a blanket waiver of subrogation. This leads us to the wording on a Commercial General Liability (CGL) coverage form endorsement.

Subrogation waived prior to a loss is permitted by the Commercial General Liability coverage form endorsement. Interestingly enough, there is also an endorsement for the Commercial General Liability coverage form that can be used to waive the subrogation clause. Waiver of Transfer of Rights of Recovery Against Others to Us (Form CG 2402 1093) can be added to the commercial general liability coverage form, and the wording follows:

We waive any right of recovery we may have against the person or organization shown in the Schedule above because of payments we have made for injury or damage arising out of your ongoing operations of your work done under a contract with that person or organization and included in the products completed operations hazards. This waiver applies only to the person or organization shown in the Schedule above.

Waiver of subrogation prior to a loss is permitted by the Commercial General Liability coverage form. That waiver depends upon a contract separate from

the CGL policy. It is possible that the contract waiving the subrogation is flawed in some way, thereby allowing an insurer to subrogate despite the contract. Attaching an endorsement, CG 2404, to the Commercial General Liability coverage form is a better way. Although the subrogation waiver will still be in the construction contracts, having subrogation waived by attaching an endorsement to a policy is a way of reinforcing or precluding any error(s) in the construction contract waiver of subrogation wording.

SUBROGATION WAIVER ENDORSEMENT

There are separate subrogation waiver endorsements for workers compensation and commercial general liability coverage forms. However, none of the other forms has a specific form to waive subrogation. While this may be very difficult to accomplish, it is recommended that a specific waiver of subrogation endorsement be attached to every insurance policy for every contractor at the construction site. Insurers have blank endorsements that they can use to accomplish this.

This is a partial list of the types of insurance policies that may need to be endorsed with a subrogation waiver endorsement: builders risk, installation floater, contractors' equipment, workers compensation, automobile umbrella, and commercial general liability.

UMBRELLA

If your insurer has an umbrella endorsement for waiving subrogation, by all means use it. Should your umbrella carrier not have a specific waiver of subrogation endorsement, it is suggested that they use a blank endorsement and wording that tracks

with the CGL's waiver of subrogation form.

UNDERWRITING

Although some underwriters are reluctant to provide a waiver of subrogation endorsement, there are several reasons why providing one is not an underwriting problem. As late as the early 1970's, subrogation was not a normal procedure in the insurance business. Subrogation was rarely, if ever, carried out. No underwriter considers subrogation while underwriting an account. Underwriters do not think, "Any loss that this account sustains can be subrogated so, therefore, I will not have a bad loss ratio on this account." With subrogation clauses in operation, underwriters are just as likely to be subrogated against as they are to subrogate against someone else. Many of the coverage forms' subrogation clauses already allow subrogation rights to be waived prior to a loss. Providing coverage by referring to a contract other than the insurance policy can provide difficulties in interpretation. Adding a subrogation waiver endorsement simply puts the identical feature directly into the insurance contract. If waiver of subrogation applies to all of the contractors at a construction site, an underwriter's exposure has not changed.

SUMMARY

- Subrogation exposures exist at construction sites because many different firms work in close proximity.
- It is possible to have a subrogation claim not be covered by insurance.
- An uncovered subrogation claim can bankrupt a contractor.
- Construction can be delayed

- when a contractor goes bankrupt.
- Many insurance policies allow waiver of subrogation if the waiver is in writing prior to the loss.
 - Workers compensation and commercial liability contracts have waiver of subrogation endorsements that can be added to their respective contracts.
 - It is recommended that a waiver of subrogation endorsement be added to every policy for every insured at a construction site.

The Management Methods Committee gratefully acknowledges and thanks LeRoy Utschig, CPCU, CLU. ARM for preparing this bulletin.



Bulletin

What Are the Pros and Cons of OCIPs and CCIPs?

Introduction

A “wrap-up” is a centralized and controlled insurance and loss control program, usually for a single project, which covers the owner, general contractor (GC) and all subcontractors.

There are two commonly-used types of wrap-ups. One is sponsored by the owner, which is called an Owner Controlled Insurance Program (OCIP), and the other, sponsored by the general contractor, is called a Contractor Controlled Insurance Program (CCIP). The majority of wrap-ups are owner-sponsored (OCIP).

An owner or general contractor sponsors a wrap-up because it offers the possibility of a significant cost savings by combining the insurance for all parties on the project into one policy.

Also, unlike non-wrap-up projects where the stronger parties (owner/general contractor) contractually divert as much liability as possible to subcontractors, the OCIP sponsor can control the defense on a liability claim. This is far more efficient than trying to compel the insurance carriers of the subcontractors to accept a claim and defense of the owner, general contractor or both.

While some subcontractors are infrequently allowed to opt out of enrolling in a wrap-up, those situations are rare and participation is usually non-negotiable—if the subcontractor wants the job, enrollment in the wrap-up is mandatory.

Project Performance

As a subcontractor working on projects which are managed under a wrap-up, there are considerations regarding insurance coverage and contractual duties to the project. Some of these include reporting all payroll, claims on the project, providing updated certificates of insurance and post wrap-up coverage. In addition, there are some things to remember including review of loss runs and insurance once the project is completed and off-site coverages.

The contract terms of most wrap-ups include necessary items for the firm and for the sponsor. Subcontractors are strongly advised to request and review the wrap-up manual provided by the owner or general contractor. However, subcontractors may find that it is usually not very detailed which makes it difficult to evaluate the policy exclusions.

Payroll must be reported to the project, a requirement of the CIP insurance carrier, but the subcontractor should also ensure all payroll is reported to the sponsor of the wrap-up. The subcontractor will be asked to furnish the payroll estimates, by classification, for the project, and then compute the premium that the subcontractor would have paid under its own program for doing the job. The sponsor will then deduct the amount of premium determined from this calculation from the subcontractor's contract price.

The state bureau should be notified of all payroll reported to the project carrier and subsequently by the wrap-up. **It is important to report the correct reported payroll to the bureau as it is calculated against the losses of the subcontractor's company to reduce its EMR.** The administrator of the wrap-up should be contacted to verify all payroll has been reported. While the reporting of payroll under a wrap-up may take up to 20 months to be shown by the bureau, subcontractors should direct their agent to produce their EMR worksheet to verify all payroll is reported and reported under the correct class codes.

Claims under a wrap-up must be reported to the sponsor's insurance carrier. While the costs of the claims are paid by the sponsor's carrier, subcontractors should ensure the claim is for its employees and not those of another subcontractor. Be sure to request loss runs from the wrap-up sponsor twice per year during the construction and for a couple of years after completion of the project. Proactive agents will review these loss runs and the losses/reserves of their client companies as they impact the insurance underwriting of insurance renewals for years.

Certificates of insurance for off-site insurance should be forwarded to the CIP sponsor. While the project is providing subcontractors with workers compensation, general liability and excess coverage for the project, the contract requirement still mandates that subcontractors provide evidence of off-site coverages that meet the terms of the general contractor. In addition, be sure to obtain the insurance certificate of the wrap-up for each year and maintain all payroll records to the project as they will be needed at a future payroll audit to verify coverage and reporting of that project payroll in lieu of reporting to the insurance carrier.

All change order pricing should be calculated correctly, either including the cost for insurance if a back end true-up is required, or exclusive of insurance if the change order hours will not be included in the final audit calculation. The sponsor will award contracts to subcontractors based on the bid documents. The sponsor will then have the winning subcontractor and its agent complete some forms which indicate the rates on the subcontractor's general liability and workers compensation policies.

What to Watch For

While wrap-ups are good for the sponsors, they are not necessarily beneficial for subcontractors.

Exclusions - Buyer Beware

Wrap-up liability policies increasingly contain more and broader exclusions. Subcontractors should make every effort to determine what the policy terms will be before bidding the job. In that manner, the subcontractor can make a complete and accurate comparison to its corporate coverage and, thereby, a complete and accurate assessment of the risk of the present procurement.

But, making this determination is usually difficult or impossible because the sponsor either will not divulge the specific policy terms or it does not have the terms at bid time. It becomes a “buyer beware” situation for subcontractors bidding the job.

It is typically impossible to get a copy of the wrap-up general liability policy in advance of the bid. If the subcontractor is not given a copy of the policy before or after the bid process, the sponsor should allow the subcontractor to view it in the sponsor’s offices. This opportunity usually will not come until after the contracts have been awarded. If the subcontractor is only allowed to view the policies, but not make copies, the subcontractor should take its agent along for the review.

A potentially high risk factor for subcontractors in wrap-ups is that their own liability policies may contain a complete wrap-up exclusion. Each subcontractor should consult with its insurance agent to determine if its general liability policy has such an exclusion. If there is a total exclusion, any claim not covered by the wrap-up policy will likewise be excluded from the subcontractor’s policy—no coverage anywhere, an unacceptable situation.

If the subcontractor’s liability policy has a total wrap-up exclusion, its agent should try to negotiate a modification that will afford contingent coverage under the subcontractor’s policy. Such an endorsement would respond to wrap-up claims if the wrap-up excludes the loss or if the wrap-up limits have been exhausted.

Some wrap-ups will have an exclusion for damage to the work itself (including that which is caused by the subcontractor’s negligence). If there is not a proper mutual waiver of subrogation in the job contracts, the

subcontractor could be liable for the entire amount of the damage, unless it has either no wrap-up exclusion or contingent wrap-up coverage on its own general liability policy.

Deductibles

Wrap-ups usually carry large general liability and workers compensation deductibles for the sponsors, and in some cases, the sponsor will make the subcontractors liable for a portion of this amount—maybe the first \$10,000. This is more likely to occur under the general liability than the workers compensation policy. Before the bid, the subcontractor should determine if it might be faced with paying part of any general liability or workers compensation deductibles.

Builder’s Risk Policies

Another area of concern is the builder’s risk policy. This policy covers property (the work) in the course of construction and typically names the owner, the general contractor, and subcontractors at any tier as named insured.

Builder’s risk policies on wrap-ups typically have high deductibles, often \$50,000 or \$100,000. Unlike the deductible under an OCIP general liability claim, the entire deductible is typically borne by the responsible party. This could present a difficult financial burden for a subcontractor if held responsible for paying the entire deductible. If the subcontractor carries an Installation floater as a part of its own program, this policy should be amended to “buy down” the large builder’s risk deductible without invoking a contributing insurance clause. The subcontractor’s agent should be able to explain in greater detail why this is critical.

Other liabilities not covered

Coverage is not usually provided under a wrap-up for pollution and professional liability. Any exposure to hazards

covered by these policies should be carefully reviewed between the subcontractor and the subcontractor's insurance agent.

The subcontract agreement with the general contractor must also be scrutinized, where there are likely to be other terms and conditions affecting the insurance coverage.

The subcontractor will still have to produce evidence of general liability, auto and workers compensation coverage for all activities away from the project site, such as shop fabrication work.

Lack of Coverage for Suppliers

Another concern about the wrap-up is the lack of coverage for suppliers. Because suppliers are not considered contractors on site, care should be taken to make sure that the wrap-up has a strong contractual risk transfer. Hold harmless and indemnity agreements become more important as this project is excluded from your primary program.

Post Project Considerations

Once the project insurance has ended and delivered to the owner, any additional work for punch out or warranty should be under the subcontractor's own insurance. All payroll for this work must be turned into the subcontractor's insurance carrier and all claims will be paid under the subcontractor's insurance.

Considerations regarding insurance coverage should include the possibility that wrap-up coverage may be cancelled prior to completion of the work. An experienced insurance broker who manages wrap-ups may best provide advice and endorsements to the subcontractor's primary insurer to ensure that optimal coverage is in place for claims that may occur in the future.

Wrap-ups usually provide completed operation coverage for a specific time after the project has been delivered. Since coverage for this project is usually excluded under your insurance, care should be taken to address the legacy claims issues after the completed operations period.

Liability for warranty work performed after the subcontractor's enrollment in the wrap-up terminates is not covered under the policy, which could be problematic. If a claim later occurs due to a subcontractor's work, it could be difficult to determine whether it arose from the original installation, or from warranty work. Worse, if the subcontractor has a total wrap-up exclusion on its own general liability policy, a claim arising from warranty work will not be covered under either the sub's policy or the wrap-up.

All wrap-ups provide coverage for the project duration as well as for a fixed number of years after the project is completed. This is usually noted in the wrap-up manual, and should be determined at bid time, if it is not. All available coverage afforded under the wrap-up will terminate at the end of this period.

Conclusion

When bidding a job, know the type of wrap-up required from all management levels. Estimators, sales persons, controllers and risk managers should know the type of project with regards to whether it includes the cost of insurance, it is net of insurance or it is a combination of credits to the project wrap-up sponsor. Your insurance agent should review every bid that has a CIP program contemplated, as the cost of insurance can be the difference between losing a bid or reducing profit to the project if incorrectly identified.

Definitions

OCIP: Owner controlled insurance program. This is where all parties of a project (owner, general contractor and subcontractors) are covered under a single policy—one general liability policy (with higher limits) and usually a workers compensation policy.

CCIP: Contractor controlled insurance program. Similar to an OCIP, except it is sponsored by the general contractor instead of the owner.

Wrap-Up: Another name for a CCIP or an OCIP.

OCIP or CCIP Sponsor: The entity (owner or general contractor) who puts the project insurance coverage together with their broker and insurance carrier.

Contractor: Usually refers to the General Contractor for the CIP.

OCIP Broker: The insurance agent/broker who is responsible for securing and placing the insurance coverage for the sponsor of the CIP.

Subcontractors: Subs to the GC who are performing work at the defined work site under the direction of the GC and participating in the OCIP.

Statute of Repose: The amount of time after which a cause of action cannot arise. If an injury occurs after this time has lapsed (5-10 years in most jurisdictions), the contractor is generally not held liable for claims arising from their work. In the DC area, Virginia's statute of repose is 5 years; DC and MD are 10 years.

Products/Completed Operations

Aggregate: This limit on the Wrap-Up is one amount of coverage to cover any and all claims which occur after completion, and during the statute of

repose. This limit is not replenished annually.

Builder's Risk Policy: Property insurance covering the project while in the course of construction. All of the parties in the project (owner, GC, subs at any tier) are included as named insureds. A substantial deductible usually applies for each loss.

Checklist

1. Determine the builder's risk deductible and how responsibility is apportioned.
2. If one subcontractor causes a loss to another subcontractor's work, what is the extent of coverage and responsibility for deductible under the OCIP?
3. Confirm with the sponsor that the liability coverage provides for separation of insureds. This means that each enrolled entity in a wrap-up will be afforded its own separate defense in the event of a claim. This reduces the potential conflict of interest that could occur under a single, consolidated defense for all parties.
4. The subcontractor should have its agent double check its wrap-up enrollment form to make sure all rates, calculations and other information is correct.
5. Make every effort to eliminate a wrap-up exclusion from the subcontractor's liability policy, or to at least obtain contingent coverage.
6. Verify the number of years of completed operations coverage provided by the wrap-up.
7. Notify the subcontractor's insurance carrier(s) to make sure they will deduct the payroll for wrap-ups from their final audit.

The Management Methods Committee gratefully acknowledges the assistance of:

Michael C. Cash
Insurance Associates Agency, Inc.
Senior Account Manager
10201 Fairfax Blvd.
Fairfax, VA 22030
703-352-7333
703-352-6490
mcash@insassoc.com
<http://www.insassoc.com>



Bulletin

Subguard/Subcontractor Default Insurance

INTRODUCTION

What do you do when the general contractor (GC) on a project you were just asked to bid calls for very detailed financial information to qualify your company under its Subguard policy? Your first response may be, "What is Subguard and why does this contractor need all of my detailed financial information?"

Subguard is a trademarked name for a Subcontractor Default Insurance (SDI) program marketed by Zurich North American Insurance Company. Subguard and Subcontractor Default Insurance are terms that can often be used interchangeably by many in the insurance industry and are becoming more widely used in the construction industry.

These programs are touted by the insurance companies to large general contractors, at-risk construction managers and design-build firms as an attractive alternate to the traditional surety programs. For purposes of this bulletin, however, we will refer to the purchaser as the "general contractor."

The programs started around 1996 at a time when the surety market had contracted and parties were looking for

other options to provide protection from subcontractor default. Under SDI, the general contractor, construction manager or design-build firm purchases the policy directly from the insurance company. The two-party agreement is solely between the insurance company and the purchaser." In contrast to the historical surety programs, SDI is intended to shift a large portion of the risk associated with subcontractor default from purchaser the insurance company by means of the issued policy.

These programs vary between the insurance carriers but in general are typically reserved for large construction companies that subcontract at least \$75 million or more of work on an annual basis. Moreover, they are used in the private contracting world due to the federal Miller Act and various state statutes applicable to public construction projects. Public projects will still typically be subject to traditional surety bonding.

SUBGUARD VS. PERFORMANCE AND/OR PAYMENT BONDS

Subguard policies differ significantly from the traditional Performance and/or Payment Bonds issued by the surety companies. Under a Performance and/or Payment Bond, the issuing

surety company guarantees to one or more parties the performance or payment of another party under a construction contract.

To the extent that a subcontractor or vendor who has issued a Performance Bond and/or Payment Bond fails to perform or defaults under the contract, the surety company has the obligation to complete the work under the Performance Bond and to pay any outstanding invoices or payment obligations under the Payment Bond. The surety essentially steps into the place of the defaulting contractor and will either perform the work or subcontract with others to perform the work. As a result of this obligation, the surety will be entitled to any remaining payments due under the contract to assist in offsetting its cost. To the extent the remaining amount left under the contract is insufficient to address the completion of the project, the surety company will seek to enforce the indemnity or guaranty agreement that it received from the subcontractor for whom the bond was issued.

In contrast to a surety program, under Subcontractor Default Insurance the coverage provided is subject to a large deductible which could be \$500,000 to \$1,000,000 or more. Additionally, since it is the general contractor, construction manager or design-build firm that has the obligation under the large deductible, they are the responsible party to pre-qualify the subcontractors they elect to cover under the program. As a result, the general contractor, construction manager or design build firm will implement a detailed qualification process in order to screen subcontractors for coverage and ultimately the decision to accept or deny them under the policy will typically be theirs.

Since the general contractor has deductible liability, they are viewed as being in the best position to evaluate and address very quickly subcontractor failures. Under the traditional surety relationship, the surety is responsible for reviewing the creditworthiness of the contractor in deciding whether or not to issue a bond.

SUBGUARD ADVANTAGES/ DISADVANTAGES

One key advantage to the general contractor under Subguard is that it can take over for the defaulting subcontractor in a short period of time with coverage provided for direct and indirect costs resulting from the subcontractor's default. The general contractor is not required to finance the completion of the job on an interim basis as they would under a surety bond situation since payments made from the insurance company under a valid claim are typically made within thirty (30) days of providing documentation of the loss. In contrast, the surety will undertake investigation that could add months to the project as they will be slow to act while they perform a full investigation. This creates additional liability on the general contractor as they often cannot wait for an answer and must maintain job progress.

SDI is advantageous to the subcontractor since it preserves the subcontractor's bonding line by removing the need to issue a bond. As a result of the last downturn in the construction industry, the surety landscape further contracted and fewer companies are writing surety bonds today. Therefore, the availability of bonding lines has been diminished, leading to more stringent requirements from the remaining surety companies. In addition, bonding lines often require a broad indemnity agreement and/or a personal guaranty from the

shareholder(s) or owner(s) of a contractor or some other form of pledged collateral. Since Subguard is a policy procured by the general contractor, there is no cost to the subcontractor nor is any personal guaranty or other security required to be provided.

However, it is important to note that the Subguard carrier only has an obligation to the insured (the general contractor) and there is no independent obligation to the subcontractor. If a general contractor fails financially, neither the owner nor the subcontractors will be protected or covered by the policy. Under such a scenario the subcontractor would not have a claim against the insurance company while in the surety situation they would have a claim against a bond issued by the general.

From the project owner's viewpoint, lenders typically look favorably on projects that have a Subguard policy in place as there is less concern for defaulting contractors and this may lead to quicker loan approval. Since the work is funded by the insurance company, the project is able to move forward with less of an impact to the schedule.

Further, while a surety bond typically provides for one year of construction defect coverage, SDI often covers latent defects for up to 10 years. With Subguard in place on a project, the general contractor will have an easier time securing a performance bond from their surety if one is requested by the owner. Moreover, since the bond and insurance costs are passed on to the owner through the cost of the work, the cost for the SDI is less than buying individual bonds from each of the subcontractors as they are often covered under one policy.

COSTS

The typical SDI premium can run from .4% to upwards of just over 1%, depending largely upon the selected deductible and other factors related to the general contractor's qualification procedures. The higher the deductible the lower the policy cost. Under a high deductible policy that includes loss fund or retrospective premiums, the GCs can often pass through to the owner the full cost of the policy with a potential return of premium if no claims are made under the policy. Since the general contractor is driving the pre-qualification process and the management of the subcontractors, if managed properly, this can often lead to additional profit on a job for a general contractor which is a large reason these programs are becoming more attractive.

An additional attraction to the general contracting community is that Subguard will cover costs of correcting defective work, delay costs, payment to suppliers and vendors, delay costs, liquidated damages, extended general conditions as well as other costs associated with a subcontractor's default. Some of these costs would not typically be covered under the traditional surety program.

This bulletin is not intended to be legal advice. A person should seek local counsel for specific information regarding the information found in this bulletin.



Bulletin

Builders Risk & Installation Floater Insurance

Introduction

Imagine this scenario.

Your contracting company is working as a subcontractor to a General Contractor (GC) on a commercial construction project. The project is nearing 50% completion. You have installed all the rough-in piping and have set three of the six roof-top units. Some of the plumbing fixtures are stored inside the building, and the three remaining rooftop units are stored at the site away from the building.

One night, a fire breaks out in the uncompleted building, destroying everything except the roof-top units stored outside. Who pays for the plumbing fixtures stored inside the building? Who covers the cost of reconstructing the building to the stage it was in before the fire? Is there insurance to protect against this risk?

A mechanical contractor's general property insurance will typically cover property owned by the contractor, such as the contractor's real estate and personal property including tools, office furniture, data processing equipment, fleet vehicles, etc. A more complex element of property coverage relates to property located at the jobsite, being

incorporated into the construction site (pipe, fixtures, HVAC equipment, etc.) or materials and equipment being transported to the jobsite. That property is usually not covered by the normal commercial insurance policy's property coverage.

Insurance coverage for property directly involved in construction carries unique risks due to the fact that this property has many different owners, including the building owner, general contractor and sub-contractors. Ownership of the property is usually defined by the contracts involved and may change hands during the construction process. This is a key point! For example, it is common practice that ownership of the material will transfer to the owner when the material is incorporated into the building (the pipe is hung in the hanger), but every contract may assign this ownership differently.

In addition to the different parties involved, property can be stored at the site, off-site or in transit. Also, risk of loss on a jobsite is higher than for property that typically resides in an office or a shop. Jobsite property in incomplete structures is more

susceptible to the elements. The insurance industry has developed two basic types of policies to address these risks—builder’s risk and installation floaters.

Builders Risk

Builder’s risk policies cover the on-site property loss exposures associated with construction, a structure with sub-limits for property in transit or in temporary storage. The construction contract will typically assign the responsibility for purchasing the builder’s risk insurance. The responsibility for purchase of the insurance does not necessarily follow the transfer of ownership. While it may be customary for either the owner or GC to purchase builder’s risk insurance, it is important to understand the terms of the contract so that it is clear who (if anyone) is required to purchase the policy.

Usually a builder’s risk policy will have limits equal to the completed value of the project. The policy would cover “Special Perils previously known as All Risk” (meaning loss is covered unless specifically excluded, e.g.: 1. Loss by War, 2. Nuclear Explosion, etc.) which is broad in scope and fairly typical. It can be extended to also cover perils of Flood & Earthquake. The coverage limits and coverage scope may also be dictated by the contract.

Builder’s risk policies may also carry deductibles. Some contracts will restrict or eliminate deductibles, but some subcontract forms will also shift the cost of paying the deductibles to the subcontractor.

One final and important point related to builders risk concerns “who is an

insured” and waivers of subrogation. . It is important that the builders risk policy cover the owner and all contractors working at the site, plus potentially some material suppliers. As an insured under the builder’s risk policy, (you as a subcontractor), you cannot be subrogated for losses under this coverage.

Installation Floaters

An installation floater provides coverage for the installation of a system or specific part of a construction project (e.g. plumbing, HVAC, electrical, etc.), but the coverage extends only to specific property for a specific contractor during construction. It typically covers property while in the course of construction that is not yet accepted by the owner until completed, tested and placed into use. The construction contract will define when these materials or system are accepted as part of the building and to then be part of the builder’s risk. Remember... the ownership transfer will be established by the construction contract.

The installation floater is purchased by the mechanical contractor. It is typically not required by contract, but protects the contractor for loss of construction property owned by the contractor at the site or in transit. The value is determined by the contractor based on the contractor’s unique set of circumstances and may be amended due to jobsite factors. Installation floaters will typically carry deductibles based on the contractor’s appetite for sharing risk.

But...What About the Fire?

Regarding the above scenario, assume the following:

1. The prime contract required the owner to procure and pay for a builders risk policy covering the cost of construction and insuring the GC and all subcontractors. The owner did have this insurance in effect.
2. The prime contract and the subcontract dictated that materials incorporated into the building become the property of the owner.
3. The mechanical contract carried an installation floater on all of the workload with limits in excess of the value of the fixtures stored on site.

In this case and with these assumptions, the owners' builders risk policy would provide proceeds for the owner to rebuild the building to the state it was in before the fire. This would include the cost of the installed pipe and rooftop units because ownership transferred to the owner when the materials were installed. The contractor's installation floater would provide coverage to the mechanical contractor to replace the fixtures stored inside the building because this material was still owned by the contractor. All proceeds would still be subject to appropriate limits and deductibles. The situation would change depending on any changes to the assumptions and the specifics of the contract.

Conclusion

It is suggested that contractors:

1. Purchase company-based installation floater coverage with limits based on your typical estimated risk of materials in transit or stored on-site awaiting installation.
2. Review the insurance provisions of your contracts. Know when ownership of construction material transfers to the owner. Be sure that the owner or GC also has the responsibility and has purchased a builders risk policy. If not, the contract should allow you to recover the cost of procuring this insurance.
3. Obtain a copy of the builders risk policy or evidence of coverage including deductibles.
4. Know who is responsible for payment of a builders risk deductible. Be cautious of a contract that shifts the risk of a deductible payment to the subcontractors and the possibility that the deductible is large.
5. Be sure that the construction contract includes a mutual waiver of subrogation regarding the builders risk policy.
6. Discuss these issues with your insurance agent during your annual renewal process and whenever you are concerned with specific jobs.

The Management Methods Committee wishes to thank Steve Federer of the Hylant Group, Columbus, OH for his assistance in the completion of this bulletin.



Bulletin

Team Management in Construction

THE TEAM ORGANIZATION

The “team concept” for building a project has, in the past, been a “design and build” concept. The team, as a unit, works together and accomplishes the design and construction of the project. However, the mechanical contractor’s involvement in the project may not be as a design firm, but rather as the constructor furnishing input as a contractor regarding costs and construction considerations.

The usual team will minimally consist of the owner or developer, architect, engineer, general contractor, mechanical contractor, and electrical contractor which will cover all of the specializations necessary to design and build the job. Note that the owner of the job is considered a member of the team, a very important element for efficient and rapid resolution of any matters requiring the owner’s decision.

There may be additional organizations in the team that contribute their expertise in a certain specialization, depending on the magnitude and importance of that work to the design/development effort. For instance, the structural engineer, and possibly a structural firm, may be involved. Another member may be a fire protection contractor since fire protection systems must be considered for particular types of buildings. The early

involvement of the fire protection contractor in the team for those kinds of projects is essential.

HOW TEAMS ARE FORMED

It is preferable to be with a selected group for the development of a large building or factory, but this is unusual and, most likely, many contractors have not gone through a team job from start to finish.

Most often, the mechanical contractor is one of several companies invited to present their qualifications and be interviewed. The mechanical contractor may respond on an individual basis to an invitation from a general contractor who may have already been selected, or he may be part of a team of contractors making the sales pitch.

Either way, the invitation usually requests certain specific information about the mechanical contractor’s company including general information, basic organization, annual income, list of projects under construction, backlog in dollar volume, financial statement, references, and the names of employees planned for the job.

Other questions may relate to how the contractor would organize the job, how he would work with the designers, his approach to handling the construction,

his cost control and labor monitoring control systems, his approach to scheduling and his familiarity with CPM or PERT systems.

While the mechanical contractor might be involved in a team through any one of a number of circumstances, he might form a team for a particular project or he might be picked along with other contractors by the owner. Most frequently, the opportunity happens because a general contractor knows or is acquainted with the mechanical contractor or because the GC needs a firm with the mechanical contractor's qualifications.

TEAM QUALIFICATIONS

The following four qualifications must be met for a team to handle the mechanical contracting responsibilities of a project:

1. Estimating capability
2. Engineering capability
3. Experiences with the team concept
4. Construction capability.

These are not necessarily discussed in order of importance.

Estimating capability is extremely important to determining the various costs necessary to test various design approaches and arriving quickly at the right numbers for comparison. The contractor members of the team must have extensive background in pricing buildings of all types and, most important, must have cost records from past work and project bids.

It is often helpful to be able to provide a fairly realistic opinion of possible cost or cost differences or, at least, which choices would be the most expensive, and the magnitude of differences between them. In some team jobs, the estimating requirements begin with a budget derived from the sketchiest of information and this estimate is refined

several times as more information and actual layouts become available. The process continues until the time when drawings and specifications are fairly complete and definitive, and the information is available for a conventional estimate of the project.

In other cases, the final price of the job must be set from only a plot plan and/or representative floor plans and all contractual information is available for a conventional estimate of the project. In other cases, the final price of the job must be set from only a plot plan and/or representative floor plans and all contractual information must be established, including a firm price or maximum price, before any other information is available. As indicated, estimating is one of the most difficult, but also one of the most important, capabilities that a mechanical contractor must provide to the team.

Engineering capability is also essential to the design of HVAC and plumbing systems. Understanding system options, code requirements, and the practical considerations of the various types of plants or systems that might be mentioned above constitutes the engineering approach to estimating the cost and degree of difficulty from a mechanical contracting standpoint. It is an important capability for the team.

Experience with the team concept is helpful, but not necessary, to being a team member. If the contractor has worked successfully with other individual team members on previous projects, that experience can substitute for experience with the team concept. It is more important that the contractor have the essential estimating and engineering capabilities.

The team concept is not an inflexible, arbitrary way of doing things. However, the job requirements and the leading

team members will most likely establish the program to be followed. Therefore, it is important for the contractor to understand the program, schedule of meetings and requirements as they pertain to the mechanical contractor's responsibilities to the project and the team. The main thing, then, is for the contractor to work seriously and diligently on the information he is to have available and to be well prepared with the assigned work and any other information or concepts he wants to propose. The best team members and the ones most appreciated are those who have done their homework well, and not necessarily those who can boast of extensive experience.

Construction capability is also absolutely essential. After all the other preparatory work is completed, top performance is what will cap off the effort for a successful project.

THE OPERATION OF THE TEAM

1. Establish Preliminary Design and Criteria

The purpose is to define the type of structure and probably the type of construction needed. For instance, will the building need a steel frame or poured concrete? What are the building's dimensions; the number of square feet, number of floors, height information, etc. Where will the building be located and on what specific piece of property? Once the building site is determined, an investigation of the area must be conducted for utility structures.

The schedule for the project, from the beginning of conceptual planning and estimating through completion of working drawings and construction, should be established. Decisions on design criteria governing HVAC systems and plumbing must be made, at least on a preliminary basis. The location of equip-

ment rooms and central plants and information on any special usage areas, such as computer rooms, cafeterias, etc., must be established. The arrangement of lease areas must be determined and it will help considerably to obtain a copy of the proposed lease agreement between the owner and his tenants.

2. Preliminary Budget

At this point, it may be appropriate to establish a committed price on the project. There are two approaches to setting budgets that are generally used. First, the owner and his consultants establish a budget for the entire project which, at that cost, makes the project financially feasible. Then, the budget is divided into the various items it covers with an allowance for each element: the land and associated costs; architect's fees; engineering fees; general construction; and mechanical and electrical. If each part of the overall project is within its allocation of funds, the project is feasible. In this approach, the cost of the project is the beginning, and design and planning to fit that cost are the functions of the team.

Another approach is for each of the team members to propose a budget for the portion of the project under his responsibility by either following criteria for the job or initiating criteria in the explanation of the budget proposed for each phase. The total budget is then compiled and tested by the owner and his financial people to determine if the project is feasible. If the budget is determined to be an acceptable (understanding that this budget is actually developed prior to design), the team then works with the designers to design/develop the project to the established budget. During this process, factors may come up that would substantially increase the project costs, requiring that the team either postpone or abandon the project, or repeat the process.

3. Feasibility Analysis

The first factor involved in the feasibility analysis is the pro forma. This is the developed estimate of the owner's total costs, as compared to the revenue he anticipates making for determining whether or not the proposed project will produce a acceptable profit. The feasibility analysis also considers the availability of financing, which is closely linked interlocked with pro forma.

It is normally not the duty of the mechanical contractor to work the pro forma, but he might be involved in some of the estimates of tenant finish or unit cost for various tenant work or possibly in maintenance and operating costs.

4. Construction Start Before Completion of Working Drawings

Usually a job on the team basis will start as soon as the owner is satisfied that his project is feasible and that the costs are correct. The final commitment on financing and availability of funds is also a determining factor. Construction can be started as soon as foundation drawings are being prepared. This will result in the building being completed and producing income well ahead of a project which is contracted under the bid system.

5. Working Drawing Preparation

Team members work in close cooperation to control the costs as the construction documents are being prepared.

6. Final Price and Contract

Except in the case where a firm price is negotiated on the first preliminary drawings, the final firm price is estimated from the completed working drawings to determine that the job is designed within the budget originally established or possibly to see if savings have been gen-

erated. It is desirable at that point to receive a fixed price contract for the job. This will also provide the owner with a guaranteed cost.

There are also jobs where the guaranteed maximum is established with a fixed fee and usually with a share of savings. The optimum teamwork occurs when an "incentive type" contract is used where the owner shares any savings that might be generated.

7. Schedule

Jobs run on a team basis should be carefully scheduled under the supervision of the general contractor for the best results.

8. Construction

The team spirit can prevail throughout the entire project and all of the team members benefit from the maximum cooperation.

ADVANTAGES OF THE TEAM APPROACH

1. Before the expensive detail work is undertaken, the team checks out the job for a realistic balance between the technical considerations and the necessary economical considerations. Thus, the owner or developer can determine whether his project is feasible on a cost-to-income basis.
2. Financing can be arranged based on a firm committed price instead of budget figures that might ultimately prove to be inaccurate.
3. Early project completion is possible because construction can begin and material can be procured while final construction documents are being completed.
4. The contracting side of the team will

have a voice in controlling construction details and techniques to produce more building for less money in less time. There are many examples where choice of materials or choice of job configuration or other changes which arise in the design/development process substantially reduce job costs. It can be shown that the team concept and an "incentive type" construction contract afford the owner many benefits in these areas over bidding of jobs.

5. Under the "team" system of construction, all possible advantages are extended to the client to the end that the lowest possible project cost can be achieved. It can be readily shown that this program and an "incentive type" construction contract afford the client the *maximum* benefit of competitive buying, the *maximum* control of the equipment and materials to be used in his building, the *maximum* assurance of on-time and on-budget delivery, and the best possible conditions for top efficiency and performance of all individuals and firms involved in the project.

DISADVANTAGES OF THE TEAM APPROACH

1. To participate fully in the team, the mechanical contractor must have a staff of highly competent people that are immediately available to the project. Many times the quality of the mechanical contractor is judged by his proposal and his representatives.
2. If the mechanical contractor attempts to participate in every project that he hears about, he will soon find that many of these are "blue sky" and that he has spent a lot of time, money, and travel expense for nothing. Be selective!

3. If other team members are based in other cities, many out-of-town trips may be necessary. If all pre-contract expenses are not reimbursable, the mechanical contractor may end up with a low profit job, even though he is part of a successful team.
4. The paper work on a large cost-plus project of this type is staggering. Unless all of the accounting and billing time is reimbursable, the mechanical contractor could have a large hidden expense. This applies to your controller's time when audits are required.
5. Many owners and general contractors feel that a negotiated job should carry a low fee. This is not reasonable because of the expertise required of the mechanical contractor, as outlined above, and the fact that the contractor must supply his best project engineers and supervision to the job because of the team relationship. If the mechanical contractor cannot get a reasonable return from the job, he may be better off pursuing other types of contracts.
6. On large projects, the changes may come so fast that the mechanical engineer cannot handle them. At this point, the mechanical contractor may have to get involved in drafting and layout to keep the job moving. Make sure that you have these personnel available and that their costs are reimbursable.
7. When the project is going to be fixed price or cost-plus with a maximum, the contractor has to use great skill when pricing the job, especially when using less-than-complete working drawings. If he is too conservative, the job will not go. If he is too low, he will have a problem later.

SUMMARY

The team concept has been used for many years in several of its various forms and names. In this bulletin, the term "team concept" refers to the projects where all team members are involved from the start, and especially before any working plans and specifications are developed. Contractors can provide input into the design, the one largest advantage to the owner.

Many projects have been completed on a team concept basis and the mechanical contractor can look forward to this method of construction being a part of our business in the future.



Bulletin No. JM 2
File: Job Management

Bulletin

Job Supervisor's Manual

MCAA's *Job Supervisor's Manual* has been replaced by a two-part (instructor and student) manual that is distributed through the United Association. The publications are available from the UA's IPT JTC bookstore using the item numbers and titles below.

Job Supervisor/Leadership and Development Student Binder

This training manual explains how to be a better leader on the job. It tests the student's traits and suggests different approaches to solving problems. Role playing is used to show examples of situations and their solutions. Labor and management representatives are involved to give their views of the importance of this training. Overhead transparencies are available on CD.

Job Supervisor/Leadership and Development Instructor Binder

To order:

Call 301-218-1241 or

Visit the online store at <https://www.cpostores.com/ipt>. This is a restricted site; users will need the e-mail and password from their UA business manager.

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Bulletin

Scheduling

INTRODUCTION

Contractors schedule jobs, generally, because it enables them to work effectively and efficiently, both alone and with other contractors. Specifically, scheduling is advantageous because it incorporates all job activities into a master schedule, gives a framework for coordinating resources and activities necessary for timely job completion, and affords a time scale for monitoring progress and adjusting job activities.

On any construction project involving a mechanical contractor, several kinds of schedules may be used, but none is independent of the others. On a typical project, the following schedules will be developed and maintained:

- Prime contractor's master schedule
- Mechanical construction schedule
- Labor and job supervision schedule
- Prefabrication schedule
- Purchasing and delivery schedule
- Tool and equipment schedule
- Subcontractor(s) schedule

PRIME CONTRACTOR'S MASTER SCHEDULE

The development of a master schedule for any project is the responsibility of the prime contractor. The prime contractor and the subcontractors should work

together to develop a coordinated master project schedule. The development of a coordinated schedule requires that each subcontractor be prepared to identify its specified work activities and the time duration required to complete those activities. The work activities are then coordinated and sequenced in an attempt to create an unobstructed "window of opportunity" in which to complete each work activity.

Because scheduling for a multi-party project is a complex process and since schedules are not static, it is important that a contractor designate one representative who is responsible for updating schedules and communicating changes. It is a general rule that written notification of schedule changes be given to everyone involved in a project as soon as a change is made. Regulator meetings should be held to update the coordinated master schedule and the revised schedule should be dated and distributed to all subcontractors.

MECHANICAL CONSTRUCTION SCHEDULE

For the mechanical contractor, the mechanical construction schedule is the foundation of all project activities. Development of this schedule involves four steps:

1. A review of the prime contractor's schedule should be

undertaken to ascertain the existence of an overall project schedule and to determine whether the overall schedule is complete and feasible. Special attention should be paid to whether the general schedule adequately allows for the completion of mechanical activities and what clarifications in the general schedule are necessary before a mechanical schedule can be designed.

2. Project milestones should be identified, including the start and completion dates, and the projected activities of other trades.
3. Mechanical activities should be listed in sequence and then plotted on a bar graph which represents a basic time line showing the day, week, or month when the various project activities should start and finish.¹ Many contractors now use computer software to assist them with this task. To find scheduling software suppliers, you may wish to consult MCAA's list of Manufacturer/Supplier members at <http://www.mcaa.org/directory>.

¹ There are a variety of scheduling methods that can be used to give you control over your part of a project. To decide which one is best, a contractor must evaluate the complexity of the job and advantages of each method. Many Federal projects specify certain methods as part of the contract, although even the smallest job can benefit from some form of written schedule. Among the methods available are bar charts (which are referred to in the examples in this bulletin) and network diagrams (including the well-known Critical Path Method), both of which can be used to advantage. For very complex jobs, there are consultants available who have experience working with the details involved in scheduling for large projects.

4. Activities that can be started and completed at any time within one or more time periods in the general schedule—sometimes called “float functions”—should be identified. Identification of these functions allows some flexibility in scheduling since they provide some room for adjusting to unforeseen circumstances and taking advantage of especially favorable conditions for a particular task.

LABOR & JOB SUPERVISION SCHEDULE

A labor and job supervision schedule is used to make sure that there are always enough of the right people to do the work, as well as to circumvent unnecessary fluctuations in labor and supervision load. In this process, the scheduler plots a bar graph based on the mechanical schedule which also shows the number of employees and supervisors assigned to each task. In analyzing the resulting bar graph, a contractor can calculate the number of workers and supervisors needed during any time period by adding up the number of tasks and the number of people assigned to each task. Once the results are in, both the mechanical construction schedule and the labor and supervision schedule can be modified until the mechanical schedule reflects what the contractor considers to be the best use of company labor; that is, a schedule that maintains a fairly even manpower load for the duration of the project and ensures that the right number of properly qualified people are there when they are needed.

PURCHASING & DELIVERY SCHEDULE

A purchasing and delivery schedule is used to ensure that all equipment and materials are delivered on time and that

all purchases are obtained at the best price. In a process similar to the one used for the labor and supervision schedule, a comprehensive list of items to be purchased is prepared and the conditions affecting purchasing for the project (such as delivery considerations) are examined. Then the purchasing and delivery activities are plotted on a bar graph using the same scale as the mechanical construction and labor and job supervision schedules.

TOOLS & CONSTRUCTION EQUIPMENT SCHEDULE

This schedule is used to make sure that tools and construction equipment are available when needed (i.e., that the right tools and equipment are on site when needed) and are managed in the best way, with particular attention to ensuring that all special tools and rented equipment are returned to their sources when they are no longer needed. Development of this schedule involves a two-step procedure:

- (1) identifying the tool and equipment requirements of the job, specifying needs for standard tools, specialized tools and equipment, and rented tools and equipment;
- (2) plotting a tool and equipment schedule on a bar graph using the same time scale as those used by the other schedules and stipulating deliveries of tools and equipment to the jobsite and return of all tools and equipment to their sources.

SUBCONTRACTOR SCHEDULE

It is estimated that subcontractors perform 20 percent to 30 percent of the work specified in any mechanical contract. For this reason alone, it is easy to see why a subcontractor schedule is an important guarantee of maximum

productivity from subcontractors, as well as smooth coordination with other mechanical activities.

A successful subcontractor schedule must involve the subcontractors themselves. Only in this way will they get a clear overview of the project and an understanding of how their efforts will affect—and be affected by—those of other subcontractors and of the mechanical contractor.

To schedule for subcontracting, have each subcontractor supply information on delivery dates and storage requirements for his equipment, materials, and tools, as well as his manpower needs for the duration of the job. Then plot a schedule for each subcontractor on a separate bar graph and on a master subcontractor schedule (using the same time scale as those used by the other schedules) which shows all subcontractor activities. An analysis of the master subcontractor schedule should reveal if subcontractor activities are coordinated with the mechanical activities and those of the other trades, and if each subcontractor has enough time and room to work productively.

LOOK AHEAD SCHEDULE

The prime contractor should develop a coordinated short interval look ahead schedule each week, based upon an updated master schedule. The use of this schedule will keep all subcontractors informed as to the status of the project and will assist in identifying requirements for manpower, tools, construction equipment, material equipment, and subcontractors. It also creates a form in which the onsite personnel can discuss coordination of their specific work activities with other



Bulletin

Pre-Job Conference

Foreword

“Planning Ahead” is a basic management concept for businessmen in any industry. In construction management, it is essential for the successful completion of a job.

One technique of planning that we highly recommend is holding a Pre-Job Conference with the owner, architect and all contractors on the job. This should be done as soon as possible after contracts are signed or as far as possible in advance of starting work.

The attached bulletin outlines the importance of the Pre-Job Conference and presents an agenda for your use at these meetings. For more information on this subject, please review the section in MCAA’s Project Manager’s Manual.

The Pre-Job Conference serves a very important communications function on a project. It is of such importance that one should be held on every major job.

In fact, the general or special contract conditions frequently may specify that such a conference be held. If there is no such requirement in the general and special conditions of a contract on any job, a mechanical contractor should hold such a conference anyway—one with the owner and architect and one with the subcontractors. It should become part of each contractor’s job management procedures.

Not only may these conferences be the first occasion that all parties on the construction team have to meet face-to-face and become acquainted, they also

set the stage for continued communications and better job relations.

The Pre-Job Conference may be chaired by the owner, architect or general contractor. In addition to these people or their representatives, the meeting should include the resident inspector or consulting engineer, all prime contractors, main subcontractors, and sub-subcontractors, if desired.

Following this meeting, the subcontractor should have an in-house conference with both his key people and all subcontractors in attendance. Many important matters can be clarified at this time. Although requirements will vary from job to job, the following example may be helpful in establishing an agenda for such a conference:

AGENDA FOR PRE-JOB CONFERENCE

CORRESPONDENCE:

- (1) Mailing address of owner, architect, engineer, general contractor and other major subcontractors

- (2) E-mail address of owner, architect, engineer, general contractor/construction manager and other major subcontractors.

- (3) Cell phone numbers of owner, architect, engineer, general contractor/construction manager and other major subcontractors' field representatives.

- (4) Who is responsible for the job conference minutes and will a copy be mailed to everyone?

- (5) Who will call future meetings?

SUBMITTALS:

- (1) Number of copies for each party _____
- (2) Length of time for processing _____
- (3) Shop drawings—responsibility for review _____

INSPECTIONS:

- (1) Are notices required? _____
- (2) Authority of the inspector _____
- (3) What tests require written reports or signature? _____
- (4) Daily Reports _____
- (5) Photos _____

JOBSITE CONDITIONS:

- (1) Special hazard areas _____
- (2) Welding permits required _____
- (3) Shutdowns _____
- (4) Parking _____
- (5) Working hours _____
- (6) Security clearance (badges required) _____

(7) Change house _____

(8) Contractor gate _____

(9) Temporary toilet facilities _____

(10) Craft jurisdictional problems _____

(11) Temporary heat _____

ACCIDENTS:

(1) Ambulance service available _____

(2) Doctors to be listed for service _____

(3) Nearest medical facility _____

(4) Accident reporting procedure _____

OWNER FURNISHED EQUIPMENT:

(1) Delivery schedule _____

(2) Receiving, storage, installation, start-up, guarantee _____

(3) Insurance to be furnished _____

SAFETY PROGRAM:

(1) OSHA requirements _____

(2) Tool box meetings _____

(3) Safety equipment required and/or available _____

(4) Safety responsibility of various contractors _____

SCHEDULES:

(1) C.P.M _____

(2) General Contractor's schedule _____

(3) Subcontractor's input to schedule _____

(4) Notification of change in schedule _____

STORAGE AND WAREHOUSING:

(1) On-site locations _____

(2) Off-site locations _____

(3) Bonded warehouse _____

(4) Contractor's yard _____

BILLINGS AND PAYMENTS:

(1) Cut-off date _____

(2) Billing date _____

(3) Payment date _____

(4) Approval of billing _____

(5) Approval of percentages _____

(6) Retention _____

(7) Material stored _____

CHANGE ORDERS:

(1) Who approves _____

(2) Field change orders _____

(3) Overhead and profit percentages _____

(4) Hand tool rate _____

(5) Equipment rental schedule _____

(6) Mark-up on subcontractors _____

BACKCHARGES:

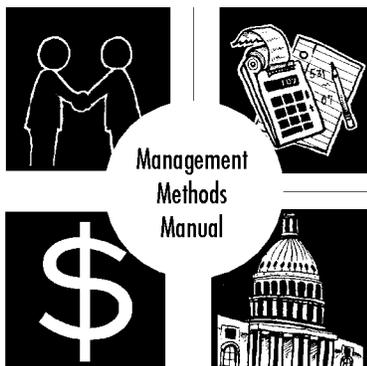
(1) Require they be billed out separately _____

(2) Require that they be rendered monthly _____

(3) Percentage of overhead for labor and material _____

(4) Require that work sheets must be signed by firm representative _____

(5) Require immediate notice of backcharges to determine responsibility _____



Bulletin

Effects of Job Schedule Delays on Construction Costs

INTRODUCTION

A study of mechanical and electrical projects, conducted by MCAA and the National Electrical Contractors Association, has shown that significant delays in construction and distortions in planned schedules are uncommon and cannot be anticipated in bids. When they do occur, they have a devastating effect on construction costs, particularly labor.

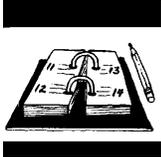
Delay-related factors account for a large majority—nearly 90 percent—of the total labor costs overrun experienced by these contractors on projects with schedule problems.

One-half of the delay-related excess costs are due to losses in labor productivity. Extra supervisory costs are the next most significant factor, and overtime premiums the least important.

In the study, total estimated prime costs equaled approximately \$115 million, ranging

from about \$17,000 to \$7,715,000 per contract and averaging nearly \$1,620,000. Total actual prime costs were about \$150 million, ranging from \$20,000 to nearly \$10 million per contract, and averaging about \$2,100,000. The total cost overrun and the average of individual overruns were both about 30 percent. The total labor costs overrun was 48 percent, but the average of labor cost overruns was 55 percent.

Estimated prime costs (including materials, labor, subcontracts and other direct job expenses) ratios of the total sample were typical of ratios for specialty contracting: 40.5 percent labor, 48.6 percent materials and 10.9 percent direct job expenses. Actual prime costs were distorted by the adverse effects of schedule disruptions on labor costs and direct job expenses: 46.5 percent labor, 41.7 percent materials and 11.8 percent direct job expenses. A summary of monetary data on the prime costs of mechanical projects is given in Table I.



**Table 1 Mechanical Projects
Summary of Monetary Data on Prime Costs**

(Dollar figures are in thousands. Percentages are expressed to the nearest whole percent and are derived from the totals and subtotals on this table.)

	Estimate	Actual	Overrun as Percentage of Estimated
Labor			
Total	\$12,509	\$18,887	51%
Average	544	821	
Range	35-1,519	40-2,821	
•% of Total Prime Cost	35%	43%	
▣ Delay-Caused Overruns	0	4,931	39%
▣ Loss of Productivity	0	2,992	24%
Materials			
Total	15,442	16,841	9%
Average	671	732	
Range	12-3,659	30-3,844	
•% of Total Prime Cost	44%	38%	
Direct Job Expense			
Total	7,238	8,499	17%
Average	483	567	
Range	4-2,168	12-2,387	
•% of Total Prime Cost	21%	19%	
•Total Prime Costs			
Total	45,963	59,946	30%
Average	1,768	2,306	
Range	58-5,546	70-8,087	

•Total Prime Cost figure does not equal the sum of Labor, Materials and Direct Job Expense because figures were not reported for those categories in some instances. Percentages were computed on the sum of Labor, Materials and Direct Job Expense of those making complete reports.

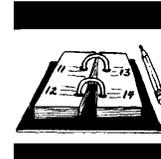
▣ Totals of delay-caused overruns and those specifically due to loss of productivity include these data only from reports that included labor cost estimates and actual total labor cost.

NATURE OF DISRUPTIONS

The study found that schedule delays and disruptions are not usually under the control of the specialty contractor, whether he is a separate prime contractor or a subcontractor. The specialty contractor's work, in most cases, cannot be performed until preceding work has been performed by other contractors or subcontractors. Moreover, the work of

specialty contractors is often significantly delayed or increased in scope due to such hindrances as:

1. Unexpected congestion in shared working areas by other trades who should have completed their work earlier.
2. Physical obstructions permanently installed out of sequence by other contractors.



3. Temporary physical obstructions that should have been removed prior to commencement of the mechanical or electrical work.
4. Interference by employees, customers or property of the owner when portions of the space are occupied before completion of mechanical or electrical work.

CAUSES AND EFFECTS OF DELAYS

Inadequate coordination by owners, general contractors and construction managers is the major cause of failure to maintain schedules, followed by administrative delays in correcting and clarifying ambiguous design documents. Poor design ranks third.

Contractors who have experienced serious schedule problems report that delays affect productivity of the work force most significantly. Next, they affect loss of momentum and productive rhythm, followed by the need for redundant mobilization and demobilization in various job areas and by employees.

The causes and effects of schedule disruptions can be avoided by:

- Planning more realistic schedules
- More effective enforcement by those having the authority to do so
- Better design
- More efficient administration.

No radical departures from conventional procedures are necessary, the study concluded. The means and expertise to implement these needed steps exist within the industry.

ANTICIPATING DELAYS IN BIDS

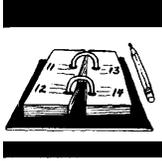
Contractors cannot normally anticipate delays and/or disruptions at the time of bidding. Experienced bidders may add to their estimates the cost of usual or normal delays and disruptions which are repeatedly encountered on projects of the same type, size and complexity or with the same owner. These occurrences can be anticipated and are not deemed serious or significant.

RECOVERING OVERHEAD

Contractor overhead costs are also significantly affected by delays. Unabsorbed overhead that is not allocable to other projects, which cannot be undertaken until a delayed project is finally completed, can be especially expensive, but this factor has been difficult to document.

Standard overhead procedures fail to recognize that overhead is actually more of a function of time than of prime cost. A \$50,000 contract that takes three years to complete probably requires more of the company overhead services than the \$100,000 job, completed in one year.

Many contracts pre-establish a maximum percentage, such as 15 percent, that can be applied to the prime costs of change orders to cover overhead. Such percentages often apply to general contractors and subcontractors uniformly and are seldom adequate for change orders of specialty contractors. Administrative costs are proportionately much higher for change orders than for the same amount of prime cost expended as part of the much larger original contract. Moreover, the administrative costs incurred by the subcontractor actually performing the change order work are a great deal higher



than those incurred by the prime contractor for work being performed under subcontracts.

One solution is to use the Eichleay formula, developed to allow contractors to recover “unabsorbed overhead”—continuing overhead that is not being absorbed by other work that cannot be undertaken, or by overhead reimbursements on the temporarily reduced prime costs on the contract. It can be used when it is difficult or impossible to prove actual allocation of company overhead to the specific project. It is generally accepted by the U.S. Court of Claims, Federal Boards of

Contract Appeals, and most state courts and arbitrators.

The Eichleay formula is based on the ruling of the Armed Services Board of Contract Appeals, Decision 5183, December 27, 1960, in an appeal of the Eichleay Corporation from a ruling of a contracting officer. It recognizes that overhead is a function of time as well as of prime costs and assumes that all field office overhead is being recovered as direct job expense.

The formula is described in Table 2.

Table 2 Eichleay Formula

1.	Billings for Delayed Contract Total Company Billings During Extended Period of Performance on the Contract (Contract Period)	·	Total Company Overhead During Contract Period
	= Overhead Allocable to the Contract		
2.	Allocable Overhead Actual Days of Contract Performance	=	Daily Overhead Allocable To Contract
3.	Daily Overhead	·	Number of Days of Delay = Amount Claimable for Unabsorbed Overhead



Bulletin

Working With Owners

OBJECTIVES

- Develop guidelines for an effective and cooperative work environment on a construction project.
- Establish up-front responsibilities with the owner, design team, suppliers and subcontractors; and
- Schedule regular communications meetings to ensure a professional, cost-effective project.

POTENTIAL ADVANTAGES OF WORKING WITH AN OWNER

- Better payment terms available. Don't be afraid to ask for earlier or more frequent payment or down payment.
- Potential for lower retention or no retention. Again, don't be afraid to ask.
- Can often avoid requirement to provide performance/payment bond.
- Good performance can lead to repeat business and possible service and maintenance contract.

POTENTIAL PITFALLS OF WORKING WITH AN OWNER

- Owner's representative will often be a contract employee and not engaged in owner's business.
- Owners often lack construction expertise and sophistication to

manage multiple contractors and produce an accurate coordinated construction schedule.

- Startup and commissioning – make sure that the owner has personnel to take responsibility for systems startup and commissioning.
- If existing facility, potential for working around existing operational systems and personnel. Need to make sure that procedures and safety measures are in place.
- Owner might not normally provide Builder's Risk Insurance. Insure that this is in place prior to construction. Also, be aware of the deductible for the Builder's Risk policy and clarify who is responsible to pay the deductible.
- Owners will often have a lack of understanding of scope change and the cost impact when they don't make timely decisions.

PRIOR TO CONTRACT

Maintain a good image and a positive relationship with the owner. Find out what the owner wants, and then stress it. Convince the owner that you fit his "want list." Show the owner security and comfort with your business (i.e., show insurance, financial strength,

bonding capability, safety, experience, licensing, organization, equipment, value, etc.).

CONTRACT

Coordinate with all prime contractors. Make sure who the owner's designated representative is (with control of the project). Lay out the owner's responsibilities (example: Article 4, AIA Document B141 2007, "Standard Form of Agreement Between Owner and Architect"). Use standard contract documents to promote mutually acceptable contract language for both the owner and contractor.

DURING CONSTRUCTION

Proactively manage the relationship with the owner. Use public relations (PR) and news releases for the owner. **[Please note that more detailed information on this subject is available in Bulletin MK5, *Listening To Our Customers*.]**

Create an organized project notebook for the owners' representative, with tabs on job minutes, schedules, subcontractors and supplier lists, etc. Schedule regular project meetings and keep insure that minutes of project meetings are maintained and distributed. (See checklist of items to cover.)

Job meeting checklist to clarify responsibilities:

- Permits/Licenses
- Insurance
- Safety
- Parking
- Storage
- Construction drawings including BIM process
- Shop Drawings and submittals
- Temporary facilities (i.e., temporary

heat services, such as gas or electric, sanitary, water, cost of power, site offices, site security, site cleanup, snow removal, dust control, wireless internet access)

- Progress and time schedules
- Inspections/testing
- Material handling
- Materials furnished by others
- Record keeping requirements
- Payment/cost breakdowns
- Subcontractors/suppliers
- Changes/claims
- Productivity
- Prefabrication—Payment and Storage
- Tools/equipment
- Ordering and paying overtime
- Quality/cost control
- Back charges
- Cleanup
- Record drawings
- Warranty-guarantee period
- Training of owner's maintenance personnel
- Commissioning
- Offer Preventative Maintenance and Service Contract

OWNER'S GENERAL RESPONSIBILITIES

1. Provide complete project information.
2. Provide all real estate survey information.
3. Have all geo-technical data responsibility (i.e., underground storage tanks).
4. Toxic or hazardous materials on site (i.e., asbestos).
5. Provide proper insurance including Builder's Risk Insurance.
6. Secure project drawings and contract documents.
7. Provide all legal approvals for the project development.
8. Clear all necessary easements and assessments of the property.

9. Establish the ability to pay for construction costs.
 10. Pay for performance and payment bonds (if required).
 11. Should communicate with the sub-contractors only through the prime contractor and not be contractually obligated to any of the contractors' subcontractors, unless set up otherwise, such as a C/M project.
 12. Waive subrogation against contractors, architects, engineers, subcontractors and sub-subcontractors for loss (carried under the owners' insurance).
 13. Agree to arbitration of claims and disputes in questions arising out of or relating to the contract.
 14. Provide a representative to be in charge of the project.
 15. Be aware of any fault or defect in project nonconformance with the drawings or specs, and give prompt written notice to the contractor.
7. Follow up on final payment, and clear any final lien waivers that may be necessary. Note the state's lien requirements to insure that final payment is made before lien rights expire.
 8. Transfer billing arrangements of any utilities that may have been in your name to the owner's name.
 9. Request a letter of recommendation from the owner, architect and/or engineer.
 10. Request permission to take pictures of sections of your work. Ask permission for use in marketing campaigns.
 11. If appropriate, consult with in-house services to pursue a service and/or maintenance contract.

AFTER CONSTRUCTION

1. Complete operation and maintenance manuals and record drawings promptly.
2. Provide operational instructions to the owner's maintenance team and/or provide for a maintenance contract.
3. Document start-up dates of major equipment and inform the owner of warranty periods.
4. Make sure all punch list items are complete and permit items inspected and signed off on by the local authorities.
5. Send your congratulations to the owner for the completed project with a building plaque, news release, or any other tangible "thank you" method. (This is also a nice touch for the architect/engineer/ general contractor.)
6. Advise your bonding company that the project has been completed to open up available bonding capacity.



Bulletin

Jobsite Coordination

Historically, job coordination has been one of the primary responsibilities of the general contractor, but today, with new methods of job management, i.e., "Construction Manager," this responsibility, in many cases, is passed along to all the contractors on the project. The construction manager can be architectural and engineering firms or organizations specializing in this form of job management.

The mechanical contractor is most likely to be burdened with much of this responsibility since his work will consume most of the space in the ceilings, shafts, and in the mechanical equipment rooms.

Many specifications have clauses that cover coordination, and as a mechanical contractor, you should analyze this cost impact at bidding time. One area that may have to be qualified at bidding time, or certainly before contract signing, is called Coordinated Drawings. With single-line duct layouts and some-times little or no engineering interface within the design team, coordinated drawings could be a costly item.

Some qualifications that have to be noted are:

- 1). Coordinated drawings are furnished to insure that no interferences will occur. It is imperative that all trades participate and sign off on the completed drawings, including but not limited to HVAC, plumbing, sprinkler, electrical and general construction.
- 2) The contractor has assumed that all the contract drawings have been coordinated during the design phase, and that there is adequate room in ceilings, shafts and mechanical equipment rooms to install the work shown.
- 3) The contractor will not be responsible for relocation of mechanical shafts.
- 4) Any and all costs incurred due to insufficient space will be the responsibility of the architect, engineer, construction manager, general contractor or owner.

Some contractors make it a practice to notify the architect, engineer, construction manager, general contractor or owner of these conditions, but in your work area, there may be other qualifications required.



Management
Methods
Manual



Bulletin

Bulletin No. JM 8
File: Job Management

Partnering

Foreword

Simply put, partnering is a process in which the different parties involved in a construction project work cooperatively to complete the project in a satisfactory manner. Partnering is now used extensively in many segments of the industry, and this overview of its history, the way it works, and its advantages can be useful to mechanical contractors.

WHY PARTNERING?

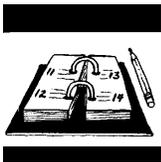
No change is made without a reason. The move toward partnering in the construction industry grew out of an environment in which excessive recourse to litigation had gone a long way toward draining the industry's financial and human resources, as well as depleting much of the profit from contractors. In fact, construction gives birth to more litigation than any other U.S. industry. This pre-partnering environment was characterized by adversarial, rather than cooperative, relationships among all parties. Thus, there could be disputes between owner and general contractor, between general contractor and subcontractor, between subcontractor and subcontractor, between management and labor, and the list could go on.

Partnering, on the other hand, starts with a cooperative attitude and works from there. It is a way of structuring a project so that it is unnecessary for one party to lose and another to win. In the way partnering is supposed to work, everyone is a winner.

GOALS AND METHODS OF PARTNERING

A partnering relationship is not contractual, but it *includes* a written statement of principles that define the parties' common expectations and objectives. It also provides a compelling mission statement that includes clear mutual objectives and guidelines for accountability and resolution of disagreements through trust and commitment.

The partnering process can be developed by any party to a project and for any



kind or size of project. An owner's intention to encourage partnering, for instance, can be provided for in the project solicitation advertisement and specifications. Such a provision would emphasize the voluntary nature of partnering and would assert that any costs associated with implementing the partnering process would be shared equally without affecting the contract price.

Partnering can also be included in a presentation at the prebid conference. In the context of a negotiated contract for private work, it might be a contractor who proposes the use of partnering. Even in public works contracts, the contractor can initiate a partnering agreement after the award, since partnering does not change the contract.

THE KEY ELEMENTS OF PARTNERING

Although each partnering relationship will be different in certain respects, all exercises of partnering must embrace the following key elements:

Commitment. Commitment to partnering must come from top management. A jointly developed partnership charter or statement is not a contract, but is a symbol of commitment.

Equity. The interests of all parties are considered in the creation of mutual goals. There is a commitment to satisfying each party's requirements for a successful project by utilizing win-win, rather than adversarial, thinking.

Trust. Teamwork is not possible where there is cynicism about the motives of other members of the team. Through the development of personal relationships and communication about each stakeholder's risks and goals, there will be better understanding. With understanding comes trust. And with trust comes the possibility for a synergistic relationship.

Development of mutual goals and objectives. At the initial partnering workshop, stakeholders identify all their respective goals for the project in which their interests overlap. These jointly developed and mutually agreed upon goals may include achieving value engineering savings, meeting the financial goals of each party, limiting cost growth, limiting review periods for contract submittals, early completion, no lost time due to injuries, minimizing paper work generated for the purpose of case building or posturing, no litigation, or any other goals specific to the nature of the project.

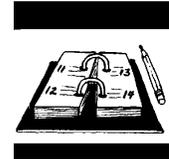
Develop strategies for implementation. After setting out the goals, stakeholders together develop strategies for implementing their mutual goals and the mechanisms for solving any problems that may arise.

Continuous evaluation. To ensure implementation, the parties agree to plan for periodic joint evaluation based on the mutually agreed-to goals. These evaluations ensure the plan is proceeding as intended and that all stakeholders are carrying their share of the load.

Timely responsiveness. Timely communication and decision-making can not only save money, but can also keep a problem from growing into a dispute. In the partnering workshop, the parties develop mechanisms for encouraging rapid issue resolution, including the escalation of unresolved issues to the next level of management.

HOW THE PARTNERING PROCESS WORKS

If the partnering process is to work, the willing participation and support of the senior management of all organizations involved must be assured. Since trust and communication will not be established just because top



management thinks it is a good idea, top managers must be visible in the process by attending an initial partnering workshop. Their continued support for the process can be demonstrated by continued participation.

All partnering projects start with a well-planned, well-run workshop that is tailored to a specific team and a specific project. Two, or sometimes three, days are scheduled for the workshop for most projects. This workshop is crucial to the success of the partnering process.

The workshop should be held at a neutral site and will be significantly improved by the presence of impartial facilitators with engineering and construction experience. The job of these facilitators is to provide training in communication, group dynamics, and team building.

A primary goal of the workshop is to identify and develop one or more team members who are enthusiastic about the partnering process, since the presence of a strong leader is necessary to gain the support of all stakeholders.

The first day of the workshop is devoted to team building. It includes enjoyable “hands on” exercises that teach the value of communication and trust. This leads to the development of a friendly atmosphere in which team members can get to know each other as individuals with individual strengths and weaknesses. It is the first day of the workshop in which an environment of mutual trust is established. This is absolutely necessary so that team members can express their concerns in a non-judgmental way and actively listen to the concerns of others. These attitudes, in turn, foster an on-going project climate in which issues can be raised, openly discussed, and jointly settled. The key to successful part-

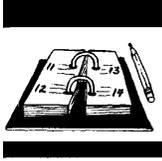
nering is to be able to disagree without becoming disagreeable.

The second day of the workshop starts with the development of a pledge or mission statement that each member signs as a commitment to the team. The pledge defines the long-term goals and objectives of the project and becomes a win-win charter. It must include the following objectives to provide measurable milestones for project success:

- To champion open and frank communications between the participants.
- To encourage value engineering savings.
- To limit cost growth.
- To promote safety to avoid lost-time injuries.
- To avoid litigation.
- To finish ahead of schedule.

After the pledge is developed and signed, the initial workshop is devoted to identifying and understanding potential problems and developing specific mechanisms to address these issues. The problems and issues discussed can include a variety of subjects such as expedited requests for information, special processes for submittal and shop drawing reviews, value engineering procedures, conflict resolution, the impact of schedule changes, a safety awareness program, and, where appropriate, the interface between construction personnel and facility operators.

Since it is the goal of the workshop to create an environment of high trust—in which everyone feels comfortable expressing ideas and contributing solutions—it is essential that potentially difficult areas of the contract should be discussed openly. Understanding all the stakeholders’ risks and concerns and



seeing how each portion of the contract fits in relation to others helps to build the team attitude that is necessary for project success. This process will help each party understand the personalities with whom they will be working before actual problems arise.

Finally, the workshop is the place where a leader must be selected from among the participants. This leader is to provide day-to-day coordination of the partnering effort, to include providing administrative and logistical support, encouraging communications, and promoting problem solving.

After the initial workshop, the large partnering group should meet at least once a month during the course of work. These meetings will introduce any new members, evaluate progress, and renew the team spirit created at the workshop. Since they will also address emerging issues, a facilitator who is also an experienced construction engineer should be present to evaluate the team's interaction and check on the participation by all

team members. This facilitator can also share experiences from other partnering efforts to help resolve similar problems.

CONCLUSION

Mechanical contractors—along with the rest of the construction industry—have witnessed how adversarial and confrontational methods of problem-solving negatively affect both the quality of work and the contractor's bottom line. The more money spent on litigation, the less profit is made.

Partnering is a way in which we can redirect our energies to the ultimate goal of constructing a quality product on time and within budget. It is a challenging endeavor that involves a basic change in the way we think about the way we work. In the final analysis, partnering is a process through which individual contractors can cooperate in taking charge of a project. It has the potential to change our industry one project at a time.



Bulletin

Project Forecasting

Introduction

Project Managers are often confronted with aggressive schedules and less than complete construction documents. In this environment, managing a project to a profitable outcome is predominantly about controlling change and implementing resourceful and efficient strategies to minimize the cost of construction.

Change comes in many forms; there are scope changes and design changes, but more common are changes in anticipated conditions, incorrect estimating assumptions, late equipment deliveries, weather concerns, under-performing subcontractors or construction managers. Experienced and resourceful project managers are constantly monitoring these changing conditions and reacting accordingly. Some manage to the old school of that says, "Build it as cheap as possible and it will cost what it costs." Unfortunately, tight margins, litigious attitudes and high construction costs don't lend themselves well to this wait and see approach.

What is Forecasting and Why is it so Important?

In its simplest terms, forecasting is the use of accurate and timely data to understand exactly where a project is financially and to identify developing cost variances as soon as possible. Only then can effective strategies be

developed and implemented to preserve positive trends or correct negative trends. The Merriam-Webster dictionary includes this definition for forecast, "foresight of consequences and provision against them."

Project Managers must always know exactly where a project is financially and which way the margin is likely to trend given current circumstances. Effective plans can only be made when you understand exactly where you are at that moment and what trends you are currently encountering. "Working as hard as we can," or "working as fast as possible," doesn't cut it.

Project management must be able to identify specific tactics - cut current unit costs by 10%, reduce crew rate by \$2.00 /hr, etc. - to effectively manage project profitability.

Forecasting is about knowing where project finances are at all times and evaluating tactics to mitigate negative trends and support positive trends. How can you correct a downward trend if you don't know it's occurring? How do you protect positive variances if you don't know they're accumulating? Most importantly, you need to discover negative trends as early in a project as possible. The sooner a problem is discovered the more likely it can be corrected. Figure 1 graphically depicts

the importance of discovering negative cost variances early in a project. The importance of early discovery cannot be over-emphasized. Based on a review of over 500 contracts, the Office of the Under Secretary of Defense for Acquisition has observed that:

- Once a contract is 15 percent complete, it is highly unlikely to recover from a cost overrun.
- Given that a contract is more than 15 percent complete, the overrun at completion will not be less than the overrun to date, and the percent overrun at completion will likely be greater than the percent overrun to date.

These findings have been confirmed at the 95 percent level of confidence and were generally insensitive to contract types and type of work.

This is why forecasting is one of, if not the, most important project management tasks.

Forecasting can be a complex and overwhelming task if your company's accounting and project management systems are not set up to accommodate a culture of continuous, or frequent forecasting. This bulletin will attempt to lay a framework around this topic that should help to begin the process of developing accounting and project management systems and practices to facilitate accurate and timely forecasting.

Accounting and job costing specifics can vary dramatically from one company to another. Some companies rent company-owned equipment to projects, some carry additional variable overheads or burdens on labor, etc., but the general principals presented here can be applied in any situation.

It Begins with a Good Job Breakdown

Even small projects can quickly become complex and accurately evaluating them by looking a total costs is impossible. Totaling up costs and tossing them in one big bucket, or even only a couple buckets, makes it extremely difficult to get any meaning out of the numbers.

Accurate forecasting must begin with a good job cost breakdown or work breakdown structure. Proper project cost breakdown should begin with estimating if possible, and be done with a look ahead as to how the project will be built and how it can be easily tracked.

Cost Categories

Nearly all projects can be thought of as a compilation of five separate smaller projects; a labor project, a material project, an equipment project, a subcontract project and a general conditions (or "other direct job costs") project. These individual projects, referred to as "cost categories" in this bulletin, are each managed differently and the help a project manager may receive varies with each. A project manager may enlist a general foreman to help forecast labor and a purchasing agent to help with equipment forecasting. Furthermore, each of these cost categories has a different life span; if bought out promptly after award (as a project should be), the equipment category can be accurately forecast very early in a project as opposed to the labor category.

To further simplify forecasting material and equipment costs, it may be wise to consider separating these categories into large purchases made by office personnel (equipment) and day to day miscellaneous items ordered by field

personnel (material). This strategy allows items such as large bulk piping purchase orders to be included in “equipment” and thereby reduce the size of the material category (day to day purchases) which is always more difficult to forecast.

Cost Codes

Depending on the size, complexity and length of a project it may be necessary to further breakdown cost categories into cost codes. This topic is well covered in other materials, but with regard to forecasting it is important to point out that a good cost code breakdown must be done with a look ahead as to how work will be measured and tracked. This is often not possible at the time an estimate is performed and estimating data may need to be rearranged by project management.

For example, if a project will be built floor by floor, don't break down the estimate by system. In this case, work should be broken down by floor and include hours, labor cost AND units. This will allow you to produce estimated productivities and estimated hourly costs and to more easily calculate actual productivities and actual hourly costs throughout the project. Individual subcontracts and equipment can also be broken into separate cost codes, but in this case, it is important to have a good reason for additional breakdowns. If your cost accounting system allows you to easily access individual purchase orders and their status, further breakdown by cost code is often not necessary or can be limited to a few major items.

What is “Cost?”

Once costs are incurred, it is generally too late for project management to have any effect on profitability. “Incurred”

costs are certainly important to understand where a project stands and to produce accurate financial reports, but good project management involves itself primarily with the future and working with forecasted and committed costs. Specific terminology varies by company, but basically there are four types of cost we deal with;

Original Estimated Cost/Budget: The original project estimate (including all of the assumptions and clarifications that are associated with it). This cost never changes.

Incurred Cost: The value of invoices and labor cost actually charged to a project.

Committed Cost: The value of incurred costs combined with open purchase commitments such as subcontracts, purchase orders, and purchase agreements.

Forecast, or Revised Cost/Budget: Project Management's current estimate at completion of, or to complete, the project. Includes change order work, adjustments for actual productivities, buyout variances, actual working conditions, etc., effectively, Project Management's current project estimate.

Project Management needs to focus on committed cost and variances that develop between committed cost and forecast costs – always be looking ahead. It is easy to review and analyze incurred costs, but that doesn't affect profitability. Good project management focuses on the future and controls those costs that are yet to be incurred.

If a project is bought out early and purchase orders and subcontracts are used for all purchases, a project can be largely committed well before 15% of the costs are incurred. This dramatically increases opportunities to discover and

resolve budget problems and reduces the uncertainty in forecasting.

Charge it Where it Was Budgeted!

Accurate cost accounting is obviously critical to accurate and timely forecasting. Errors commonly occur and produce inaccuracies or complicate forecasting when costs are not charged to the cost categories and cost codes where they were budgeted. It helps to think of the job cost breakdown as a matrix (see Figure 2). Costs must be budgeted, committed and incurred in the same category and cost code to produce accurate and useful financial reports.

It is critically important that project management, purchasing and job costing procedures exist that facilitate the posting of costs to the location where they were budgeted.

Figure 3 demonstrates the effect errors in job costing, or purchase order posting, have on accurate forecasting. In this case a piece of equipment estimated at \$10,000 was budgeted to cost code 001, the purchase order was posted to cost code 002 and the invoice was posted to cost code 003. The combined effect produces a \$30,000 forecast cost at completion. This is a very simple example, but on a project with thousands of transactions, you can very quickly lose control and create meaningless cost reports if the company does not have a culture committed to accuracy and compliance with procedures.

Forecasting Labor

The key to a good labor forecast is quickly and accurately determining project-to-date productivities or unit costs. As stated earlier, this starts with a proper job cost breakdown, but it also requires a method for tracking units

installed or hours spent in conjunction with work completed. Methods can vary from sophisticated quantity surveys using marked up progress prints to a simple manpower loading schedule (such as the one shown in Figure 4). Labor should always be tracked at the cost code level but methods may for larger jobs than smaller jobs. It is critical to use a logical approach that fits the project rather than someone's opinion or "gut feel." This information is also invaluable should it become necessary to pursue a claim on the project. It can also be very valuable feedback to the estimating group.

It is also critical that field labor supervisors understand the importance of forecasting, the method used, and be intimately involved with producing and redeeming labor forecasts. Statements like, "I *think* we're doing good," or "I *think* we're in good shape," should send up a red flag. These types of statements are evidence that no logical tracking system exists and project team members are flying by the seat of their pants. Don't be surprised if these statements are followed up with, "I *thought* we were in good shape," or "I *thought* we were doing well."

Negative labor trends discovered early present great opportunities for resourceful project managers. If the negative trend is due to the actions, or lack of actions, of others, timely fact based data is critical in making a claim, or arguing for better working conditions. If the trend is an in-house issue, perhaps you can increase apprentice labor, or increase fabrication and subassembly, or re-evaluate supervision.

Never underestimate the resourcefulness of good people when they discover a problem early enough to take corrective action. Management needs to make sure the project management team has the

tools and systems to discover and quantify problems as early as possible!

Forecasting, Equipment and Subcontract Costs

The first key to accurately forecasting equipment and subcontract costs is to act with a sense of urgency when buying-out a project. The project team needs to quickly identify items and subcontracts to be purchased, assemble a purchasing log and get these items bought out. The second key is to focus on committed cost. As the buyout is accomplished quickly and accurately, enter purchase commitments into the job cost system. Third, by purchasing as much as possible early in a project, including placing bulk pipe and fitting orders, you can minimize the outstanding dollar amount in the material category and reduce day to day material purchases - which greatly complicate forecasting.

By comparing the committed costs to estimated values, it is possible very early in a project to identify negative variances that need to be compensated for and positive variances that may serve as contingency funds for a later date. Once again, if discovered early, there is a significantly better chance of compensating for negative variances.

Forecasting Material Costs

Forecasting the future cost of material purchased on an intermittent basis from the field is extremely difficult. Once again, the prompt and accurate entry of purchase commitments is critical. Always be thinking committed cost; incurred cost is history.

One simple forecasting technique that often suffices is to first establish with field supervisors the starting value for

field materials. Then, as the field staff orders materials, a set of progress prints is colored in, or marked, to indicate what areas have been fully ordered (this has the secondary benefit of helping supervisors focus on purchasing in a logical fashion). These marked up documents can be evaluated by a variety of means (footage ordered/total footage, etc.) and a reasonable percentage of total material ordered can be calculated. Since we have already established that as much as possible should be purchased with PO's, we should be able to quickly price the orders and enter a commitment into the job cost system. Comparing the value of the committed cost to the forecast cost produces % committed. Compare this value to % ordered from the drawings. Any variance between % ordered % committed must be addressed.

As an example, if committed cost is 30% of the forecast cost and marked up drawings indicate 50% of the job has been ordered, it would appear there are additional profit, or contingency, funds in the material forecast. Keep in mind that purchase commitments must be entered accurately and timely.

The Role of the Accounting Group and Systems in Forecasting

Job cost accounting systems and software play a critical role in acquiring good data and simplifying forecasting. Because accurate and timely forecasting is critical to maintaining and increasing profitability, these accounting systems and tools must be carefully designed and selected. A company culture that demands accuracy and prompt data input is critical to producing meaningful forecasts.

There is a wide variety of software available that provides both job cost (accounting) tools and forecasting tools.

At a minimum, the system should: allow for adequate job cost breakdowns; combine job cost, payroll, and purchasing data easily and in a timely fashion; produce budgeted, incurred, committed, and forecast costs; be available to project management at any time; and facilitate the easy entry and tracking of change orders. Many systems use computer calculations to aid in forecasting and some permit “on screen” forecasting by simply adjusting any one of the following values: hours, labor dollars, unit cost, total cost, or units. More advanced software packages produce computer calculated cost variances by applying actual unit costs and/or actual labor unit costs to uncompleted work.

In Summary

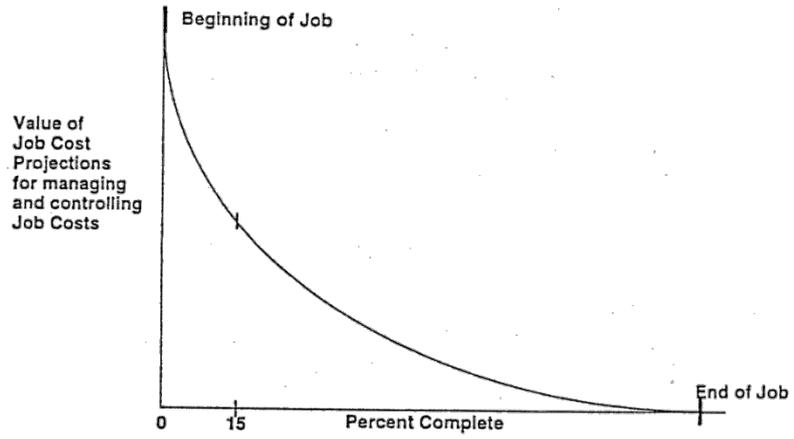
Effective project management focuses on the future, just as good trade supervision must plan ahead for labor crews to be productive. The ability to manage to a budget, be resourceful and develop creative plans to minimize *future* costs separates great project management from good project management. And, the sooner potential problems are discovered, the greater the chance they can be avoided.

Regularly using a methodical approach to look ahead and forecast project performance can help identify upcoming problems and opportunities for savings. The question “how often should I do a forecast” isn’t appropriate. The best project managers will *a/ways* be working to an accurate and credible forecast.

How often they may actually update or revise the forecast depends on the nature of the project and the accounting tools available. The level of detail in the forecast depends on project complexity and it needs to be a team document that is understood and supported by all stakeholders – trade supervisors, purchasing, subcontractors and the client, when appropriate.

Furthermore, performance is improved simply by performing accurate and constant measurement. It is a fact that whether you’re trying to lose weight, get in shape, or manage a major construction project, accurately and regularly measuring progress improves results.

Figure 1 - Value of Job Cost Projections vs. Time



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<u>Cost Codes</u>	<u>Cost Categories</u>				
	<u>L</u>	<u>M</u>	<u>E</u>	<u>S</u>	<u>ODJC</u>
001					
002					
003					
004					
005					
006					
007					
008					
009					
010					
011					
012					
013					
<u>Totals</u>					

Figure 2

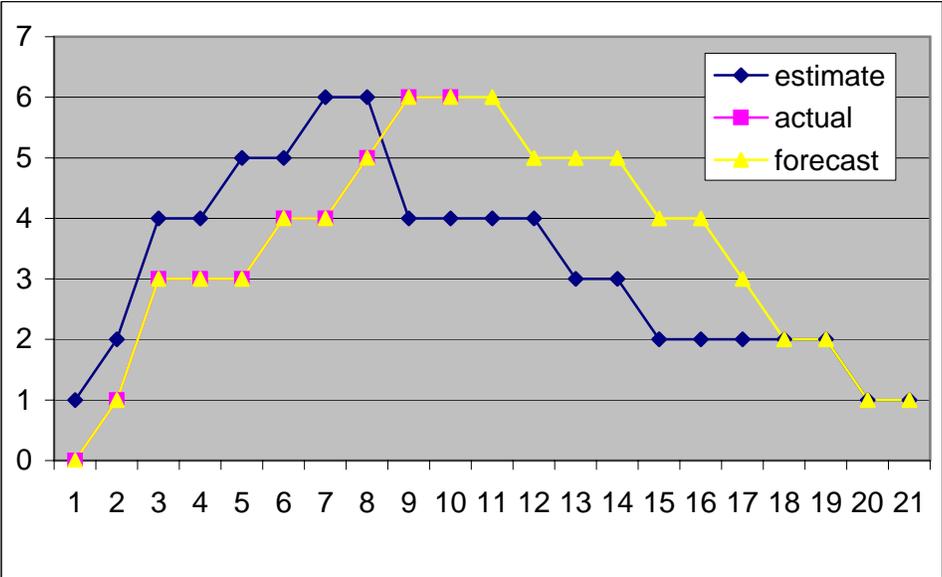
<u>Cost Codes</u>	<u>Cost Category - Material</u>			
	<u>Budgeted Cost</u>	<u>Committed Cost</u>	<u>Incurred Cost</u>	<u>Forecast Cost at Completion</u>
001	\$10,000			\$10,000
002		\$10,000		\$10,000
003			\$10,000	\$10,000
Total				\$30,000

Figure 3

Figure 4

LABOR TRACKING AND FORECASTING

<u>wk</u>	<u>estimated</u>	<u>actual</u>	<u>forecast</u>
1	1	0	0
2	2	1	1
3	4	3	3
4	4	3	3
5	5	3	3
6	5	4	4
7	6	4	4
8	6	5	5
9	4	6	6
10	4	6	6
11	4		6
12	4		5
13	3		5
14	3		5
15	2		4
16	2		4
17	2		3
18	2		2
19	2		2
20	1		1
21	1		1
Total	67	35	73





Bulletin

Controlling Project Costs Caused by Third-Party Commissioning Agents

INTRODUCTION

Mechanical contractors have been subject to scope-of-work “creep” by third party commissioning agents. They may require activities that are beyond the original bid scope and design of the project. This impacts the mechanical contractor’s cost and potentially has schedule implications. In addition, pricing the cost of working with a third party commissioning agent at bid time can be difficult if the scope of the commissioning agent’s work is not understood.

How does a mechanical contractor minimize the potential for cost increases and schedule impacts due to scope creep by the third party commissioning agent? How does a mechanical contractor price the cost of third party commissioning accurately?

PRE-BID IDEAS—GET THE PRICING RIGHT AT THE BEGINNING

1. If the plan documents call for third party commissioning, find out (by the RFI process, if necessary) who the commissioning agent is and what is included in their scope of work. Request specifics regarding the commissioning process the commissioning agent intends to follow.

2. Request a copy of any and all forms that the commissioning agent may request from the mechanical contractor, including any required record keeping or any other data capture system.
3. Pay particular attention to:
 - a. Duct and piping pressure testing requirements
 - b. Assembly testing
 - c. Duct cleaning
 - d. Hydro testing, flushing, cleaning and fill requirements for hydronics systems
 - e. Operation and maintenance formatting and assembly requirements
 - f. Testing and balancing requirements above industry standards
 - g. Cost of chemicals, process fluids, fuels, and disposal
4. Depending on the commissioning agent’s processes and scope, the project manager’s work may be accelerated at the front end of the project when your staff is busy with procurement, submittals and pre-planning. There will also be time and scope demands during the close-out

phase. Both time periods can mean that project staff, who may already be dealing with demanding phases of the job, will be doubly burdened.

5. If the third party commissioning agent has not yet been selected or if the scope of the commissioning agent's services are not clear, consider adding an allowance for commissioning support in the bid.
6. Regardless of how clear the scope of commissioning services may be, it may be wise to break out commissioning assistance as an additional cost to the base bid, listing the allowance or cost separately.
7. Consider the following language to be added to your scope/bid letter:

“Our pricing assumes that the drawings and specifications prepared by the designers integrate their detailed review of manufacturer’s installation, operation and maintenance information for the specified equipment, and that those requirements are evident in the plan and section views of the equipment, as well as any associated installation details. If there is no basis of design equipment, the contractor qualifies that there may be added costs associated with installation requirements unique to the equipment that have not yet been researched or identified by the design and construction team.”

And/or:

“Our pricing assumes that any associated latent construction activities required to properly install and operate systems, if not rendered in plan, section, or detail, will be provided by others. For example: concrete and roofing work of any kind, curb leveling, structural reinforcement, or line voltage wiring, fire alarm devices, or interlocks, etc.

—not shown on the project documents, but required to meet manufacturer’s installation, operation and maintenance requirements—will be provided by others customarily assigned those responsibilities.”

POST AWARD IDEAS – LIMIT THE POSSIBILITY OF SCOPE EXPANSION

1. Request a kick-off meeting with all interested parties shortly after award to review the commissioning plan for the job. The interested parties should include the construction manager (CM), design engineer, electrical contractor, controls contractor and commissioning agent.

During the kick-off meeting (and in addition to detailing the commissioning plan):

- a. Verify with all parties that the contractors are to comply with the scope of work, not to re-engineer the job to the commissioning agent's desires. To the greatest extent possible, verify that the commissioning agent understands the system design and the contractor's scope of work.
- b. Seek input on how the commissioning agent and CM want the contractor to communicate issues related to complying with the bid scope of work.
- c. Develop an understanding among the parties regarding how the CM and commissioning agent will communicate with the owner, if necessary, when proposed actions are not in the scope of work.
- d. Review the timing of jobsite visits. Plan for visits at strategic times related to the construction schedule to identify corrections to the work at times related to the work activities.

- Waiting until the job is in start-up phase to identify corrective actions is disruptive and expensive.
- e. Request that the commissioning agent pay particular attention to the control and equipment interface – right after submittal approval and before construction starts.
 - f. Address commissioning as a separate activity in the construction schedule so as not to compress these activities with start-up and punch out.
2. Have the commissioning agent review all samples, models and mock ups, and approve them before construction begins.

DURING CONSTRUCTION – IDEAS TO MINIMIZE THE RISK OF DOWNSTREAM ADDED COST AND SCHEDULE IMPACT

1. Require your vendors and suppliers to provide equipment submittals tightly edited for the project and so identified. If they do not, then do so yourself. You will probably learn some interesting things.
2. If possible before equipment release, but shortly thereafter, require your vendors and suppliers to provide equipment installation/operations Manual (IOM) information edited for the project. If they do not, then do so yourself; you may learn a great deal. Either way, your foreman (or delegate to journeyman) should read the IOM and compare it to the design, reviewing impacts with the design engineer or project manager as he/she sees fit. There may be change orders; or there may be multiple, easier ways to meet a requirement; or there may be options available on the equipment that finesse certain issues. If you are substituting procedures, there is a potential major risk that needs review.
3. Distribute equipment IOMs to the other trades early in the project. There may be impacts on others and they need to review and respond to their own requirements. Don't get stuck with a roof tap unit (RTU) condensate drain pan that pools when the general contractor doesn't level the curb.
4. Direct the PM, design engineer or service technician to search the temperature control proposal and submittals and equipment submittals for excluded or missed line voltage interlocks, fire alarm interface, and equipment with field wiring performed by others. If you have the resources to initiate this effort early in the project, you may be able to negotiate a deal with the electrical contractor. You may or may not get paid ... but this should minimize rework and ease start up complications.
5. Execute the manufacturers' installation checklists to the extent you are responsible and as modified for the job. File in an accessible location.
6. Keep up with internal documentation to give evidence of quality assessment/ quality control (QA/QC) on pipe and duct assemblies: Pressure test reports, as-built drawings, photographs. These will probably be required at the end of the project, and if the commissioning agent comes looking during construction, it discourages scrutiny.
7. Consider the commissioning impact related to temporary use of the permanent mechanical equipment during construction. Are there maintenance requirements that will become an issue for the commissioning agent later? Discussing these issues in advance may save costs later and, depending on the scope, may identify change order opportunities.



Bulletin

Temporary Usage of HVAC Equipment

Introduction

Today's building owners need to understand the risks involved in using permanent HVAC systems to provide temporary heat during construction.

Owners should consider using temporary heating, cooling and dehumidification equipment specifically designed to be used for climate control during the construction process.

The following provides a summary of requirements of the SMACNA IAQ (Indoor Air Quality) guidelines for an occupied building under construction, 1995, Chapter 3:

- HVAC equipment must be protected from dust and odors.
- The return side of the system is extremely vulnerable since it is under negative pressure during operation. Be sure to watch the location of all intake related parts of the system, whether outdoor air grilles, ceiling plenums, transfer vents, etc. to ensure contaminants are not entering the mechanical system.
- Seal all return system openings with plastic. And, photograph the sealed equipment to document your procedures.
- When there is a lot of debris at the site, that portion of the system where work is going on should be dampered off. If the whole site is at risk, the entire system should be shut down and protected.
- It is preferable not to use the permanent mechanical system, but if it must be used, temporary filters should be added to all appropriate grilles, intakes, etc. These filters must be maintained throughout their operation and then replaced at the end of the project.
- **DO NOT USE THE MECHANICAL ROOM FOR STORAGE.**
- Increase filter efficiency, if necessary, and use activated filters if there are odor problems.
- When systems are off, all diffusers and outlets should be sealed with plastic.
- On existing duct work, professional duct cleaning is sometimes necessary.
- Source control is an important method to keep contaminants out of a building. For the mechanical contractor, this typically means

mandatory use of low volatile organic compound (VOC) caulks, adhesives, sealants, cleaning fluids, etc. This would also include welding, which could be more problematic.

- Pollution sources may be exhausted through local, portable exhaust systems.
- Portable air cleaners may sometimes be required.
- Items that give off VOCs can be controlled by enclosing or sealing.
- Pathway interruption is often used to keep contaminants from spreading through a worksite. This can involve the mechanical contractor when the HVAC system is needed to depressurize the work area. Take care to protect the system when it is used in this way. This might mean extra filter changes and even duct cleaning due to heavier air flow.
- A recommended exhaust rate for negative pressure for this guideline is 10% greater than the supply air rate.
- Whether using positive or negative pressure, always remember to protect the system from contaminants. Do not forget to rebalance the system, if necessary.

LEED Considerations

As a mechanical contractor on a LEED job, it is important to take time to consider the LEED NC version 2.2, which provides a point (EQ Credit 3.1) preventing contamination of building systems and materials during the construction process.

This impacts the mechanical contractor in several areas:

1. An indoor air quality (IAQ) management plan must be adopted. The contractor should receive a copy of this plan before bidding on the job to determine its responsibilities. As the contractor, you may or may not be asked to sign off on the plan, but have a copy signed and dated by the architect-engineer or the general contractor in case changes are made and you are not notified. In some cases, you may even be asked to provide your own procedures on how you keep the mechanical systems free from contaminants.
2. Credit 3.1 requires you to meet or exceed control measures as recommended by SMACNA's IAQ Guidelines for occupied buildings under construction, 1995, Chapter 3. The SMACNA Guideline addresses HVAC protection, source control pathway interruption, housekeeping and scheduling.
3. **This credit discourages the temporary operation of mechanical systems, if possible.**
4. You may also be responsible for keeping logs, whether you purchase the system or not, of filtration media. You will need to list the manufacturer model number, menu rating and location of all filters and verify they were replaced prior to final occupancy.



Bulletin

Integrated Project Delivery (IPD)

Introduction

Our industry today appears to be evolving at a faster pace than we have experienced in the last 30 years. Customers are demanding greater value, technology—both hardware and software—is evolving rapidly, and our need to increase productivity is driving profound changes in how we execute our scope of work in the construction industry.

Lean concepts traditionally used in the manufacturing industry are alive and well in the construction industry. At the core of Lean is the elimination of waste. Through this drive to eliminate waste, owners and general contractors (GCs) are seeking new contracting methods to aid the overall Design/Bid/Build process. The Integrated Project Delivery (IPD) method is becoming the dominant contracting strategy to assist in streamlining all aspects of the construction process and aid in the drive to eliminate waste from the system.

The IPD methodology is rooted in the idea of truly integrating all parties (owner, designer, GC/CM, and subs) in the planning, design, and construction

process at the earliest possible moment. The assumed outcome, if all parties are brought into the integrated and collaborative model, is maximized efficiency at all stages of the design and construction process.

To best understand the concept of IPD, we will compare and contrast common traits of traditional project delivery methods versus traits of the IPD method. We will also look at some of the benefits to the various parties involved. Then, we will address some of the basic principles of IPD and show the varying levels of IPD.

Common Traits of IPD

The best comparison of traditional project delivery vs. IPD comes from *Integrated Project Delivery: A Guide*, version 1, © 2007, AIA National | AIA California Council. The table on the next page shows the comparison of six specific areas associated with either method (Teams, Process, Risk, Compensation/Reward, Communication/Technology, and Agreements).

Traditional Project Delivery		Integrated Project Delivery
Fragmented, assembled on “just-as-needed” or “minimum-necessary” basis, strongly hierarchical, controlled	Teams	An integrated team entity composed of key project stakeholders, assembled early in the process, open, collaborative
Linear, distinct, segregated; knowledge gathered “just-as-needed”; information hoarded; silos of knowledge and expertise	Process	Concurrent and multi-level; early contributions of knowledge and expertise; information openly shared; stakeholder trust and respect
Individually managed, transferred to the greatest extent possible	Risk	Collectively managed, appropriately shared
Individually pursued; minimum effort for maximum return; (usually) first-cost based	Compensation Reward	Team success tied to project success; value based
Paper-based, 2 dimensional; analog	Communications/Technology	Digitally based, virtual; Building Information Modeling (3, 4, and 5 dimensional)
Encourage unilateral effort; allocate and transfer risk; no sharing	Agreements	Encourage, foster, promote and support multi-lateral open sharing and collaboration; risk sharing

Source: *Integrated Project Delivery: A Guide*, version 1, © 2007 AIA National | AIA California Council.

As you can see, the Traditional Project Delivery method is a very silo-based and individualistic model in which risk is passed down to the lowest level and information is shared on an only-as-needed basis. It does not encourage or foster any kind of team effort, but rather an atmosphere in which contractors focus on covering their risk and not considering the needs or success of other stakeholders.

On the opposite end of the spectrum is the IPD delivery method. It focuses on leveraging the knowledge base of all stakeholders where everyone is collaborating to ensure the overall success of the project and each of the stakeholders. It drives a more welcoming and friendly atmosphere,

which ultimately drives a more favorable, “fun” culture while eliminating impediments throughout the lifecycle of the project.

Benefits of IPD

Benefits that arise from the use of the IPD delivery method are vast and impact all parties involved in the construction process. Designers benefit from the expertise contractors provide by participating early in the design process. Documentation time is streamlined, and IPD leads to better cost control and budget management. Contractors benefit from cleaner design drawings that reduce change orders and RFIs and allow for early pre-planning that can increase productivity and lead

to more effective adoption of fabrication and modularization techniques.

The owners are winners as well with IPD since the project team better understands the owners' goals. This facilitates schedule consistency, a streamlined process for evaluating cost options, more accurate budgeting, better forecasting and easier management of costs, schedules and quality.

Basic Principles

At the core of the IPD delivery method are collaboration and planning. To achieve a higher level of collaboration and planning, the IPD method increases the number of participants involved in the early planning and design phases of the project. In addition to the traditional team of owner, architect, designer, and GC/CM are major and minor subcontractors. The team might also include major equipment suppliers. Through a process called “on-boarding,” the team begins to redefine a typical project team by empowering team members with the tools to work together in a manner that requires mutual respect, trust, open communication, and collaborative, innovative decision-making.

Leadership is made up of principles held by each team member and decisions are made as a group with buy-in by all parties required to move forward with an idea. A common feature in an IPD project is the lack of any company affiliation. The project team is viewed as one organization in and of itself; this helps to break down the walls and silos found in more traditional project delivery models.

Compensation strategies in an IPD world are typically GMP or T&M. The key components are those of mutual benefit and reward for all parties and are typically designed around shared

savings plans where risk is spread across all parties.

Through early goal definition the team can set the ground rules for tracking throughout the project, and those rules are owned and agreed to by all stakeholders. This sets the stage for how the team will measure its success.

Once the on-boarding process is complete, the team focuses on planning because the IPD methodology believes increased planning will result in better efficiency during each stage of the project. Planning is also seen as a key area to drive collaboration in the design phase which will ultimately reduce the execution (construction) phase.

Planning processes include such task areas as schedule, performance tracking, BIM execution, fabrication, etc. Essentially all aspects of the design and construction process are followed by all parties throughout the lifecycle of the project. The components of the plan will be tracked to ensure adherence and measured to ultimately gauge project success in safety, schedule, quality and budget.

Technology plays an important role in the IPD world as it is typically used to aid in streamlining processes and maximizing both functionality and interoperability. Use of BIM, heavy fabrication, and modularization can typically be found due to the increased collaboration of trades and the early entry into the project and design process.

Levels

While the term “Integrated Project Delivery” may be fairly new, the concepts are present in a variety of contracting strategies or delivery methods that we are more used to seeing. A joint effort of the National Association of State Facilities

Administrators (NASFA), Construction Owners Association of America (COAA), APPA: The Association of Higher Education Facilities Officers, Associated General Contractors of America (AGC) and the American Institute of Architects (AIA) published a document titled, *Integrated Project Delivery For Public and Private Owners* in 2010.

This document attempts to provide a better understanding of IPD, and includes definitions of the different levels of IPD. The chart below, which was developed for the publication, provides a glimpse into how we see IPD concepts at play in other, more common delivery methods. The publication further explores the concept of IPD as a philosophy or as a delivery method.

	Level One “Typical” Collaboration	Level Two “Enhanced” Collaboration	Level Three “Required” Collaboration
Level of Collaboration	Lower	↔	Higher
Philosophy or Delivery Method	IPD as a Philosophy	IPD as a Philosophy	IPD as a Delivery Method
Also known as	N/A	IPD-ish; IPD Lite; Non-Multi-party IPD; Technology Enhanced Collaboration; Hybrid IPD; Integrated Practice	Multi-Party Contracting; “Pure” IPD; Relational Contracting; Alliancing
Delivery Approaches	CM at-Risk or Design Build	CM at-Risk or Design Build	Integrated Project Delivery
Collaboration	Typical; collaboration not contractually required	Enhanced; some contractual collaboration requirements (early participation of stakeholders, use of BIM, and sharing of models, etc.)	Required; collaboration required by a Multi-Party Contract
Common Contract Type	Open Book, cost-plus with a Guaranteed Maximum Price (GMP); fixed fee	Open Book, cost-plus with a Guaranteed Maximum Price (GMP); fixed fee	Multi-Party, Open-Book, cost-plus without a Guaranteed Maximum Price (GMP); shared financial risk/reward tied to project outcome
Common Procurement Methods	Design; Qualification Based Selection (QBS) Construction; QBS or Best Value (fees)	Design; Qualification Based Selection (QBS) Construction; QBS or Best Value (fees)	Design; Qualification Based Selection (QBS) Construction; QBS or Best Value (fees)

Whether IPD is being used as a philosophy or as a delivery method is largely determined by whether or not collaboration is contractually obligated. Owners who choose to fully implement IPD as a delivery method and contractually obligate all parties to the collaboration levels necessary will see the greatest benefits. Using IPD-ish or IPD as a philosophy can still result in some benefits to the owner, but it is unlikely to provide the full range of benefits.

IPD is a product of the natural evolution of the construction industry. Those that have experienced IPD as a delivery

method see components that are evident on most of our projects today, such as BIM, design-build, fabrication, modularization, last planner, etc. IPD takes these individual ideas or technological advancements and combines them with a culture of open communication, collaboration, mutual respect, mutual reward, and goal setting to provide benefits to all stakeholders in the construction process. It does require a different view on resource allocation due to the early involvement of key project personnel, but the benefits appear to be well worth it.



Bulletin

Minimizing the Risk of Poor Site Conditions

Introduction

Site conditions may significantly impact productivity on the job. Poor site conditions can affect material handling as well as the actual time required for installation of pipe and equipment.

This bulletin will provide examples of site conditions to consider as well as strategies to address unanticipated site conditions and changes to those conditions.

Site Conditions Checklist

Clearly, site conditions are a job-specific issue, but here is a starting point for consideration:

1. **Is there a mud control plan for the worksite?**
2. **What are the pad conditions?** Is the underground work installed after the pad has been poured?
3. **What are the de-watering plans?** Who has responsibility?
4. **What are the soil conditions?** Are the soil boring reports available?
5. **What are the egress and access conditions around the site?** Can forklifts and other material handling equipment navigate the site as needed?
6. **Are material lay-down areas available?**
7. **Can material be handled within the existing building?** How do doorways, hallways, stairs, etc. impact material handling?
8. **Are break/lunch areas, portable toilets, parking and trailers reasonably close to work areas?**
9. **Is lighting sufficient?** Minimal OSHA requirements may not provide sufficient lighting for crews to work productively.
10. **Is adequate power available?** If not, what are the plans for generators, gas powered equipment, etc.? Is there a need for special ventilation for gas powered equipment?
11. **How will the schedule impact the site?** Will the interior be dried in? Is temporary heat needed and, if so, will it be provided?
12. **How do owner-occupied areas affect site conditions?**
13. **What access is provided to multiple floors?** Are there permanent stairs, temporary stairs, extension ladders, elevators, man-hoists etc. If elevators

or man-hoists are provided, are they sufficient for all the craft labor working on the site or will the crews have to wait to access the elevator or hoist?

14. **Is roof access readily available?**
15. **What is the plan for trade contract storage of materials inside the building in the proximity of work areas?** Are any conflicts anticipated?
16. **Are there special security requirements for worker and delivery access to the site?**
17. **If crane use is shared by multiple crafts, what is the schedule and what certainty exists that the schedule can be maintained?**
18. **Will temporary/permanent HVAC be available for comfort during construction?**

Five Steps to Mitigate the Risk of Poor Site Conditions

1. **Make site conditions a specific element of every bid and proposal.** Have a clear understanding of the issues you may face related to site conditions when you bid the job. Visit the site, including new construction, to identify any potential site condition issues.

2. **Use the RFI process to obtain clarity on site conditions that are not addressed in the bid documents.** For example, if the soil boring report is not provided on an underground bid, request it as a specific RFI. If forklift access is a concern, submit an RFI. And, the RFI process will document your bid assumptions if a problem develops later.
3. **Clarify items on your bid that were either not answered clearly or not answered at all.** Again, this notation will document your bid assumptions.
4. **Consider how site conditions may change during construction.** Does the schedule (if one is provided at bid time) give any clues?
5. **Be assertive and raise any site issues that deviate in a significant way from your expectations at bid time as soon as they develop.** Understand that cost over-runs caused by changed or unanticipated site conditions can result in claim issues. Be sure to comply with any claim notice provisions in the contract. Waiting until the job is over to raise these issues is seldom a winning strategy.



Bulletin

Design-Assist Project Delivery

INTRODUCTION

Design-Assist project delivery is a recent trend in the construction industry whereby owners and construction managers (CM)/general contractors (GC) create collaborative hybrid design teams. These teams are tasked with selecting optimal systems at a manageable cost so that the project can be completed within the required schedule and budget.

Mechanical contractors contribute their knowledge of constructability, estimating, construction coordination, and schedule/cost control to the design process. Working together, the team resolves issues during the design phase rather than in the field, where costs are higher and risks are greater.

This method of project delivery, which is distinct from Design-Bid-Build and Design-Build, offers a number of advantages and also involves risks that mechanical contractors need to be aware of.

THE DESIGN-ASSIST PHILOSOPHY

The Design-Assist project delivery method benefits from the early engagement of Design-Assist subcontractors, usually the mechanical, electrical and plumbing (MEP) subcontractors. Under this procurement

method, an owner or CM/GC may award a construction contract on a best value basis prior to the completion of the design. While Design-Assist is not considered a form of Integrated Project Delivery (IPD), there are similarities that may provide benefits to the mechanical contractor.

The Design-Assist process places the MEP subcontractors under contract early in the project – during the design phase. Subcontractors are selected using a bidding process based on schematic design or design development documents.

Using this process, the project team is able to employ the expertise of the Design-Assist subcontractors in both the design and construction phases to optimize project cost, value and constructability. The Design-Assist process seeks to resolve design and constructability related issues prior to construction, thus maximizing the overall value, speed of construction, and quality of the final product.

The Design-Assist process is not intended to transfer design liability to the Design-Assist subcontractors; the design professionals retain both responsibility and liability for the design.

Building Information Modeling (BIM) is often utilized on Design-Assist projects

to bring the constructability expertise of the subcontractors to the engineering design of the project.

THE BIDDING PROCESS AND CONTRACT FORMAT

Under a Design-Assist construction approach, the owner typically contracts with a CM/GC on a Design-Build basis or with a CM/GC at Risk with a Guaranteed Maximum Price format.

The CM/GC will usually issue a Request for Quotation (RFQ) or Request for Proposal (RFP) to the MEP bidders based on preliminary project documents (design development drawings, design narrative, scope of work, construction schedule, etc.). The documents that are issued as part of the RFP or RFQ are not a complete design package.

A contract is awarded to a successful mechanical contractor on a qualification/evaluation basis (rather than a low bid approach). Factors that are used in the evaluation process include: strength of the proposed project team, previous Design-Assist or Design-Build experience, the contractor's financial strength, relevant project experience and level of expertise in BIM/CAD coordination, as well as the mechanical contractor's construction cost budget.

The two predominant methods of contracting after award are:

Single Step Process – the CM/GC issues a single Design-Assist contract that includes the mechanical contractor's cost for involvement in the design and budgeting process as well as a commitment to participate in the project construction. The contract can be based on the mechanical contractor's budget or the GMP established during the RFP process.

Two Step Process – the CM/GC issues a contract for the portion of the Design-Assist process that involves the mechanical contractor working with the CM/GC and mechanical engineer during the design and budgeting process. This is done with the goal of negotiating a Guaranteed Maximum Price or Lump Sum Price contract for the construction at the completion of the design.

BENEFITS TO THE OWNER AND/OR CONSTRUCTION MANAGER/ GENERAL CONTRACTOR

Design-Assist allows the CM/GC to bring the major trade subcontractors on board early in the design process to gain their knowledge of pricing, constructability, design alternatives, etc.

When the mechanical contractor participates in the design and constructability process, potential design and construction problems can be addressed before construction, thereby reducing costs for redesign as well as RFIs and rework during construction.

The Design-Assist process gives the owner and CM/GC more confidence in the constructability and pricing that the mechanical contractor develops for the project. In addition, it lowers the owner's risk of price creep due to unexpected design changes.

The Design-Assist process can be used on a fast track schedule and a successful project can be completed in less time than the traditional Design-Bid-Build project approach.

BENEFITS TO THE MECHANICAL CONTRACTOR

The Design-Assist approach can yield a more collaborative, less adversarial contract approach. This often results in a —win-win” relationship between the

owner, CM/GC and mechanical contractor.

Award of contract usually takes a “best value approach” where factors other than low price are part of the evaluation process.

Because the mechanical contractor will be intimately involved in the design process from an early stage, the contractor has more control over and input on the system design, materials, constructability issues, etc. This should enable the contractor to better manage risk and cost.

The design liability resides with the mechanical engineer that has been contracted by the owner or CM/GC as part of the Design-Assist process.

RISKS TO THE MECHANICAL CONTRACTOR

There is a risk for the mechanical contractor committing to a Guaranteed Maximum Price (GMP) or Lump Sum price early in the Design-Assist process, before the design is far enough along to have confidence in pricing. There will be pressure from the CM/GC to maintain the estimated project cost within the owner’s established budget to prevent the owner from obtaining competitive pricing. The end result might be a lower profit margin than desired as the mechanical contractor absorbs construction costs for late design changes while trying to keep their estimate within the Lump Sum or GMP budget.

If the mechanical contractor can’t maintain the construction estimate within the owner’s budget, there is a risk that the owner and CM/GC will solicit other mechanical contractor bids for the project after the design is complete.

If design errors or omissions are discovered during construction, the responsibility for the cost of these errors or omissions will often fall to the mechanical contractor to absorb since they were involved as a partner in the design process.

The success or failure of the Design-Assist process often relies on the culture and mindset of the companies involved. Companies that traditionally work in the Design-Bid-Build and low-bid competitive environment might not be good partners on a team utilizing the Design-Assist process.

MANAGEMENT RECOMMENDATIONS FOR MECHANICAL CONTRACTORS

Mechanical contractors should carefully evaluate the other partners in the proposed Design-Assist process, particularly the owner, CM/GC and mechanical engineer. If their mindset isn’t collaborative, the Design-Assist process will have a lower chance for success and a higher risk to the mechanical contractor.

The mechanical contractor should actively involve a project manager and/or estimator in the early stages of the Design-Assist process, while design is in progress. Since a construction budget is often established as part of the RFP process, it is important for the mechanical contractor to take an active role in the design and constructability review, and to provide budget pricing updates on a regular basis during the design phase.

Be cautious of a proposed Design-Assist process that requires the mechanical contractor to provide a price guarantee as part of the RFP process without sufficient allowance for contingency. At this early stage in the process, the design is often not developed enough to allow an accurate

estimate to be prepared. Good communication of the work scope included and allowances being carried can provide some leverage during final pricing.

SUMMARY

The Design-Assist approach offers the mechanical contractor the opportunity to work with the owner and CM/GC in a collaborative contracting approach. This enables the mechanical contractor to manage risk and increase the chances for a profitable and successful project. There are certain benefits available to the Mechanical Contractor to participate in a project where the Design-Assist contracting process is employed, but the contractor also needs to be aware of the potential risks involved and manage those risks accordingly.

SOURCES OF INFORMATION USED IN THIS BULLETIN

1. Alliance for Construction Excellence, *Design-Assist, Best Method Approach to Subcontracting*, final issue March 8, 2013.
2. Pharmaceutical Engineering, *Fast-Track Life Science Projects: When to Use Design-Assist and Why It Works*, September/October 2011.
3. MCAA *Management Methods Bulletin JM 12, Integrated Project Delivery (IPD)*, 2015.
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Bulletin

Turnover Meetings— Estimating/Sales to Project Management

INTRODUCTION

“The beginning is the most important part of the work.” Plato, one of the greatest thinkers of all time, famously said this almost 2,500 years ago. Even though this concept has existed for thousands of years, some still dive head first into a project without much thought about how to start or even a complete understanding of the project to be undertaken.

Pre-project planning is critical to a successful project and MCAA’s *Planning for Profitability: Your Guide to Successful Pre-Construction Planning* does an excellent job of discussing the planning process. This Bulletin will expand on one early aspect of the pre-project planning process – the turnover meeting.

WHAT IS A TURNOVER MEETING?

Otherwise known as a kickoff or start-up meeting, the turnover meeting is a transfer of information from one party to another. In this case, the information is transferred from the person or persons who prepared the estimate and proposal to the project management team who will be executing the project. The turnover meeting is effectively a handoff – a turnover of the project.

Sounds simple enough, but the details are critical, and how your company culture addresses turnover meetings can turn a dull and routine meeting into a productive and rewarding planning exercise. The remainder of this Bulletin identifies the traits of highly-effective turnover meetings.

WHAT PROJECTS REQUIRE A TURNOVER MEETING?

Every project that is managed by someone or some team, other than those who estimated and sold the project, requires a turnover meeting.

In some ways small projects often benefit more from a thorough turnover meeting than large jobs. Small jobs – with their quick pace and thin margins – can’t afford to get off to a bad start, and there is simply no time to recover from one.

For very small projects, the meeting might involve only one or two people and take 30 minutes, but the concepts of an effective and thorough turnover are the same regardless of the project size.

WHO ATTENDS THE TURNOVER MEETING?

Be wary of the project manager who confuses being in control with being the one who needs to know everything and then dishes out that information on a “need to know basis.” By including **the entire project management team in the turnover meeting**, you create a collaborative environment, encourage creative discussion, and accelerate the sharing of information. The presence of the entire team also increases the project experience, and there is no substitute for experience (we’ll come back to that later).

On top performing teams, each individual must know and understand the role of every other team member AND how their actions impact the performance of others. Only by understanding how their actions impact others’ performance can team members make productive improvements to the overall process. Construction is a team sport, and the team must be together when the initial “game plan” is revealed.

So, who is the “project team?” This can vary widely based on the type and size of the project. On large projects in complex organizations, the team might include the following:

- Project Manager and PM Staff
- Estimator
- Account Manager
- Labor Superintendent
- General Foremen
- Fab Shop Foreman
- Safety and Risk Manager
- Engineering Manager
- Trucking/Tool Room Manager
- Purchasing Manager
- CAD/BIM Supervisor
- Service Sales Supervisor

THE PROJECT MANAGER

The project manager is the most important figure in the turnover process. Highly effective project managers understand that they need a team. They work hard to communicate team roles and expectations and hold individuals accountable. This is true even on small projects – maybe the team is small (perhaps just a foreman, the fab shop supervisor, trucking manager and the labor superintendent), but each team member needs to understand the big picture and how their performance impacts the overall process. The turnover meeting sets the tone for a collaborative process.

Henry Ford said, “Coming together is the beginning, keeping together is progress, but working together is success.” At the turnover meeting, the team begins to work together and the project manager must be the team leader and foster productive relationships.

WHEN DOES THE TURNOVER MEETING OCCUR?

The most effective meetings take place after the attendees have an opportunity to review some of the documents and project materials. Ideally, estimating furnishes those materials to project management for their initial review and development of a preliminary understanding of the project. This also allows operations to select appropriate team members and finalize the project staff. The foreman selected should be familiar with this type of work and facility.

HOWEVER, it is critical that project management have a sense of urgency about the turnover meeting. The project review **MUST** be conducted with a sense of urgency and the team selected without delay. If estimating/sales feels a project award is imminent, they too must

act with urgency and furnish project management with the estimate, proposal and other sales materials as soon as possible.

Once project management has completed a preliminary review and the project team is finalized, the project manager should immediately schedule the turnover meeting.

HOW LONG DO THESE MEETINGS TAKE?

If conducted well, turnover meetings almost always take longer than you think they will. Very small projects can be quick, but large, complex projects can take days to thoroughly turnover. It is important not to rush this process and to focus on DETAILS.

NOTE – there is no question that details are important to project management and labor when we begin a project. An extremely valuable side effect of good turnover meetings is that estimating and sales learn what is important to operations. Operations must seek details in the turnover meeting, and by doing so, they help to improve the estimating process.

WHAT ARE THE TOPICS OF DISCUSSION?

Attached to this Bulletin are a variety of sample forms that can help to guide the discussions at these meetings. But, it is important to think of those forms and checklists in that mindset – as guides and reminders. Each project has unique challenges and subtle differences that become obvious only through discussion and questioning.

Generally the topics covered in the turnover meeting fall into the following categories.

Project Overview: A “big picture” review; the customer, the nature of the work, the type of contract, the schedule, etc.

Estimating Details: What are the numbers? A review of the estimating summary sheet, number of hours, how much money is being carried for the equipment, whether it is taxable, etc.

The Logic Behind the Estimate: This is a critical and often overlooked aspect of the meeting. A good estimate and proposal are more than a collection of numbers; they are a preliminary construction plan. This is a discussion about what is BEHIND the numbers. Why did we use a certain productivity factor? Where do we think the crane will be set? What can we fabricate? Where can we store materials? How did we assume the equipment would be set? What are the most significant risks (financial and safety) in the project? What are the opportunities for gross margin improvement in the project?, etc.

NOTE – Remember that good turnover meetings have the added effect of improving future estimates.

The “Deal”: We are in the *contracting* business. It is very important that in addition to planning how we intend to build the project, we dedicate time and energy to understanding and optimizing “the deal.”

The “deal” as referred to here can be just as important to a successful project as the construction plan. Aspects of the “deal” that need to be discussed and understood by the team might include:

- What are the contract terms and conditions?
- What clarifications, or exclusions, were identified in our proposal?
- Why did we pursue this project?
- What is our relationship with the customer?

- Do we have any special vendor relationships?
- What is the process for change order, or additional, work?
- In what format will we present change orders?
- Can we offer substitutes, provide value engineering?

NOTE – the turnover meeting is the time to identify cost savings opportunities. The project is in the “honeymoon phase” and partners are most likely to be cooperative. It is important to identify margin and building improvement ideas now, while the project is fresh in the estimator’s mind, and with the entire team present.

- Is there a value engineering deduct to offer that can also help to establish the change order format?
- How will the labor rates be established?

A NOTE ON EFFECTIVE COMMUNICATION AND ATTITUDE

The personalities and communication styles of successful project managers can be VERY different than those of estimators. Effective project managers need to understand those differences as they push for sales specifics and details. The turnover meeting can be intimidating for estimators if they feel their work is being scrutinized and criticized.

Estimators typically have a very short time frame and little information with which to prepare proposals and estimates. Their assumptions and plans will normally be very preliminary and perhaps with little or no direction from the customer. Nonetheless, it is always more effective to fully understand an early preliminary plan and build on it instead of starting from scratch. Be

supportive of your estimators and encourage them to be open and share all of their thoughts and ideas.

The turnover meeting is not the place to be critical of estimating. The attitude of project management should be understanding, supportive, optimistic and forward thinking. Mistakes will be uncovered, and that is a good thing in the sense that when found early they can often be overcome.

Stay focused on the goal and remember the world is filled with problem finders because that is easy. The most effective project managers look forward, are optimistic and are problem solvers.

Good project managers will try very hard to find BOTH problems (risks) and opportunities at the turnover meeting. Studies show that the earlier these are discovered, the greater the possibility that risks can be overcome and opportunities maximized.

Great project managers enlist the entire team in this effort. They understand that the estimate doesn’t determine how the job will end, just where it starts. By involving estimating, they may even help to develop better estimates.

AVOIDING INFORMATION OVERLOAD

There can be an enormous amount of information exchanged at the turnover meeting, particularly for large projects. This makes it important to have an organized approach to the meeting. Here are some techniques that help.

Break down the project into five “sub projects” and review each as though it is a separate, independent job. The stages are:

1. **The Labor Project.** What are the labor-related items and issues, such as the labor estimate, crew make up

and size, material handling plan, fabrication plan, etc.

2. **The Material Project.** What are you buying, who is buying it and for how much, opportunities for value engineering, storage plans, etc.
3. **The Equipment Project.** Who is buying, any relationships, delivery and rig plan, who does start up, warranty details, etc.
4. **The Subcontract Project.** How much did we carry, what is the exact scope, who is qualified, etc.
5. **The General Conditions and Other Costs Project.** What do we need to rent (lifts, cranes, etc.), tools, jobsite office, permits, etc.

Use the team. Operations and project management can ask that individuals take a leadership role in one aspect of the job. For example, they might assign an assistant project manager or purchasing agent to lead the equipment buy-out or assign the labor superintendent or general foreman to spearhead the details of the labor plan.

Checklists and forms can be extremely helpful to thorough and productive meetings (attached to this Bulletin are several examples). Incorporate them into your company procedures and see that they are used consistently.

SUMMARY

Turnover meetings are much more than simply exchanging estimates. These meetings will have a significant positive impact on your business if your company culture embraces three critical strategies and initiates them at turnover meetings:

1. **Planning.** It's really all about planning. Having estimating/sales develop an effective preliminary plan that can be built on and developed

by project management. Effective project management looks ahead and tries to take control of future events to manage the outcome. The best way to do that is to develop a sound plan and update it regularly.

2. **Experience.** Use the combined experience of the team to apply best practices, learn from past mistakes and anticipate obstacles. Share like experiences and use them to identify potential hazards and opportunities.
3. **Risk AND Opportunity Management.** Get into the tiniest details of the project and work to find the risks AND the opportunities. The best way to manage the risks and optimize the opportunities is to find them as early as possible.

MAJOR PROJECTS: NEW JOB SETUP CHECKLIST

PROJECT NAME / NO. _____

ITEM	RESPONSIBILITY (NAME)	DATE COMPLETED
Turnover meeting w/ estimating		
Letter of Intent		
Signed Contract		
Insurance certs to customer		
Contract Abstract (Notice, CO proc, etc)		
Verify contract docs (dwgs, schedule, specs) dates & revs		
Project specific subcontract/ PO terms		
ID and communicate to team unusual General Conditions (temp heat, clean up, drug testing, extended warranties, special testing, X-Ray welding, special safety rules, other work rules, liquidated damages, etc)		
New job setup input form		
Assumptions to customer and GF		
Kickoff meeting w/ general foreman		
Safety program - job specific		
Cost code strategy and breakdown		
Labor Cost (\$'s & hours) breakdown		
Equipment Breakdown		
Subcontract Breakdown		
Material Breakdown		
Other Cost Breakdown		
Schedule / milestones		
Manpower loading curve		
Productivity tracking plan		
Crew mix / crew rate breakdown		
Purchasing Log - enter ALL Equipment and subs		
EQ Purchasing Plan - WHO buys what		
Material purchasing plan		
SIGNED subcontracts & insurance certs		
Change order log		
Change order template - breakdown, job specific		
Change order labor rates		
RFI Log		
Shop drawing log		
Set up filing system		
Schedule of Values		
Value Engineering review		
Submit VE - "T" drill shaped nozzles, grapple		
PVF and Hanger standards		
Duct construction standards		
Permits - who and which?		
Jobsite office and tool storage		
Equipment rental plan / special tools		
Construction Plan document		
Turnover meeting with CAD		
Foreman books with safety info		
Initial tool order		
New hire packets - project specific		

Site Risk Assessment

General Contractor:											
Are we Prime Contractor?				Y	N	Job #:					
Job Name:											
Project Manager:											
Piping Foreman				Y	N	Who:					
Sheet Metal Foreman				Y	N	Who:					
Plumbing Foreman				Y	N	Who:					
Laborers				Y	N	Who:					
Boilermakers				Y	N	Who:					
Site Address :											
Start Date:					Finish Date:						
Day Shift:				Y	N	Night Shift:		Y	N		
Weekend Work:				Y	N	Shift or Overtime:		Y	N		
Our Job Scope:											
Roof Work				Y	N	Confined Space				Y	N
Shut Down Roads				Y	N	Asbestos				Y	N
Shut Down Sidewalks				Y	N	Lead				Y	N
Respirators				Y	N	Lockout/Tagout				Y	N
Ladders				Y	N	Special PPE				Y	N
Scaffolding				Y	N	Hearing Protection				Y	N
Rigging				Y	N	Disable Fire Suppression				Y	N
Weld/cut/grind				Y	N	Lasers				Y	N
Equipment Storage				Y	N	Mobile Work Force				Y	N
Aerial Lift				Y	N	Helicopter				Y	N
Tool Storage				Y	N	Job Site Trailer				Y	N
Fork Trucks				Y	N	Crane				Y	N
Trenches/Excavations				Y	N	Who:					
Core Drilling				Y	N	Who:					
Insulator				Y	N	Who:					
Electrician				Y	N	Who:					
Excavator				Y	N	Who:					
Roofer				Y	N	Who:					
Balancer				Y	N	Who:					
Controls				Y	N	Who:					
Demolition				Y	N	Who:					
Special Tools				Y	N	What:					
General Trade				Y	N	Who:					
Other				Y	N	Who:					
Notes:											

ATTACHMENT A

PLANNING TURNOVER REQUIREMENTS

Job Number: _____	Job Name: _____
Meeting Date: _____	Piping Planner: _____
S/M Planner: _____	

PLANNING & ADMINISTRATIVE NEEDS:

- Is the job Competitive Bid or Negotiated?
 - Coordination Drawings (for others) or for Fabrication (HTL) Only
 - Mechanical and Plumbing drawings and Project Specifications
 - Flow diagrams, riser diagrams, or P&ID's available?
 - Architectural background drawings and Structural shop drawings (in AutoCAD) - Must be latest Revision or Revit model (release form required?)
 - Equipment submittals, pre-approved, approved? Available in AutoCAD?
 - Submittals from Owner-furnished equipment or other trades, if required (ex. Lights)
 - Pre-planning Meeting Date: _____, Productivity Meeting Date: _____
 - Estimated planning hours: S/M _____; PIPING _____; ADMIN: _____
 - Are change order hours to be separated?
 - Deadlines for shop drawings / Drawing Schedule, By Project Manager
 - Who will contact GC / CM / Architect/Engineer / Other subs for clarification and coordination and who will document? (PM or Planning) _____
- Note:** PM shall forward all RFI's to HTL's Customer (Planning can e-mail to PM)
- All other contract drawings and shop drawings from other subs
 - Will Planning manage shop drawing log? _____ (Shop drawings distrib. by PM)
 - Who will attend coordination meetings / internal progress meetings
 - What coordination is required with other trades?
 - Foreman input on spooling and subassembly
 - Will additional cost codes be used for changes, meetings, spooling, material lists?

SHEET METAL DRAWINGS INCLUDE:

Areas and systems to be drawn: _____

Background to include:

- Ceiling height, type of ceiling & light locations, type (note T-bar type if lay-in tile ceiling). Show GRD's.
- Structural steel elevations (Do we add or show steel on backgrounds?) Model Steel / Label Only
- Equipment layout

Other Needs:

- Structural coordination (curbs, framing, openings in walls / roof / floors)
- Duct standards - HTL Standards **or** Contract specs
- Specialties, Hanger locations, attachments, and details, what are we hanging from?
- VAV, FD Schedules (in spreadsheet form, not on drawings)
- Can duct be streamlined, alternate routing, duct resizing acceptable?
- Other Value Engineering ideas: _____
- Coordination meeting required (MEP)
- Do we need approval before fabricating?
- As-Built?
- Seismic - Yes/No Sub _____?
- Is Planning to include special details such as linear diffusers & custom plenums?
- Can we minimize transfer ducts? Can we use HTL standard transfer duct?
- What can be sub assembled?
- What opportunities are there for modularization?

PIPING DRAWINGS INCLUDE:

Areas and systems to be drawn: _____

Background to include:

- Ceiling height, type of ceiling & light locations.
- Structural steel elevations (Do we add or show steel on backgrounds?) Model Steel / Label Only
- Equipment layout

Other Needs:

- Structural coordination (curbs, framing, skids, platforms, openings in walls / roof / floors)
- Sleeve information
- Piping standards – HTL Standards **or** Contract Specs
- Specialties, Hanger locations, attachments, and details
- Do expansion loops, guides and anchors need to be shown?
- Material takeoff / Bill of Material
- Alternate routing acceptable?
- Value Engineering ideas: _____
- Seismic - Yes / No Sub _____?
- Coordination meeting required (MEP)
- Do we need approval before fabricating?
- Spooling by _____
- What opportunities are there for modularization?
- As-Builts?
- Insulation Sch.

GENERAL NOTES:

Planning will use standard convention for drawings for scale, layering, etc. Show service and access clearances. Provide static pressures for duct.

H.T. LYONS STANDARD CONSTRUCTION PLAN

JOB NO. _____ JOB NAME _____
PROJECT MGR. _____ ACCT. MGR. _____

To be developed by the PM after the turnover meeting on every project over \$500,000. The plan shall include:

Foremen: _____ Planner(s): _____

Customer (Co. Name) _____
Phone: _____ Cell: _____ Fax: _____
e-mail address: _____

Owner : _____ Contact: _____
Phone: _____
e-mail address: _____

Architect : _____ Contact: _____
Phone: _____ Cell: _____ Fax: _____
e-mail address: _____

Mech Engr: _____ Contact: _____
Phone: _____ Cell: _____ Fax: _____
e-mail address: _____

Consultant: _____ Contact: _____
Phone: _____ Cell: _____ Fax: _____
e-mail address: _____

CM/GC : NA Contact: _____
Phone: _____ Cell: _____ Fax: _____
e-mail address: _____

Elec Cont : _____ Contact: _____
Phone: _____ Cell: _____ Fax: _____
e-mail address: _____

ATC Cont (Co. Name): _____ Contact: _____
Phone: _____ Cell: _____ Fax: _____
e-mail address: _____

Insulator (Co. Name): _____ Contact: _____
Phone: _____ Cell: _____ Fax: _____
e-mail address: _____

TAB Sub (Co. Name): _____ Contact: _____
Phone: _____ Cell: _____ Fax: _____
e-mail address: _____

_____ Sub(Co. Name): _____ Contact: _____
Phone: _____ Cell: _____ Fax: _____
e-mail address: _____

Inspection(Co. Name): _____ Contact: _____
Phone: _____ Cell: _____ Fax: _____
e-mail address: _____

- 1. Contract Documents – specifications, drawings, addenda, schedules with dates (list below)

- 2. Pipe and duct standards: H.T. Lyons _____ or Other _____ WHO RESP _____
- 3. Schedule (the CM, GC's, ours, or both) – attached _____ or PM to provide by _____
- 4. Pre Construction Manager: _____

5. Pre Construction tasks required:

6. Permit requirements

Authorities having jurisdiction _____

Codes (by contract) _____

Permit pulled by H.T. Lyons _____ or CM/GC/Owner _____ Permit No. _____

7. PA One Call: Required _____ or Not Required _____

8. Purchasing log – attached _____ or PM to provide by _____

9. Purchasing responsibilities

PM shall originate purchase of all equipment and subcontracts

PM shall delegate to Purchasing Manager to purchase _____

Foremen shall originate purchases of all field materials including _____

Planning shall take off material for shop fabrication including _____

Review Table 2 (also 1 and 3) under section 6 of the Project Manager's manual

10. Submittal and delivery log – attached _____ or PM to provide by _____

11. Job phases – can be areas of work, separate trades, phases set by the GC/CM, or most useful will be our own break down of the project into smaller pieces.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

12. Labor breakdown for each trade with detailed description for cost codes – attach.

A good figure for labor breakdown is an average of 500 to 1000 hours per cost code.

For example, a project with 12,000 hours would make sense to have 12 to 24 cost codes.

13. Attach manpower loading curve: _____

14. Plan to update manpower loading curve: _____

15. Productivity tracking plan: _____

16. Any special scope items or special tools required: _____

17. General condition items:

Work hours _____

Break time _____

Lunch area _____

Break area _____

Parking _____

Trash disposal _____

Port-a-johns _____

Temp. power _____

Temp. heat _____

Water _____

Cleanup responsibilities _____

Refueling of trucks, welding machines, forklifts _____

18. Constraints/restrictions to accessing our work

19. Key material and equipment deliveries

20. Plan for fabrication and subassembly

21. Tool list – prepared by foremen, attached _____ or foremen will provide by _____

22. Plan for trucking and storage:

23. Plan for material handling to upper or lower levels:

24. Equipment rental plan:

25. Plan for hangers or supports in all areas:

What is the structure type: existing _____, new _____, bar joists _____, steel beams _____, metal purlins _____, concrete slab on Q-deck _____, concrete slab on formed deck _____, precast slabs _____, prestressed or posttensioned slabs _____, metal roof decking only _____, wood _____, or other _____ (describe) _____

Will supplemental steel be required? No _____, Yes _____ Where? _____

Will horizontal pipe be attached with concrete inserts _____, beam clamps _____, drill in anchors _____, welded clips _____, or other _____ (describe) _____

Will horizontal duct be attached with strap inserts _____, beam clamps _____, drill in anchors _____, shot pins _____, or other _____ (describe) _____

Can trapeze hangers be used? _____

Plan for supporting pipe risers _____

Plan for supporting duct risers _____

Are pipe sleeves required in concrete walls _____, masonry walls _____, gypsum bd. walls _____. What type? _____ Will they be firestopped? _____

When will these sleeves be needed? _____

If H.T. Lyons lays out duct openings, describe plan for lay out in

- Concrete formed walls _____
- Masonry walls _____
- Gypsum board walls _____
- Concrete floors _____
- Roof deck _____

26. Excavation and backfill plan:

31. Value engineering ideas

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

32. Cost Savings Ideas – include idea, estimated cost to implement, estimated savings

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

33. Administrative issues, contract and scope review notes, billing date, union waivers and procedure for change notification.

Billing date	_____
Bill for stored or fabricated materials?	_____
Tax exempt project?	_____
Job recovery or waivers?	_____
Change notification required?	_____
Schedule delay notification required?	_____
Proceed on verbal or written changes?	Use HTL extra work order form
Retention reduction?	_____
_____	_____
_____	_____
_____	_____
_____	_____

TURNOVER MEETING

Job Name:		JOB #:	
PM:	Date:	Time:	
Team:	Sales Engineer:	Value:	

Waivers	Y <input type="checkbox"/>	N <input type="checkbox"/>	Job Recovery	Y <input type="checkbox"/>	N <input type="checkbox"/>	Tax Exempt	Y <input type="checkbox"/>	N <input type="checkbox"/>
Permits	Y <input type="checkbox"/>	N <input type="checkbox"/>	Cert.of Insurance	Y <input type="checkbox"/>	N <input type="checkbox"/>	Specified Billing Date	Y <input type="checkbox"/>	N <input type="checkbox"/>

Site/Shipping Address: _____

Bill To & Address if New: _____

Start Date: _____ Finish Date: _____

Schedule by: _____

Who's in Charge of Manpower? _____ Shift or Overtime? Y N

PF Field Hrs	SM Field Hrs	Plumber Hrs	Svc. Tech Hrs
PF Shop Hrs	SM Shop Hrs	Trucking Hrs	Balancing Hrs
PF Plann. Hrs	SM Plann. Hrs	Laborer Hrs	

Design Complete	Y <input type="checkbox"/>	N <input type="checkbox"/>	Design By Whom?
Pipe Fab	Y <input type="checkbox"/>	N <input type="checkbox"/>	SM Fab Y <input type="checkbox"/> N <input type="checkbox"/>
Pipe Coord. Dwgs/Plann.	Y <input type="checkbox"/>	N <input type="checkbox"/>	SM Coord. Dwgs/Plann. Y <input type="checkbox"/> N <input type="checkbox"/>
Engineering	Y <input type="checkbox"/>	N <input type="checkbox"/>	Engineering By Whom?
Controls	Y <input type="checkbox"/>	N <input type="checkbox"/>	Controls By Whom?
Commissioning	Y <input type="checkbox"/>	N <input type="checkbox"/>	Commiss. By Whom?
Mobile Work Force	Y <input type="checkbox"/>	N <input type="checkbox"/>	ASME Y <input type="checkbox"/> N <input type="checkbox"/>
National Maintenance	Y <input type="checkbox"/>	N <input type="checkbox"/>	Domestic Steel Req? Y <input type="checkbox"/> N <input type="checkbox"/>

PO Log Complete Y N Quick Entry Required Y N

Insulator	Y <input type="checkbox"/>	N <input type="checkbox"/>	Balancer	Y <input type="checkbox"/>	N <input type="checkbox"/>
Electrician	Y <input type="checkbox"/>	N <input type="checkbox"/>	Controls	Y <input type="checkbox"/>	N <input type="checkbox"/>
Excavator	Y <input type="checkbox"/>	N <input type="checkbox"/>		Y <input type="checkbox"/>	N <input type="checkbox"/>
Roofer	Y <input type="checkbox"/>	N <input type="checkbox"/>		Y <input type="checkbox"/>	N <input type="checkbox"/>
Crane	Y <input type="checkbox"/>	N <input type="checkbox"/>	Trailer(s)	Y <input type="checkbox"/>	N <input type="checkbox"/>
Fork Truck(s)	Y <input type="checkbox"/>	N <input type="checkbox"/>	Scrap	Y <input type="checkbox"/>	N <input type="checkbox"/>
Special Tools	Y <input type="checkbox"/>	N <input type="checkbox"/>	Equip Storage	Y <input type="checkbox"/>	N <input type="checkbox"/>
General Trade	Y <input type="checkbox"/>	N <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

S A F E T Y	Job Specific Safety Requirements:
	Nearest Medical Help:
	Where is Safety Info Posted:
	Site Safety Rep:

NOTES: _____ **Attendees:** _____



Bulletin

Joint Ventures

WHAT IS A JOINT VENTURE?

A joint venture (or co-venture or joint Adventure, as it is sometimes labeled) has been defined in many ways. One such definition is:

“A joint venture exists when two or more persons (corporations) contribute cash, labor or property to a common fund with the intention of entering into a transaction for the purpose of making a profit to be shared in proportion to the respective contributions.”

A more detailed definition would be:

“An association of persons with an intent to engage in and carry out a single business venture for joint profit, in which they combine their efforts, property, money, skill and knowledge, without creating a partnership or corporation, by agreement that there shall be a community of interest among them as to the purpose of the undertaking, and that each joint venture shall stand in the relation of principal as well as agent to each of the other co-venturers with an equal right of the control of the employees necessary to carry out the common purpose of the venture.”

A joint venture should have all or most of the following characteristics: joint control and management, sharing in profits and losses, a common undertaking, and a single venture.

It has sometimes been referred to as a “one shot partnership,” but it is not a traditional partnership. Nonetheless, most of the state laws that govern partnerships apply to joint ventures and the rights of members of the venture. It is now possible in most states for corporations to enter into partnerships and, of course, joint ventures.

A joint venture generally is not an association considered taxable as a corporation, but the danger exists that if it does not satisfy certain requirements, it could be so treated for tax purposes. These requirements relate to the free transferability of interests, centralization of management, continuity of life of the venture and limitations on liability.

A joint venture is not a separate corporation. However, for specific long-term ventures, such as operation of a particular plant, a “joint venture corporation,” that is a corporation formed by two or more corporations as the sole shareholders, may be created.

WHO MAY CREATE A JOINT VENTURE?

Under the definition, any two or more persons, partnerships or corporations may form a joint venture.

In the construction industry, a joint venture would ordinarily be between two or more corporations or firms in the industry on a “horizontal” or a “vertical” basis.

“Horizontal” means two or more corporations in the same field, such as two mechanical contractors, whose skills, know-how, equipment and other resources complement and extend each other. If the “marriage” is between two or more companies, neither of which would, on its own, have the capacity to bid or perform the job and the result is to increase competition by creation of a new bidder, little or no danger under the antitrust law exists. However, if the joint venture is comprised of two or more companies and each of which has the capacity to bid and perform the job independently, and its result is the reduction or elimination of competition, the formation of the joint venture may be a violation of the antitrust laws.

In a “vertical” venture, two or more companies complementing but not duplicating each other would become the joint venturers. This could be limited to two venturers such as a mechanical contractor and an electrical contractor. A better example, however, would be an architect, engineer, general contractor, mechanical contractor and electrical contractor coming together in a joint venture to furnish the owner with a “turnkey” project.

Since a joint venture has all the elements of a partnership, but none of the safeguards as to limited liability enjoyed by a corporation, the most important question that a prospective

joint venturer has to ask is, “Who is my co-venturer going to be?” The profitability of the venture will depend in large measure on the ability of the venturers to work together and, critically, on the financial strength of the coventurer.

All of the potential benefits, as well as the advantages of sharing risk, can be lost by the insolvency or bankruptcy of a single member of the venture.

WHY IS A JOINT VENTURE DESIRABLE?

The reasons for a contractor to enter into a joint venture are numerous and sometimes unique. As a general rule, the following are usually present:

- To guard against mistakes in bids by crosschecking and dual estimating;
- To increase working capital;
- To increase bonding capacity or provide bonding capability and to decrease bonding cost;
- To add managerial strength and knowhow;
- To secure specialized and complementary skills;
- To increase labor supply;
- To pool equipment;
- To reduce overhead expenses;
- To spread the risk of loss;
- To involve a local contractor;
- To expand into new geographical areas;
- To be more competitive on projects with diverse components; and

- To enhance Small Business Enterprise/Disadvantaged Business, Enterprise/Minority Business, Enterprise/Women Business and Enterprise participation.

The reasons for the inclusion of a local contractor are numerous. They include:

- Knowledge of local conditions;
- Access to a local labor supply and union relationship;
- Familiarity with local license and permit Requirements;
- Knowledge of local suppliers;
- Personal relationship with or knowledge of owner; and
- Political connections.

All of the above reasons can be reduced to one—the ability to bid and perform larger and more complicated or specialized jobs and return a larger profit to the co-venturers. Of course, the corollary is that the joint venture gives the owner an additional bidder and a stronger contractor at a lower cost.

There is one further reason for forming a joint venture which may involve either a local or national co-venturer. Under Executive Orders prescribing Equal Employment Opportunity (No. 11246 as amended) and the Office of Minority Enterprise (No. 11458), the Labor Department has adopted rules and regulations requiring provisions for equal employment opportunities in all government contracts. Federal departments and agencies, particularly the “8 (a)” program of the Office of Business Development of the Small Business Administration, have established preferences and incentives for minority contractors. In the case of a partnership or its alter ego, a joint

venture, this would require 50 percent ownership by members of a minority group: African-Americans, Native Americans, Asians and Spanish-surnamed Americans. In the case of a joint venture between corporations, the minority company must have at least 51 percent of its voting shares owned or controlled by minority persons. Including a minority contractor not only complies with Labor Department regulations, but such a joint venture may gain preference or set-asides when the companies bid on federal contracts. They may also be eligible for direct procurement not subject to competitive bidding.

When Should the Joint Venture Be Created?

1. Before a potential job or contract is open for bid. The advantages are derived by the opportunity of having two or more organizations doing preliminary “spade” work with time to work out cooperative arrangements on management and financing. The disadvantages are that since each job is unique, many of the details of the joint venture agreement must be left until the contract details are known.

2. When bids are solicited. By forming a joint venture before bidding so that the bid can be submitted in the name of the joint venture, the co-venturers can reduce or spread their costs of bid preparation. In addition, by cross-checking or preparing separate estimates, the co-venturers can materially reduce the chance of bid omissions or mistakes.

3. After receipt of an award by one co-venturer. By waiting until an award is made, the contractor has the advantage of knowing the exact extent and details of the contract and can select his co-venturer or venturers with knowledge of what additional capital,

labor, equipment and knowhow are necessary to complete the contract. He does not know, however, if a potential co-venturer is willing to enter into a joint venture with him. Care must also be taken to assure that the contract permits assignment to a joint venture.

4. Before each separate venture.

Often co-venturers, after completing a successful joint venture, will wish to continue the venture to bid on or perform additional contracts. It is best that a new joint venture agreement be executed for each such venture, not only for the different conditions present in each job but to prevent treatment of the venture as an association considered taxable as a corporation and to limit trust fund liability created by statutes such as Article 3-A of the New York Lien Law.

5. Use of a letter of intent to create a joint venture. If the parties considering a joint venture elect to put a joint bid together but wait until the award to formally establish the joint venture, it is advisable to prepare a letter of intent, signed by both parties, to enter into a joint venture if the joint bid is accepted by the customer. Many times, the owner or general contractor will want to see the letter of intent as evidence that the bid is reliable.

HOW TO CREATE A JOINT VENTURE

A joint venture can be created without any written agreement and merely by actions of the parties and the application of law. To do so, however, puts the parties in the position of having created liabilities and duties that have not been precisely delineated.

1. Who should prepare the joint venture agreement?

The joint venture agreement is a contract governed by law. Usually the law governing the contract will be that of the situs of the work, which may not be the home—and familiar—state of one or more of the co-venturers. In New York, for example, a little known ruling of the Attorney General states that since corporations have the power to enter into joint ventures under the New York Business Corporation Law, a corresponding obligation exists to file a certificate of assumed name under the General Business Law. It is vital, therefore, that your lawyer—and the lawyer for the other venturers—prepare and review the agreement, not only to assure that it complies with the governing law but that it accurately sets forth the intentions of the parties and adequately protects your interests with respect to potential liability to the bonding company, owner and subs.

2. What should the joint venture agreement include?

First, the agreement should set forth the name by which the joint venture will be known and the contract or job which the venture is to bid and/or perform.

The most important provision concerns management. Is management to be shared equally? (This is often a basis for disagreement, particularly if the parties have not worked together before.) Is one venturer to have the general management of the job? Is each of the venturers to have management responsibility for a particular segment of the job? (This is often necessary in a vertical joint venture between contractors in different fields.)

The second most important provision is financing, not only how, when and in what proportions the capital is to be supplied but how the profits—or losses—are to be shared. Usually, the co-venturers will share profit and losses in the ratio in which they contribute capital. The agreement should also establish how the parties will provide additional capital for the joint venture if needed.

The joint venture agreement should state how machinery and equipment and expendable equipment and working tools are to be acquired for the job. Often machinery and equipment are rented from the parties, while expendable tools are purchased by the joint venture, from the co-venturers, at an agreed price or from outside sources. And, it should be determined what fee, if any, the managing party should receive.

It should also be determined whether overhead items (such as executive, administrative and supervisory services) are to be furnished without cost by the parties, and in what proportion, or charged to the joint venture, and at what rate.

Separate books of account and a special bank account must be set up in the name of the joint venture.

Typically, one of the joint venture partners is assigned the responsibility for keeping the accounting books, including accounts payable, accounts receivable, billing functions, job cost, etc. These books should be open to each co-venturer and a statement furnished each month. An accounting firm, not necessarily representing either co-venturer, should be selected in the agreement to audit or review the books of the joint venture, as necessary.

Contracting authority should be clearly stated, such as who may bind the joint venture without joint consent and any dollar limitations on such authority.

A method of settling disputes between or among venturers, usually by arbitration under the rules of the American Arbitration Association, should be included.

If one co-venturer should fail to carry out its part of the joint venture by failing to contribute funds, equipment or manpower or by reason of insolvency or bankruptcy, the remaining co-venturer or venturers must have the right to take over the uncompleted contract and to control such capital, equipment, tools and labor as were previously engaged in the venture. In such a case, the share of profits of the defaulting co-venturer will be reduced to its proportion of the total contributions, but the defaulting party would remain liable for its full share of any losses incurred by the joint venture. It is important in this connection that the liability of any of the parties under indemnity agreements with sureties be limited to that percentage of the total liability assumed by such party in the joint venture. This provision, however, should apply only to those losses directly connected with or arising from the performance of the contract and not incidental, indirect or consequential losses that may be sustained by one of the parties. A cross indemnification agreement indemnifying the parties against losses in excess of the proportionate share of each is also worthwhile.

The joint venture agreement, in addition to prescribing when and how capital and profits—or losses—are to be distributed after completion of the job, should specify how equipment, tools and other assets purchased by or contributed to the joint venture are to be liquidated. Often the parties will be given the right to purchase or

repurchase at book value before sale to outsiders. Provision should be made for obligations which continue beyond the completion of the project, such as job insurance, warranty work and other costs.

Finally, the joint venture agreement should state that it should not be construed as a continuing partnership or association but as a joint venture and no one of the co-venturers may assign its interests therein without the prior written consent of all.

3. Other considerations:

Insurance – Be sure to consult the insurance agents for all joint venture partners. All insurance contracts need to be reviewed for appropriate insurance limits established, not only by the customer but also by the parties, based on the risk associated with the particular job. Also be certain that each party's insurance policies allow and cover the party for joint venture work.

Bonding – Will both joint venture partners' surety companies agree to bond the project? Typically, one of the sureties will issue the bond with a cross indemnification agreement from the other. However, each surety may look at joint venture projects differently. Discussion with the bonding agents early in the process is critical.

Staffing – Be sure to have a clear idea of each party's staffing commitments. Who will provide the project manager, the superintendent, accounting support, scheduling, etc. A project organization chart detailing who does what will minimize confusion later

POSTSCRIPT

The growing trend in the construction industry of joint ventures involving mechanical contractors has prompted this bulletin as a means to furnish MCAA members with information and guidance on the subject. It should be understood that before a joint venture is undertaken, other methods for accomplishing the project should be studied to assure that the best procedure is used.

For example, there are other forms of combined efforts performed under agreements with other contractors other than the type of legal joint ventures covered, and such approaches should be considered and carefully evaluated during the early planning stages. These include:

1. **A joint bid.** In this case, one party may install all plumbing while another handles all heating, ventilating and air conditioning (or various other combinations) for a project. This type can be one bid from a liability standpoint to an owner, but does not create the same cross-liability in depth as a joint venture.
2. **Variations of a joint bid.** Each party takes specific lump sum parts of the total project and then all share responsibilities on other parts, such as major equipment and subcontracts.
3. **Subcontracting.** In this instance, one party subcontracts a part of a job to another party, as opposed to a straight joint venture.

In addition, the motivation for initiating a joint venture should be studied realistically to assure that the reasoning behind the undertaking is sound. There are examples of poor or weak reasons for attempting a joint venture, as well as reasons for not attempting a joint agreement at all. These categories may include:

1. **Establishing a joint venture for financial assistance only.**
2. **Serious tax disadvantages that exist for legal joint ventures in some states.**
3. **Initiating a joint venture with an attitude and reasoning that mitigate against a competitive effort.** For instance, this can occur when each party to the venture is stretching because of the size of a project and bases their bids on the high risk involved if they get the job. Such bidding likely will not be sufficiently competitive to make the joint effort worthwhile.
4. **A possible alternative to a joint venture could be a Limited Liability Company (LLC).** An LLC is established pursuant to specific state laws, so be sure to consult legal counsel. In some states an LLC can provide an additional layer of protection to the LLC partners, but there can also be complications including insurance, tax, bonding, etc.



Bulletin

Failure of One Corporate Member of a Joint Venture to Qualify as a Foreign Corporation May Penalize All Venturers

INTRODUCTION

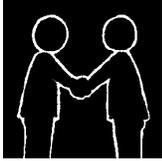
Whenever you are doing any business in a state other than the state where your company was incorporated, you must always consider whether or not to register and qualify in that state as a "foreign corporation". Every state has laws which in some manner affect or regulate foreign corporations. Generally, these laws require you to get the state's permission before transacting business there. Penalties, often severe, may be assessed if you fail to comply with another state's laws regarding foreign corporations.

NONQUALIFYING RISKS

The risk you take by doing business in a state other than your state of incorporation, without qualifying, is directly related to the severity of the penalties assessed by that state. Of course, there are advantages in not qualifying. These include avoidance of certain fees, taxes, and reporting requirements. On the other

hand, the penalties, depending on each state's statutes, include restrictions on your use of the state's courts to enforce your contracts or recover for injuries, possible invalidation or limitation of your contracts made in that state, civil or criminal actions against you resulting in fines or imprisonment, and the chance that corporate officers or agents may be held personally liable for the actions of your corporation.

The first possible penalty mentioned, restriction on the use of the courts, applies in almost every state and can be particularly detrimental. In effect, the states have said, "If you do not qualify as a foreign corporation in our state, you may not sue anyone in our courts." The practical effect of this law is that you may not be able to recover for damages or collect on your contracts with persons or companies in other states if you are not qualified there. At the same time, there is no restriction on law suits against you. Thus, you may be hauled into court as a defendant when you could not appear as a plaintiff.



In addition, a case in Mississippi demonstrates that the possible application of this penalty may be even more treacherous [Scott Company of California v. Enco Construction Company, 264 So.2d 409 (1972)].

In that case, a California corporation, a Texas corporation and a Louisiana corporation had formed a joint venture to perform a construction contract in Mississippi. The California and Texas corporations were qualified to do business as foreign corporations in Mississippi; the Louisiana corporation was not. When these corporations sued another company for damages caused by its negligent acts on the job, the Mississippi court threw out their case. The court said that all members of the joint venture must be qualified to do business in the state or they could not sue in the state courts. This decision was sustained by the Mississippi Supreme Court despite the fact that the unqualified Louisiana corporation had only contributed 10 percent of the joint venture's capital and that only the qualified California corporation was actually performing the contract in Mississippi. We have not determined whether the result in the Scott case has been applied in other jurisdictions.

Nonetheless, the lesson is clear. Not only may qualification be necessary whenever you are doing business in a state where you are not incorporated, but whenever you enter into a joint venture with any other companies, you must determine whether each member of that venture should be qualified in each state where the venture plans to do any

business and, if so, you must make sure that they are. The failure of one member to qualify in any state might severely penalize you by precluding the joint venture from going into state courts to recover for damages to it or to enforce its contracts with other persons or companies in that state.

CONCLUSION

Two general rules are suggested as guidance for those situations where you may be involved in transacting business outside your state of incorporation.

First, whenever in doubt, qualify. You may not only retain your right to sue in the state's courts, but you may also avoid some other harsh penalty as mentioned previously.

Second, whenever you are contemplating a joint venture for any project, require everyone to qualify in every state the venture enters. This might prevent you and the venture from being penalized when only one member is really at fault.

The "Summary of State Regulations and Taxes Affecting General Contractors" contains information on prequalification, licensing tax and other requirements affecting construction contracts. It is available from the American Insurance Association.

This bulletin is provided for general guidance only. Consult with your legal counsel regarding qualification requirements and whether you and your joint venturers need to qualify in a particular state.



Bulletin

Labor Relations

INTRODUCTION

To maintain effective labor relations, mechanical contractors who employ union craft workers need to have a strong local organization and continuing cooperative, labor-management programs.

PUBLICATIONS

MCAA provides the following publications to help mechanical contractors in these and all aspects of labor relations:

- **Collective Bargaining Guide and Legal Analysis—2006 Edition.** Labor and employment law experts Michael Boldt and Ryan Poor cover essential collective bargaining details in plain English. The book also comes with a comprehensive digest of all federal labor and employment laws, and links to government agency compliance websites compiled onto a CD. Published in 2006. The publication is available at www.mcaa.org/store.
- **The Industrial Relations Council (IRC) for the Plumbing and Pipefitting Industry** is an explanation of IRC's voluntary labor-adjudication services to resolve labor-management disputes, which are provided by joint agreement of

MCAA, the National Association of Plumbing-Heating-Cooling Contractors and the United Association. The booklet outlines IRC's organization, operations and policies. It provides suggestions and instructions to disputants who wish to resolve deadlocks and thus discourage strikes, lockouts and other work stoppages. Download from www.mcaa.org/private/labor/.

- **MCAA Labor Agreement Reference Library** reports on the results of current negotiations, current issues in labor relations and the means by which local associations handle a variety of situations. Go to www.mcaa.org/private/labor/laboragreementlibrary.cfm.
- **National Service and Maintenance Agreement** is an agreement between the UA and MSCA covering all service and maintenance work in currently operating facilities. The publication includes the national agreement, plus the Schedule A for each state and additional labor-related resources for mechanical service contractors. The current agreement took effect on August 1, 2010 and will run through July 31, 2015. Download from www.mcaa.org/msca/labor/

- **National Plumbing Service Agreement**, which is currently being revised, applies to all plumbing service work performed by firms to maintain the operations of existing plumbing systems within occupied or ready to be occupied facilities in an efficient manner.
- **National Agreement for Residential and Light Commercial Construction** applies to work relating to the installation of all HVAC, plumbing and fire protection equipment and the handling of all piping, appurtenances and equipment in one or two-family dwellings, multi-family dwelling, townhouses, condominiums and similar structures. The Agreement may be downloaded at www.mcaa.org/private/labor.
- **United Association Standard for Excellence** outlines the performance standards expected of UA members while on and off the jobsite. Available free at www.mcaa.org/private/labor/uastandardforexcellence/.

CONFERENCES

MCAA and the United Association jointly or individually sponsor conferences designed to educate their respective members about shared issues, including those that are important for increasing market share and forging closer, mutually beneficial relationships.

Labor Relations Conference, sponsored jointly by MCAA and the UA, is aimed at strengthening communication between the two essential components of our industry—well-trained UA craftspeople and well-educated MCAA contractors. By coming together each year, labor and management carry out their industry

stewardship by increasing mutual market opportunities. This conference covers the latest and most comprehensive discussions of workforce recruiting, market initiatives, performance measures, benefits education, and approaches to meet the industry's future workforce challenges. Sessions include discussions of economic and labor relations issues, updates on building trades initiatives and challenges, and updates on current labor/management agreements.

Collective Bargaining Seminar

Learn negotiating techniques and constructive approaches that will improve workforce performance along with contractor and industry competitiveness. The seminar will help members and local association executives improve their understanding of the bargaining process to assist in preparing properly for negotiations, and to make bargaining a constructive event for management and labor. Topics covered will include: collective bargaining innovative terms; labor law; work conditions and productivity improvements; labor contract cost/benefit analysis; and planning successful approaches in the bargaining relationship.

For more information, about these conferences, please go to www.mcaa.org/education.



Bulletin

Market Recovery Programs

INTRODUCTION

Listed below are some examples of different types of successful market recovery programs which have been instituted in various locations around the country. Their purpose is to strengthen the position of the skilled contractor and increase the market share of skilled work. Although the extent of non-skilled competition varies throughout the country, these programs, or some variation thereof, may be useful one day in your local area.

INFORMATIONAL/PR-TYPE PROGRAM

This program consists of utilizing advertising, public relations, newsletters, social functions, goodwill and community relations to strengthen the position of the skilled contractor and labor/management relations.

Examples

A. MCA of Northern California

1. Local 393 (San Jose) has a quarterly newsletter and holds a monthly labor/management meeting.

2. Local 38 (Kraft) has a Labor Management Program to promote the industry. It ad-

vertises on radio and publishes a roster of contractors for potential customers.

B. Working Together

ILLOWA Construction Labor Management Council, is jointly sponsored by Rock River MCA, MCA of Iowa and two UA unions. The primary goal of the council is to increase the market share for the skilled construction contractor. This is being achieved through educational programs, cost-clausing contracts, an intensive marketing program, education on the problems and solutions facing the construction industry, systematically increasing the productivity of the skilled construction contractor and tradesman, joint fact-finding committee, work site contact teams, user-relation teams, and impact memorandum.

C. Building Together

This joint project of MCA of Iowa and UA Local 387 promotes the skilled "label" on construction jobs.

D. M.U.S.T.

"Management and Unions Serving Together" is a Labor/Management Committee



reated by contractor associations in Southeastern Michigan and the Detroit Building Trades Council to strengthen union market share. M.U.S.T. accomplishes this goal by increasing the competitiveness of union contractors and by making construction users aware of the advantages of union construction.

To communicate to building tradesmen their vital role in determining the future of union construction, M.U.S.T. developed a series of messages for inclusion with paychecks. The inserts discussed the need for quality, productivity and teamwork, and increased the building tradesmen's understanding of the challenges in today's construction industry.

To effectively convey its message to owners, M.U.S.T. has developed a Slide Presentation which demonstrates, using completed construction projects, the skill of building tradesmen and the capability of union contractors. Recent M.U.S.T. activities include:

1. The formation of the M.U.S.T./AFL-CIO Health Care Coalition. The Coalition is a buying alliance comprised of management and trade unions that seeks to buy insurance cheaply without disrupting the design of benefits or the administrative arrangements of other union or Taft-Hartley plans. The Coalition started out small, exploring the purchase of prescription drugs first, but will move on to the purchase of other types of coverage in the future.

2. The development of an historic alliance with the Greater Detroit Chamber of Commerce, Business Attraction Council (BAC). By consolidating resources and working together to attract jobs, M.U.S.T. and the BAC are breaking new ground. Attracting new business to the region means more office

space and industrial structures, leading to new construction, renovation and expansion.

E. Built-Rite

This is an alliance of building craftsmen, contractors and construction users, all committed to creating positive change in industry and work site practices. Their goal is to strengthen construction in the Delaware Valley by delivering the best value to the customer for the construction dollar.

On a Built-Rite project, unions, contractors and users work together to increase productivity, to promote harmonious relations, to improve safety and to sharpen the cost-effectiveness of the job at hand. From pre-job planning to on-site tool box meetings, a Built-Rite project delivers on-time and on-budget construction.

F. It's Right for the Job

The "It's Right for the Job" campaign was launched by the contractors who support the Piping Industry Progress and Education Fund (P.I.P.E.) of Central and Northern Arizona in the Spring of 1990 with the goals of showing the value of using skilled, union labor and broadening the role this organization has in improving the local construction industry.

There are three primary programming elements to the campaign including: direct mail, industry forums and publicity. The target audiences include general contractors, architects, engineers, other subcontractors, legislators, large employers, and others.

G. Choice

"Contractors and Hardhats Organized to Insure Construction Excellence" was spon-



sored by Upper Peninsula (MI) Construction Labor-Management Council, Inc. CHOICE utilizes a multi-faceted approach to increasing its market share of work. A primary focus of the recovery is education of membership, both rank and file, as well as member contractors.

Maintaining contact and dialogue with the industry's customers is the Council's lifeblood. Constant updates on owners' needs, perceptions and realities are all facilitated via CHOICE. With the same regard, the industry's architect and engineering communities are intimately involved with the Council.

H. Cause

"Contractors and Unions Seal of Excellence" is an organization of Washington, D.C. area contractors, Plumbers Local 5, and Steamfitters Local 602.

CAUSE's partners work together to promote better relations between labor and man-

agement, which in turn produces a better job, delivered on time and within budget, always with a strong commitment to productivity. All of these are major benefits for builders and developers, and in the long run for the consumer too.

PINPOINTING PLAN

A plan where union and management agree to work at a lower rate on a particular job. The men actually work for a lesser rate than the prevailing wage rate.

UNION WORK RECOVERY PROGRAMS

Under this type of plan, employees pay into a fund and the union decides which job(s) to subsidize and how much to subsidize that job. Employees actually work at the negotiated wage rate (cannot be used on Davis-Bacon jobs).



Bulletin

United Association National Labor Agreement Summary and Comparison

Over the years, the United Association and other interested parties have developed agreements to assist contractors and UA labor in determining types of tasks, jurisdiction and labor groups covered for projects and other applicable purposes. Until now, there has not been a central collection of these agreements.

The matrix presented in the following pages provides a list of the current UA National Agreements along with a summary of their provisions, labor groups affected and the jurisdictions covered. For a complete copy of each agreement, go to www.mcaa.org/private/labor/pipefitterdb/contracts and click on the agreement of interest.

Some agreements are perpetual, but most have an expiration date. Every effort will be made to keep the agreements' status current, but always check to make sure the agreement of interest is the most up-to-date.

Should you wish to execute an agreement or just learn more about its contents and requirements, please contact your local association executive and/or the UA international representative in your area.

**UNITED ASSOCIATION NATIONAL LABOR AGREEMENT SUMMARY MATRIX
AS OF JULY 2014**

AGREEMENT	PARTIES TO AGREEMENT	LABOR	GEOGRAPHICAL JURISDICTION	SCOPE OF AGREEMENT	SPECIAL CLAUSES
1. NATIONAL MAINTENANCE AGREEMENT (NMA) (Effective 1/1/2012)	Owners, Signatory Contractors, Building Trades - Agreement administered by the National Maintenance Agreement Policy Committee (NMAPC)	United Association	National Agreement	Industrial construction, maintenance, repair, replacement, renovation and modernization in various plants. Does not cover new construction.	Establishes hours and working conditions. Local wages apply. No strike/No lockout.
2. NATIONAL INDUSTRIAL AGREEMENT FOR MAINTENANCE	Signatory Contractors and United Association-extended by site specific application to the United Association	United Association	National Agreement / Site Specific	Industrial maintenance, repair, replacement and renovation in various plants. Does not cover new construction. Contact UA for application of NIAM.	Establishes hours and working conditions. Local wages apply. No strike/No lockout. UA/MCAA drug testing policy permitted.
3. NATIONAL INDUSTRIAL CONSTRUCTION AGREEMENT	"National" Signatory Contractors and United Association	United Association	National Agreement	Plumbing and pipefitting work performed in construction of industrial and/or manufacturing facilities.	Establishes hours and working conditions. Local wages apply. No strike/No lockout. Standard For Excellence. UA/MCAA drug testing policy permitted.

More...

AGREEMENT	PARTIES TO AGREEMENT	LABOR	GEOGRAPHICAL JURISDICTION	SCOPE OF AGREEMENT	SPECIAL CLAUSES
4. NATIONAL POWER GENERATION MAINTENANCE AGREEMENT (effective 1/1/2012)	Owners, Signatory Contractors, Certain Building Trades	United Association, Carpenters, Boilermakers	National Agreement	National Maintenance Agreement Add-On addressing projects where distance and travel to covered sites are significant.	Establishes hours and working conditions. Local wages apply. No strike/No lockout. Special travel and subsistence addendum.
5. MID-SOUTH INDUSTRIAL AGREEMENT (Effective May 2012)	Signatory Contractors and United Association via Mid-South Multi State Pipe Trades District Council No. 21	United Association	Regional to certain jurisdictions in Tennessee and Alabama	New construction, Industrial maintenance, repair, replacement and renovation work at all industrial site in the jurisdiction of District Council 21	Establishes wages, hours and working conditions. No strike/No lockout. Standard For Excellence. UA/MCAA drug testing policy permitted.
6. NATIONAL SPECIALTY AGREEMENT	Signatory Contractors and United Association	United Association	National Agreement – by site specific application to the UA	Pneumatic messenger systems, valve maintenance and repair, high purity piping, low temperature refrigeration systems, machine pipe cutting and beveling and specialty welding	Establishes hours and working conditions. Local wages apply.
7. NATIONAL PLUMBING SERVICE AGREEMENT (Revised 6/2011)	Signatory Contractors and United Association	United Association	National Agreement	Plumbing Service Work	Establishes hours and working conditions. Executed “Schedule A” applies. Standard For Excellence.

More...

AGREEMENT	PARTIES TO AGREEMENT	LABOR	GEOGRAPHICAL JURISDICTION	SCOPE OF AGREEMENT	SPECIAL CLAUSES
8. NATIONAL AGREEMENT FOR RESIDENTIAL AND LIGHT COMMERCIAL CONSTRUCTION (Revised 6/2011)	Signatory Contractors and United Association	United Association	National Agreement	Residential and Light Commercial Construction work as defined in "Schedule A"	Established hours and working conditions. Executed "Schedule A" applies. Standard For Excellence
9. NATIONAL SERVICE AND MAINTENANCE AGREEMENT (Effective 8/1/2010 through 7/31/2015)	Signatory Contractors and United Association, MCAA and MSCA	United Association	National Agreement	To keep existing mechanical, refrigeration and plumbing systems in occupied facilities operating including inspection, service, maintenance, start up, testing, balancing, adjusting, repair, modification and replacement of mechanical, refrigeration or plumbing equipment and controls in addition to all other service, maintenance and operations work. Also included by addendum is Installation of Pneumatic and DDC Control Systems	Establishes hours and working conditions. Executed "Schedule A" applies. Standard For Excellence. No strike/No lockout. Background check and substance abuse testing guidelines.
10. INDUSTRIAL AGREEMENT FOR INSTRUMENT AND CONTROL SYSTEMS TECHNICIANS	Instrument Contracting and Engineering Association Signatory Contractors, United Association, IBEW	Instrument and Control Technicians 50/50 UA and IBEW	National Agreement	Instrumentation work, calibration work and control systems work in Industrial Facilities. New construction and Maintenance work.	Establishes hours and working conditions. Local wages apply. No strike/No lockout

More...

AGREEMENT	PARTIES TO AGREEMENT	LABOR	GEOGRAPHICAL JURISDICTION	SCOPE OF AGREEMENT	SPECIAL CLAUSES
11. NATIONAL MINIMUM STANDARD FOR A COMMERCIAL PIPE FABRICATION SHOP (Yellow Label Agreement) (Effective 5/1/2014)	Pipe Fabrication Institute, Signatory Contractors and United Association, Building Trades and Metal Trades	United Association, Building Trades and Metal Trades	National Agreement	Agreement for use of UA Pre Fabrication Union Yellow Label. Bending and fabrication of welded pipe formations and assemblies including ammonia systems for air conditioning and all skid mounted and equipment related to ammonia systems. Also includes fabrication of piping and/or domestic plumbing, comfort heating, air conditioning systems are included, subject to certain conditions pertaining to project labor agreements and local market conditions.	Establishes hours and working conditions. Local wages apply. Standard For Excellence. UA/MCAA drug testing policy permitted
12. NATIONAL MINIMUM STANDARD FOR A COMMERCIAL SPRINKLER PIPE FABRICATION SHOP	Signatory Contractors and United Association, Building Trades and Metal Trades	United Association, Building Trades and Metal Trades	National Agreement	Agreement for use of United Association Sprinkler Pipe Fabrication Union Label. Fabrication of sprinkler pipe or sprinkler pipe assemblies, welded or screwed.	Establishes hours and working conditions. Local wages apply. Standard For Excellence.
13. FOR USE OF UNITED ASSOCIATION PANEL BOARD UNION LABEL	Signatory Contractors and United Association, Building Trades and Metal Trades	United Association, Building Trades and Metal Trades	National Agreement	Agreement for contractors engaged in the fabrication and assembly of panel and/or control boards and piping to use Union Label	Establishes hours and working conditions. Local wages apply.

More...

AGREEMENT	PARTIES TO AGREEMENT	LABOR	GEOGRAPHICAL JURISDICTION	SCOPE OF AGREEMENT	SPECIAL CLAUSES
14. NATIONAL PIPELINE AGREEMENT	Pipeline Contractors Association and its Signatory Contractors and United Association	United Association	National Agreement	National agreement for work associated with the Mainline Pipe Line Industry	Establishes hours, wage rates and working conditions. Local wages apply. No strike/No lockout. Standard For Excellence. UA/PLCA drug and alcohol policies included
15. NATIONAL DISTRIBUTION PIPELINE AGREEMENT	Distribution Contractors Association and its Signatory Contractors and United Association	United Association	National Agreement	National agreement for work associated with Gas Distribution Pipe Line Work; geo-thermal heating and cooling systems included, with specific local exceptions.	Establishes hours, wage rates and working conditions. Local wages apply. No strike/No lockout. UA/DCA drug and alcohol policies included.
16. NATIONAL NON-DESTRUCTIVE TESTING AGREEMENT (effective 12/18/2008)	Signatory Contractors, United Association, Boilermakers	United Association, Boilermakers	National Agreement	National Agreement covering all phases of non-destructive testing work, including new construction, maintenance, service and pipeline	Establishes hours, wage rates and working conditions. Local wages apply. No strike/No lockout. UA/MCAA and Boilermaker MOST drug and alcohol testing policies included.

Full text of all agreements is available on MCAA's website in the Labor Resources page of the Members-Only section at www.mcaa.org/private/labor/pipefitterdb/contracts.



Bulletin

Protecting Lien Rights

Whether called a mechanics lien or a construction lien in any one of the 50 states, all liens securing payment for construction work are created by state statute. The purpose of liens is to secure payment for work performed on real property, even in the absence of a direct contract with the real property owner.

Because lien laws are created by state statute, each state has its own unique set of procedures for filing and enforcing a lien. Though all states permit those who supply labor or materials for a construction project to claim a lien against the improved real property, there are key differences among state lien laws including:

- Definition of the improvement
- Definition of proper lien claimant
- Definition of labor, services, and/or material that can be the subject of a lien
- Procedures and deadlines for preserving and enforcing the lien

In addition, it is important to note that only private property is subject to construction liens. Government-owned real property is not subject to liens but

generally government entities will require the general contractor (GC) to post bonds as an alternate way to protect subcontractors and suppliers. In many states, only properly licensed contractors are entitled to liens.

Once a lien is properly pursued under the applicable state procedure, it acts as a “cloud” on the owner’s title to the real property and it becomes difficult for the owner of the property to sell or refinance the property without first paying off the debt secured by the lien. In most states, if the debt secured by the lien is not otherwise satisfied, the lienor can proceed to foreclose on the owner’s property.

Though each state’s lien laws are different, all include strict time limits to preserve, protect and enforce lien rights. A mechanical contractor that fails to strictly adhere to the deadlines in their state will likely waive their lien rights under the statute in their state.

A summary of lien and bond laws state by state published by the Foundation of the American Subcontractors Association, Inc. can be found at: <http://www.keglerbrown.com/File%20Library/Practice%20Areas/Construction%20Law/2010-lien-and-bond-manual.pdf>.

However, these statutes are frequently updated and amended so check with an attorney in your jurisdiction for the current lien procedures in your state.

In addition to losing lien rights by failing to comply with state statutory requirements, many contractors inadvertently lose lien rights by signing overly broad waiver of lien forms. Owners and GCs generally require monthly waiver of lien forms before a subcontractor is paid. It is important to insure that the subcontractor is only waiving his rights to the monies actually received.

A typical GC's partial waiver of lien will state something like "Subcontractor hereby waives and releases any and all liens, claims and causes of action Subcontractor may have or claim to have against Contractor, Owner and the Property through the date of the execution of this release." A literal interpretation of this language may leave the subcontractor without rights to payment for any work performed prior to the date of the release. In fact in most instances, the amount paid each month will not equal the amount due for work performed in the past month because of retention, pending/unpaid change orders, claims, disputed backcharges, etc. In order to preserve lien rights pertaining to the retention and these other outstanding, unpaid items, it is recommended that partial release forms be modified. The best time to do this when the form is included as a subcontract exhibit is before the subcontract is executed.

The subcontractor should include language clarifying that the only claims released by the partial release form are those for monies actually received through the date of the release. To accomplish this, the subcontractor can insert to the end of the offending language:

"However, this release is effective only to the extent of amount requisitioned by and paid to Subcontractor through the date of the execution of this release." In the alternative, the subcontractor can carve out items it is not intending to waive. In this case, at the end of the offending language insert something like: "This release specifically and expressly excludes: payment for work performed after ____, pending claims, pending change orders, retention, (add anything else here)."

Never waive your lien rights for claims, change orders or retention that you may not yet have requisitioned, received payment for or for work not yet performed. Note that Owners and GCs are increasingly including severe release language like this not only in the partial release form, but also in their monthly requisition forms, change order forms and in other unexpected places. Also, sometimes the Owner or GC may update or alter their forms mid-project. In every case, before signing, carefully review all language on the requisition, release and other forms and make any adjustments necessary to protect your lien rights.

The information in this bulletin should not be construed as legal advice. A person should contact their local counsel for specific legal advice regarding the information contained in this bulletin.



Bulletin

Purchases and Sales of Goods Under the Uniform Commercial Code

The Uniform Commercial Code is in effect in all states (but Louisiana has not adopted all Articles) and in the District of Columbia. The Code varies slightly from state-to-state but is essentially uniform as to the fundamental concepts.

The Uniform Commercial Code (UCC) was first published in 1952. It is one of a number of uniform acts promulgated to harmonize the law of sales and other commercial transactions in all the states. This is important because of the prevalence of commercial transactions that extend beyond one particular state (equipment for a project manufactured in one state, warehoused in another, and then shipped to the job in yet another state). The UCC applies primarily to sales of personal property (goods), and not to the sale of real property. Specifically, the UCC does not apply to a construction contract with another contractor or owner involving labor and not just the sale of goods.

The Code consists of 11 Articles, the longest of which is Article 2, entitled "Sales." This bulletin concerns only sales of goods under Article 2, primarily the purchase orders that a contractor writes to material and equipment suppliers. Terms long familiar to contractors, such as FOB, FAS and CIF, are defined in accordance with their generally understood commercial

meaning. *Common terms of the sales relationship are prescribed by statute unless the parties expressly agree to the contrary.* Particular attention is given to long term arrangements.

With respect to the sale of goods under Article 2, the Code emphasizes contract concepts rather than property concepts such as title. Prior to the adoption of the Code, the remedies available to a buyer or seller, *and the risk of loss when the goods were destroyed, turned on who had title to the goods when the breach or destruction occurred. Under the Code, the remedies of the parties and the division of risk between them depend upon the duties of performance under the sales contract.* Basic rules are restated in commercial terms by reference to shipment, delivery, acceptance of the goods, and similar functional aspects.

Mechanical contractors will be especially concerned with: warranties, implied and expressed; sale of samples or models; and the relegation of offer and acceptance in the formation of a

contract to their proper place under the theory that the parties to a contract can set their own rights and obligations by agreement. The concepts of “cover” and “cure” are used. All these features of the Code will be discussed along with other sections of the Code.

WARRANTIES

Section 1 states that the basic commercial tenets of good faith, diligence, reasonableness and care cannot be disclaimed. The Code sets forth two implied warranties that all goods must conform with. These are warranties of merchantability and fitness for purpose. The warranty of merchantability implies that goods purchased conform to ordinary standards of care and are of the same grade, quality and value as similar goods sold under similar circumstances (a candy bar will be fresh and edible). The fitness for purpose warranty implies that when goods are purchased for a specific use, the seller knows of that use and that the buyer is relying on the seller’s expertise, then the goods will conform to that use. Disclaimers of the implied warranties of merchantability and fitness for a particular purpose, however, may be disclaimed by contract, but only if the disclaimer is in writing and is conspicuous. Such disclaimers may not be valid in transactions with consumers such as homeowners.

It should be noted that in many cases, particularly in purchase orders involving equipment, manufacturers do in fact disclaim the implied warranties. Contractors need to be cautious to avoid any implied warranties owed to the owner or general contractor under the prime or sub-contract, where the equipment manufacturer has disclaimed those implied warranties. Pass along only the warranties provided by the manufacturer.

The code recognizes third party beneficiaries of certain limited warranties. The warranty extends to any natural person who is in the family or household of the buyer or who is a guest in his home if it is reasonable to expect that such person may use, consume or be affected by the goods and who is injured by breach of the warranty. A seller may not exclude or limit the operation of this provision.

REMEDIES AND DAMAGES

The UCC sets forth rules to allocate the division of certain risks between parties during shipment of goods and appropriate remedies. However the parties may change those allocations and remedies by contract. Section 2-509 deals with risk of loss in the absence of a breach of contract, and Section 2-510 addresses the effect of a breach of contract on risk of loss. *The theory of risk of loss under the Code is cast in terms of specific rules to resolve specific issues rather than a search for title.* A contractor would do well to be sure his insurance coverage is properly defined to protect him from possible loss under the approach of the Code.

The Code employs the concepts of “cure” and “cover” for remedies of sellers and buyers, respectively. The concept of “cure” by the seller enables the seller to cure a non-conforming shipment if the time for performance has not expired. Thus, a seller who has defaulted because of an improper shipment may thereafter ship the correct item or an undamaged item, thereby “curing” his default, if there is still time remaining for his performance under the agreement.

On the buyer’s side, “cover” is an additional remedy. The buyer may purchase goods in replacement after a breach of the contract by the seller and

collect any difference in cost from the seller.

Damages for breach of warranty can be limited by agreement. A limitation of consequential damages for personal injury in the case of consumer goods only, such as a homeowner, is *prima facie* unconscionable, but when the loss is commercial, it is not.

Consequential damages resulting from a seller's breach of contract may include any loss resulting from the general or particular requirements and needs of which the seller at the time of contracting had reason to know and which could not reasonably be prevented by cover or otherwise. However, the breaching seller may receive some protection, in that recovery for consequential damage is permitted only when the buyer could not reasonably have prevented the loss by "cover" or otherwise. Remember, however, as previously discussed, consequential damages may be limited by contract, and this is a common practice in manufacturers' and suppliers' terms and conditions. A contractor must again reconcile limitations on consequential damages in his purchase orders with material suppliers with the obligations for consequential damages that the contractor assumes under the prime or sub-contract.

When dealing under the Code, your rights and remedies are controlled by the concepts of identification and conformity. *The drafting of an agreement must be done with the points of inspection, acceptance of the material and payment carefully interwoven.*

CONTRACT FORMATION

The Code provides that if the price of the goods is \$500.00 or more, writing is required to enforce a contract. Generally that writing need only:

- (1) Specify a quantity (which limits the recovery);
- (2) Be signed or authenticated by the party to be bound; and
- (3) Be sufficient to indicate that a contract of sale was made.

However, a written confirmation of an oral agreement between a mechanical contractor and a supplier may suffice, unless written notice of an objection to the contents of the writing by the party sought to be bound is given within 10 days after he receives written confirmation. Partial payment, as well as receipt and acceptance of the goods, also creates an enforceable contract even without writing.

The common law rule of forming contracts by offers and acceptances is sometimes referred to as the "mirror image" rule; i.e., an acceptance of an offer which attempts to repeat the terms of the offer must reflect those terms precisely. The acceptance cannot add to, subtract from, or change those terms. If it does, it is no longer an acceptance but a counter-offer, rejecting the original offer and requiring, in turn, an acceptance itself for the formation of another contract. Therefore, the only sure way to accept an offer under the prior common law was to endorse the offer by the single word "accepted" and sign it or by simply writing "I accept your offer." But contractors do not have forms so tersely worded.

The Code does not use the "mirror image." Section 2-207 captioned "Additional Terms in Acceptance or Confirmation" provides:

- (1) A definite and seasonable expression of acceptance or a written confirmation which is sent within a reasonable time operates as an acceptance even though it states terms additional to or different from those offered terms agreed upon, unless

acceptance is expressly made conditional on assent to the additional or different terms.

(2) The additional terms are to be construed as proposals for addition to the contract. Between merchants such terms become part of the contract unless:

- (a) the offer expressly limits acceptance to the terms of the offer;
- (b) they materially alter it; or
- (c) *notification of objection to them has already been given or is given within a reasonable time after notice of them is received.*

(3) Conduct by both parties which recognizes the existence of a contract is sufficient to establish a contract for sale, although the writings of the parties do not otherwise establish a contract. In such cases, the terms of the particular contract consist of those terms on which the writings of the parties agree, together with supplementary terms incorporated under any other provisions of this Act.

Here you are informed that the parties have latitude to make an agreement in their terms as long as it is done in good faith and does not alter the express limitations set forth in the Act.

Now — *be sure that you are the last man to shuffle the papers if there are terms with which you do not agree, and that you make known your disagreement to the other party “reasonably.”* Otherwise, you have an agreement based on the last terms presented (unless your first offer states acceptance is limited to the terms and conditions stated hereon, any modification shall be ineffective unless in writing and signed by both Purchaser

and Seller). Without the foregoing statement on your Purchase Order, you may need a score card to keep track of the players in this game. You can see that any two parties can be, and often are, both offerors and offerees.

It should also be clear now that it depends on whether you are “pitching or catching” in this matter of preparing the terms printed on the forms used in present-day business transactions. The clear implication from the language of the Code is that *written confirmation or objection to terms which is not sent within a reasonable time does not operate as an acceptance or rejection.* It is always best to resolve any conflict between the written terms before any performance begins. This is especially important where warranties or express disclaimers of any warranties are involved.

Suggestions:

1. If you do not want to buy material except upon terms included on your Purchase Order, it should include, in conspicuous type, a clause expressly limiting acceptance to the exact terms of the offer.

2. If you are the recipient of a sales or purchase order and want no contract except upon your terms, you need reply only as follows: “I accept your offer (identify it), provided you agree to the following additional (or substitute) terms —.” Or, you may reply, “I accept if, and only if, you agree, etc.” The exact words depend on you.

3. To be doubly sure that the contract contains all the terms you want included, do not begin performance or take any action recognizing the existence of a contract until all forms have been received by the parties and the terms have been settled.

4. In case of a written confirmation, be sure it is mailed promptly (perhaps in the case of substantial transactions, by registered or certified mail, or e-mail if applicable.)

5. Of utmost importance, any legend on the front side of a form incorporating by reference any terms on the reverse side should be in conspicuous type. Otherwise, there is a danger that a court might construe the reverse side as not having been integrated with the agreement and ignore it. The terms on the reverse side should be in as large and clear type as possible.

UNIFORM COMMERCIAL CODE: HOW IT AFFECTS YOU AND YOUR SUPPLIER

Good faith between merchant and customer cannot be implied. Article II of the Uniform Commercial Code helps you protect yourself against any breach of good faith, especially if unintentional. Since ignorance of the law is no excuse, thorough study of the UCC is essential in the daily conduct of your business.

The Uniform Commercial Code, in effect in the District of Columbia and all states, revises pre-existing commercial law, including sales of goods (except in Louisiana), secured transactions (conditional sales, chattel mortgages, etc.), negotiable instruments (bill and notes), bills of lading and warehouse receipts.

Article 2 of the Code is possibly the most significant to mechanical contractors since it states the law with regard to the formation of sales contracts. A brief review of some of the principal provisions of the Code relating to sales of goods may help you analyze the adequacy of your forms and practices in this area.

UCC OFFER AND ACCEPTANCE

Prior to the Code, in order for a binding contract to exist, the offer to sell or purchase required an acceptance delivered in the manner dictated by the offer, and without qualification or exception to that offer. The Code reflects the law to generally accepted commercial practices. It includes widespread use of printed proposals, purchase orders and acknowledgement forms, which often have differing terms and conditions. Thus, under the Uniform Commercial Code, a contract may be made in any manner that shows agreement, including the conduct of the parties, even though the moment of its making is undetermined. (Example: Supplier ships goods, buyer accepts them.)

Unless otherwise expressly provided in your purchase order, acceptance by the supplier may be made in any manner (i.e., either by acknowledgement form or by delivery of the goods). If you want acceptance in a particular way, you must so specify in your purchase order. The same rule applies to your response to a seller's quotation.

A promise by a supplier to hold a quotation open for a stated period not exceeding three months (i.e., this price is good for fifteen days) may be enforceable even though not supported by consideration; if no time is stated, then it is for a "reasonable time." This irrevocability of an offer may be negated by an express contrary provision in the offer form, or extended beyond three months if supported by consideration. The most important Code provision with regard to use of a proposal, purchase order and acknowledgement forms is 2-207. This section essentially provides that even if your purchase order and the supplier's acknowledgement contain terms and conditions that conflict in some degree, and if there is agreement

as to the principal terms of the sale, a contract may be formed. Under these conditions, a contract is formed when a “definite and seasonable expression of acceptance or a written confirmation” is sent by the supplier, unless the supplier expressly states that his acceptance is made conditional upon your assent to his different or additional terms. In this latter case, there is a contract only when you assent. Under the Code, you may wish to amend your forms to provide that acceptance must be upon the exact terms of your purchase order. If you do, you will have no enforceable contract unless you receive an unqualified acceptance.

A less stringent alternative is to provide in your purchase order that you object to any additional or different terms proposed by the supplier in his acceptance and, even if such terms are included, the contract shall be upon the terms stated in your purchase order.

If you have not qualified your purchase order, if the supplier’s acceptance form does vary from your order, and the supplier has not conditioned his acceptance, you must reasonably object to his new terms. Otherwise, you will be bound by them.

TWO REMEDIES FOR RECEIPT OF DEFECTIVE GOODS

Unless your purchase order otherwise clearly indicates, a shipment of defective (non-conforming) goods is an acceptance of your offer to buy, and a contract exists. Your remedies include: (1) rejection of the goods and a suit for damages; or (2) acceptance of the goods and a suit for damages resulting from defects. No contract is formed, however, if the supplier notifies the buyer that shipment is offered only as an accommodation to the buyer.

WHAT CONSTITUTES ACCEPTANCE OF GOODS?

Another important question dealt with by the Code is what constitutes acceptance of goods and how you may reject them. The Code provides that you have accepted the goods if, after a reasonable opportunity to inspect them:

- (1) You signify to the supplier that the goods do conform, or in spite of non-conformity, you will retain them;
- (2) You fail to make an effective rejection; or
- (3) You otherwise treat the goods as your own.

To make an effective rejection, you must notify the supplier within a reasonable time after delivery. What is “reasonable” depends on the facts of each case, especially upon contract terms relating to inspection and upon the difficulty of making the inspection (if it has not been waived in the contract). You should also state in detail the reasons for your rejection. They have an important bearing upon your remedies.

Careful consideration should be given in your purchase order form to include a provision concerning your right of inspection and the time for rejection of non-conforming goods.

The Code provides a four-year statute of limitations for any action for breach of contract, but it permits parties to reduce that period to not less than one year. The statute begins to run from the breach, not from knowledge of it. A breach of a supplier’s warranty is deemed to occur when the goods are tendered. This statute, however, is not a limitation on actions founded in tort rather than contract (i.e., claims for personal injury or damage to the plaintiff; reference must be made to the applicable state statute of limitations for such an action).

“SHIPMENT” AND “DESTINATION” CONTRACTS

The Code distinguishes between “shipment” and “destination” contracts. In the former (i.e., FOB place of shipment), the supplier only arranges for transportation to complete his performance. In the latter, (i.e., FOB place of destination), he must deliver to the selected point. In the absence of specific agreement to the contrary, the supplier may use any reasonable carrier or route and make any reasonable arrangements for the shipping. Whether the shipment is or is not at the buyer’s expense, reasonable arrangements for the shipping (i.e., protection against the weather, use of specialized vehicles, etc.) are generally the supplier’s job. Special contract clauses (i.e., risk of loss, insurance during shipping, special arrangements regarding shipping, etc.) may be desired in your purchase order.

As defined in the Code, the following meanings attach to the indicated terms:

FOB place of shipment: Supplier delivers to carrier and arranges for suitable shipping contract. Risk of loss is on you when this has been done. You pay transportation charge. You have insurable interest when goods are identified to the contract. Supplier has insurable interest until his duties, as above indicated, have been performed.

FOB point of destination: Supplier has insurable interest until his duties, as above indicated, have been performed.

FOB car, vessel or other vehicle: Supplier loads the goods and tenders the documents necessary to give you control over them. You have a risk of loss upon loading and pay transportation charges from that point. The supplier has insurable interest until then. You have such interest as in the two prior forms.

CODE OFFERS BROAD FREEDOM OF CONTRACT

The Code rests upon the requirement of good faith between the contracting parties and renders unenforceable unconscionable bargains. It does, however, permit broad freedom of contract between the parties. As a result, there will undoubtedly be a number of items which your purchase order should contain, or items which you may want to include because they are of special significance to you.

You should also be mindful that in certain instances, the Code distinguishes between commercial transactions (transactions between merchants) and consumer sales. A seller’s ability to disclaim certain implied warranties is an example of where the Code makes this distinction.

SUMMARY

This bulletin is intended merely to provide a general outline of the major provisions of the Code. Inasmuch as various states in adopting the Code have in some cases incorporated variations from the proposed Code, it is suggested that the advice of local legal counsel be obtained in reviewing your purchase and sales practices.

This bulletin is not intended to be legal advice. Contractors should seek local counsel for specific information regarding the information found in this bulletin.



Bulletin

Summary of State Regulations and Taxes Affecting Contractors

Contractors must register to do business in any states in which they work. Failure to do so can restrict the ability of the contractor to access the court system of that state in the event of a dispute, and also can subject the contractor to various fines and penalties. Once registered, the contractor is obligated to stay updated on the various tax and regulatory laws that he must comply with. Fortunately, there are some materials that can assist contractors with this challenge.

The Associated General Contractors (AGC) publishes and updates regularly the "Construction State Law Matrix." This publication is available by annual subscription through the AGC website (www.agc.org). It covers many topics, including state licensing requirements, foreign corporation registration requirements, bonding requirements, and sales and use tax obligations. The matrix is searchable by state and by topic.

The Corporation Trust Company is a service organization primarily designed for lawyers, but available to contractors through the contractor's attorney. Corporation Trust offers out-of-state corporations advice in such areas as qualifications for doing business,

corporate filings, statutory representation and corporate staffing and meeting services.

Another useful service is offered by Walters Kluwer Commerce Clearing House, Inc. This publication is a compendium of State Tax Reporters for all 50 states and the District of Columbia. Among the topics included are franchise tax, corporate income tax, property tax, sales and use tax, and unemployment tax. It also updates services including:

- **Tax Tracker News** – A daily service providing customized tax news delivered by e-mail.
- **Smart Charts** – Tools to provide comparative tax treatments across multiple tax jurisdictions.
- **Tax Calendar** – At-a-glance state and federal filing date requirements.
- **State Tax Review** – Reviews of the latest trends in all taxes in all states—pending legislation, new laws, regulations, rulings and comparative analyses of state tax data.

Working out of your own state can be complicated, and it behooves a contractor to use all information available.

This publication is not intended to be legal advice. Contractors should seek local counsel for specific information regarding the information found in this bulletin.



Bulletin No. LL 4
File: Legal

Bulletin

Truth in Lending

The Management Methods Committee recommends that contractors seek local counsel for specific information pertaining to this area of the law.



Bulletin No. LL 5
File: Legal

Bulletin

Funding Liability Under Multi-Employer Pension Plans

The Management Methods Committee recommends that contractors seek local counsel for specific information pertaining to this area of the law.



Bulletin

Records Retention

INTRODUCTION

It is important for mechanical contractors to properly maintain and store their records and documents for many reasons, especially the potential for litigation involving a construction project. A company's records encompass many things including project correspondence, employee personnel files, accounting records, etc. These records may be on paper or in electronic format.

Unfortunately, the cost of document storage can be huge. These costs can be somewhat mitigated with an effective company record retention and destruction program whereby your records, except for those of permanent value, can be systematically destroyed without running afoul of government regulations.

A good policy will include guidelines for storing, using, retaining, and destroying documents. While no single policy will suit all companies, there are some rules that are universal. The policy must be in writing and known to all employees. The policy should be implemented and controlled by a specific individual with adequate authority. The policy should be enforced uniformly to all projects and all employees.

RECORD RETENTION POLICIES

Your record retention program should provide for:

- (a) maintenance of records in accordance with applicable governmental and legal requirements;
- (b) safe storage of vital business records (e.g. articles of incorporation, mortgages); and
- (c) an orderly system for the retention, retrieval and disposal of records.

An important step in creating a record retention policy is to understand which documents do not need to be retained at all. All records not necessary for legal and business reasons can be destroyed in order to reduce the high cost of storing, indexing and handling the vast amount of documents and paper which would otherwise accumulate. Included in this category might be miscellaneous records such as:

- (a) cover letters or correspondence and internal memoranda which serve only as simple acknowledgment;

(b) notices of meetings, invitations or regrets, arrangements for functions, speakers, etc.; and

(c) stereotyped replies, notices, reports, releases, tabulations and publications of general information unrelated to a particular project that require no administrative action.

Other documents no longer necessary for day-to-day operations must nevertheless be stored for certain periods of time. Your company is most certainly subject to statutes, regulations or other laws that require documents to be retained for a minimum number of years. Your record retention policy will need to distinguish what records need to be retained for how long. Additionally, many important documents must be maintained permanently (your articles of incorporation, mortgage, etc.). If such records cannot be easily replaced, the originals of such documents should be maintained safely and securely with extra copies stored away from the originals in a safe deposit type vault or with your attorney.

RECORD RETENTION/ DESTRUCTION SCHEDULE

Your record retention program must insure that you keep those records to meet your governmental and legal requirements. All records are retained for the period required by applicable state and federal laws and regulations. This is usually accomplished with a record retention/destruction schedule. This schedule identifies each type of record to be maintained, and lists the duration that record should be stored.

There are different retention periods for different types of records. A record retention/destruction schedule is a valuable tool for showing governmental agencies that your company is

disposing of its records in compliance with regulations.

In creating a record retention/destruction schedule, first identify all types of documents that your company utilizes. Such a list might include:

- Human resource and administration
- Accounting and financial
- Corporate
- Insurance
- Tax
- Property
- Legal
- Safety
- Construction Project Documentation
- Non-project specific correspondence
- E-mail and electronic files

Within each category, you will further identify the different types of documents and the time you will keep them. Different states have different requirements. Additionally, most federal governmental agencies (EPA, OSHA, IRS, etc.) with which your company interacts have set record retention requirements.

Every company will have different specific requirements for retaining records. It is therefore strongly recommended that your attorney and CPA review and approve your record retention policy. A sample of a record retention policy can be reviewed at <http://apps.americanbar.org/lpm/lpt/articles/sampledestructionpolicy.pdf>.

Regarding construction project documentation, all states have a “statute of limitations” within which time a contractor might be sued on a project and must defend using their project records. Statutes of limitations usually run from the date a cause of action is

discovered or should have reasonably been discovered (the “discovery rule”). Therefore, many states also have a “statute of repose,” which creates an absolute end to the period of time within which a contractor might be sued on a project, even if the cause of action has not yet been discovered. Statutes of repose set definite time limits under which a cause of action can be brought against a contractor (e.g. 10 years from project substantial completion).

For example, a state’s statute of limitations might require that a lawsuit be filed within three years of discovery of property damage resulting from an improperly installed air conditioning system. If the property damage resulting from the defective installation is discovered 12 years after the project’s substantial completion then the claim may not be barred by the three-year statute of limitations. Such suit could be brought up to three years after the discovery of the damages. However, if, for example, the state’s statute of repose is 10 years from the project’s substantial completion, the lawsuit would then be barred as it was not filed within the statute of repose period.

In states with statutes of repose, project records should be maintained through at least the end of that period. Your attorney will recommend the correct retention period for construction documents in the jurisdictions where your company works, and this duration should then be reflected in your record retention/destruction schedule.

Once a destruction date established in your record retention/destruction schedule is reached, you must insure that all documents in the applicable category are consistently destroyed. This includes the shredding of paper and the destruction of various forms of electronic data and computer metadata. It is a good idea to maintain a log of

destroyed documents and your record retention policy should include this as a requirement.

RECORD STORAGE

Contractors with a high volume of stored paper records often employ outside companies and pay them for remote storage on a monthly basis. Other contractors maintain their own record storage at the office or at a nearby facility. In either case, stored records are best kept in corrugated boxes with sheets stored flat in the containers. If possible, remove rubber bands, tape and other materials that might deteriorate and discolor the records.

Businesses can choose to store their records via electronic record retention. When a company implements an electronic record retention plan for paper files, the original paper copy is destroyed and only a scanned image of the original exists. As far as the admissibility of these documents in court, the imaged documents should meet the required criteria needed as long as the imaged document accurately reproduces the original document and does not give rise to concerns regarding the authenticity of the original or have the appearance that the document was tampered with.

Emails and other data created and maintained in electronic format in computers are usually considered to be “documents” for litigation purposes and your record retention program should include a detailed explanation as to how these documents will be treated. Such electronic documents contain metadata not visible on the face of the document, including the document’s creation amendment history, transmittal history and the author’s name, etc. You and your employees need to understand that even emails deleted from an individual’s mailbox may remain elsewhere in the

system. Thus the complete destruction of electronic documents can be challenging and should be coordinated with your Information Technology professionals.

Electronic record retention is a great benefit for most documents; however, you should confer with your attorney to see which, if any documents should be maintained in their original, paper format in your state.

LITIGATION

Notwithstanding any destruction dates set forth in your record retention/ destruction schedule, your company must immediately suspend regular retention and destruction procedures when litigation or a legal document request is pending or imminent. Once you recognize that a dispute may result in litigation or a complaint is already filed, all documents related to the disputed, including electronic records, must be preserved.

Destroying relevant documents when you know a claim is likely can be interpreted as an attempt to eliminate damaging evidence, and the potential civil and criminal liabilities from the destruction of documents needed for litigation is enormous. Many states permit an independent cause of action for "spoliation of evidence," which is the destruction of evidence relevant to litigation. You can avoid even the appearance of impropriety if you retain and destroy documents on a regular basis in compliance with your record retention policy

CONCLUSION

A thorough and well-implemented record retention policy will benefit your company in many ways. It will reduce the volume of documents by ridding your organization of documents that are no longer required to be retained by law or otherwise necessary for the conduct of its business. A good policy will ensure your compliance with applicable state and federal laws and insure your records are properly maintained in case of future litigation. Finally, by following a comprehensive retention and destruction policy, you will protect your company from charges that it improperly destroyed documents relevant to litigation.

The information in this bulletin should not be construed as legal advice. A person should contact their local counsel for specific legal advice regarding the information contained in this bulletin.



Bulletin

Employers' Liability When Contributing to Union Testimonial Dinners

The so-called "anti-bribery" provision of the Federal Labor-Management Relations Act prohibits employers and associations of employers from, among other things, paying money or delivering things of value to a labor organization (or any officer or representative thereof), which represents the employees of the employer or which seeks to represent them (29 U.S.C. Section 186(a)). Section 186(b) of the Act prohibits any person from receiving payments or things of value that Section 186(a) prohibits employers from giving. Willful violations of these provisions involving money or things of value in the amount of \$1,000 or greater are felonies punishable by fines of up to \$15,000 or imprisonment for up to five years, or both. Willful violations valued at less than \$1,000 are misdemeanors punishable by fines of up to \$10,000 or imprisonment for up to one year, or both.

The payment (or receipt) of money and the giving (or receipt) of valuable gifts as specified in Sections 186(a) and (b), are clear-cut violations of the Act. Other forms of benefits given to union representatives (or received by them) are not so obviously within the purview of the Act, but nevertheless constitute violations.

The case of *United States v. Pecora*, 484 F.2d 1289 (3rd Cir. 1973) is illustrative. The defendant, Pecora, was the business manager of the local Construction and General Laborers and Materials Handlers Union and the honoree of a testimonial dinner sponsored by the union. Some employers purchased tickets at \$50.00 per couple and advertised in a souvenir program at \$300.00 per page. After deducting all costs of the event, the net proceeds were donated to Pecora—\$26,755.00³² in cash, plus a new car worth \$5,324.96 and a color television set worth \$448.00.

The government charged Pecora with violating Section 186(b) by his receipt of the cash and other gifts. Although the lower court dismissed the indictment on the grounds that there was no showing of a "corrupt purpose" which it considered necessary to constitute a violation of Section 186(b), the Court of Appeals said ". . . that is simply not correct" and remanded the case to the District Court for trial. The Court of Appeals stated that to "allow such a device [contributions to a testimonial committee] would make a mockery of attempts to enforce §186(b)."

While the focus of the Pecora case was on the union manager's receipt of cash and gifts, a lesson can be learned by

employers; namely, that no employer or association representative should contribute to or attend any such function where it is even possible that some part of the payment will be received, directly or indirectly, by a labor organization or any representative of a labor organization which represents employees of such employer or bargains with the association.

Another case important in this discussion is *United States v. Phillips*, 19 F. 3rd 1565 (1994). In this case, the United States Court of Appeals, eleventh Circuit ruled that neither intent to violate the law nor proof that a union official was in fact influenced is necessary to find a violation. As the Court stated, "...Congress must have intended sections 186(a)(1)-(2) to prohibit payments to representatives even if they were made without any intent to influence...Congress intended the term "willfully" to require proof only that the payment was made knowingly and intentionally, not accidentally or by some mistake."

Be very cautious about any payments of any kind to union officials or representatives, including attending testimonial dinners. Also, it is important to keep in mind that if, for any reason, an employer or association representative contributes to such a function, certain reporting requirements may apply. Willful failure to submit required reports to the Department of Labor constitutes a violation of another provision of the Labor-Management Relations Act.

SUMMARY

If you should have questions about the legality of a requested contribution of the type discussed in this bulletin, you should consult with your legal counsel. You should determine and pass along to your counsel information as to who will be the recipient of any funds beyond the cost of the event since that information will be of importance in assessing the legality of the contribution.

This bulletin is not intended to be legal advice. Contractors should seek local counsel for specific information regarding the information found in this bulletin.



Bulletin

Compliance with Antitrust Laws

All businesses, including ours, should take great care that they maintain strict compliance with all antitrust laws and avoid the perception of violating the antitrust laws. This bulletin provides a brief summary that is intended as a general guide only. Your association cannot and does not render individual legal advice, and suggests that specific questions of law be referred to an individual's or company's legal counsel.

PROVISIONS OF THE ANTITRUST LAWS

The most important federal antitrust statutes relating to the business activities of your company and that of your association are Section 1 of the Sherman Act and Section 5 of the Federal Trade Commission Act. Section 1 of the Sherman Act prohibits a "contract, combination...or conspiracy...in restraint of trade or commerce." This means that agreements between two or more persons or firms that "restrain trade" are illegal. A restraint of trade generally refers to a practice which inhibits free and open competition. The intent of the law is to protect competition as opposed to individual competitors.

The most critical element of competition is price and, accordingly, the antitrust laws are applied most vigorously to

protect price competition. The Sherman Act prohibits any agreement affecting

the price of a product regardless of the purpose of the agreement. For example, if businessmen reach any form of understanding or agreement that affects prices (that is, enter into a price fixing agreement), they cannot attempt to justify the actions by attempting to show some legitimate objective or beneficial result from the agreement. Such agreements are known as per se violations of the Sherman Act. Bid rigging, of course, is a form of price fixing. Other per se violations include group boycotts to pressure suppliers or customers not to deal with the group's competitor and the division of markets or territories among competitors.

Mere attendance at a meeting where businessmen engage in price fixing discussions may imply acquiescence and participation and make a businessman and his company criminally liable, even though he did not actively participate in a resulting price fixing scheme. Only by an affirmative act of withdrawing himself from such a meeting can a non-participant who was present at the conception of a conspiracy avoid liability.

The antitrust laws also prohibit agreements among competitors as to

other terms of sale, such as credit and warranties. In short, each company, in order to comply with the antitrust laws, must make its own decisions regarding prices and other terms of sale; this unilateral decision-making process is at the heart of the competitive process, which the antitrust laws are designed to protect.

Section 5 of the Federal Trade Commission Act prohibits “Unfair methods of competition in or affecting commerce, and unfair or deceptive acts or practices in or affecting commerce.” Unlike the Sherman Act, the Federal Trade Commission Act reaches anticompetitive acts committed by individual persons or companies, whether or not there is any agreement or “combination;” but, like the Sherman Act, it also covers joint actions. The FTC is also vested with rule-making powers applicable to entire industries.

In addition to federal laws, most states have adopted antitrust statutes. Therefore, no local business can expect to avoid the antitrust laws by claiming that they do not apply to them.

TOPICS TO AVOID IN DISCUSSION WITH OTHER INDUSTRY MEMBERS

There are topics that a businessman should avoid discussing with another industry member or members to avoid the perception or in fact an actual violation, of the antitrust laws. This applies no matter where the discussions take place (e.g., in an office, at a convention, in correspondence or on the telephone). These topics include but are not limited to:

Prices

- Current or future prices including bids. (The safest policy is to avoid any mention whatever of prices, even of past prices, and

one should tread lightly in this area.)

- What constitutes a “fair” profit level in one’s view.
- Possible increases or decreases in prices on future bids.
- Standardization or stabilization of prices in the region or across the board.
- Pricing procedures, including margins, markups, cost percentages, discounts, or formulas or policies for arriving at prices.
- Avoidance of ruinous competition.
- Credit and warranty terms.

Production, Capacity, and Marketing Plans

- Plans to reduce, increase, or maintain production capabilities.
- Plans to reduce or increase capacity.
- Plans to market products, expand, or contract product lines or enter new markets.

Allocation of Markets

- Dividing up winning bids.
- Dividing up territories.
- Dividing up products or product lines.

Joint Boycott of a Supplier, Subcontractor, or Customer to Pressure a Competitor to Change Prices or Other Policies

- Boycott to pressure discounter into raising prices.
- Boycott to pressure competitor to raise future prices.
- Boycott to pressure competitor to change certain competitive behavior.

PENALTIES FOR VIOLATION OF THE ANTITRUST LAWS

Federal antitrust laws may be enforced against individuals and corporations both by government officials and by private parties through treble damage actions. In both cases, penalties can be severe.

An individual convicted of a criminal violation of the Sherman Act may be fined as much as \$350,000 and imprisoned for up to three years **for each violation**. A corporation convicted of such a criminal offense may be fined up to \$10 million or more in some cases. Both may be subjected to court injunctions severely restricting their activities and to further penalties for violating such injunctions.

Violation of the Federal Trade Commission Act can result in issuance of a cease-and-desist order, which can impose extensive restrictions on the activities of a corporation. Failure to comply with such an order can result in penalties of as much as \$10,000 **per day**.

In addition to governmental prosecution for a criminal or civil violation, the business can face private actions for treble damages by injured competitors, customers or suppliers.

YOUR ASSOCIATION AND THE ANTITRUST LAWS

The provisions of the antitrust laws and the penalties for violation also apply to associations and their members and staffs. A trade association is a group of competitors and thus a “combination” within the meaning of Section 1 of the Sherman Act. Therefore, any antitrust violation that occurs through the association or with the participation of its officers or staff or is somehow facilitated by association activities can also create liability for the association, as well as the participating members.

Strict compliance with the anti-trust laws is, and always has been, the policy of your association. This association exercises extreme care, with the assistance of its legal counsel, to avoid not only a violation but anything that might create a perception of a possible violation. That policy is essential for the protection of its members and for the continuance of its activities for the improvement and promotion of the industry.

This bulletin is not intended to be legal advice. Contractors should seek local counsel for specific information regarding the information found in this bulletin.



Bulletin

Tax Requirements Applicable to Travel Reimbursements, Advances and Bargaining Units Subsistence Allowance

INTRODUCTION

Employers must generally satisfy federal employment tax requirements with respect to all “wages” paid to employees. A key term which presents interpretational problems in applying this requirement is the word “wages.” Regulations, rulings and case law have served to provide guidance and examples of how broadly the term should be interpreted and how it should be applied to particular payment arrangements. The Internal Revenue Service (IRS) has set forth a specific set of rules for applying employment tax requirements in the context of travel reimbursements and advances made by employers. See IRS Publication 463.

A related set of Internal Revenue provisions address the question of whether employer-paid reimbursements and advances may be deducted by the employer for purposes of arriving at the employer’s taxable income. The requirements imposed for deductibility purposes relate to the type and degree of substantiation that must be maintained to prove the amount and purpose of particular travel expenses.

This bulletin will explain the rules with respect to employment taxes insofar as they apply to reimbursements and advances paid by employers with respect to travel and other subsistence payments. It will also address the related question of the employer’s right to deduct these payments as ordinary and necessary business expenses.

EMPLOYMENT TAX REQUIREMENT (WITHHOLDING)

If an amount paid by an employer to an employee falls within the definition of the term “wages,” the employer is generally required to withhold from the amount paid to the employee an amount equal to the employee’s share of Federal Insurance Contributions Act (FICA) tax and the amount required to be withheld and paid toward the employee’s income tax in accordance with the Form W-4 which the employee has submitted to the employer. The employer is required to promptly pay these withheld amounts to the IRS and to also pay the employer’s share of the FICA tax and the Federal Unemployment Tax Act (FUTA) tax.

If the employer fails to pay these employment taxes, an audit by the IRS could impose an enormous tax liability on the employer. The employer will be required upon audit to pay not only the FUTA tax and employer's share of FICA tax, which it should have paid when the wages were paid to the employee, but it will also be required to pay from its own funds the employee's share of FICA tax and the income tax which should have been withheld. The IRS will also assess penalties and interest on any additional FICA, FUTA and income withholding which an employer is required to pay as the result of an audit. Furthermore, if an employer corporation is unwilling or unable to pay the tax, the IRS will hold principal officers of the corporation personally liable for making these payments.

Because of the potentially large tax exposure which could result from an IRS audit determination that employment tax requirements were not satisfied, it is extremely important that employers not inadvertently omit from "wages" items which may not legitimately be excluded. Employers generally have no difficulty recognizing that salaries, bonuses and similar payments to employees constitute "wages" on which employment taxes must be paid. A determination whether reimbursements or advances to employees are properly characterized as "wages" may not be so simple, however.

The employment tax regulations specifically exclude from the definition of "wages" any "amounts paid specifically, either as advances or reimbursements, for traveling or other bona fide ordinary and necessary expenses incurred or reasonably expected to be incurred in the business of the employer." Although this language would appear, on its face, to be quite broad in scope, the IRS has narrowed it in application.

The regulations specifically require that a reimbursement or advance will be excluded from wages only if it is paid by separate check or is otherwise specifically identified. Therefore, if the employer is delivering to an employee a single check for both salary and a travel advance, the employer should maintain particular records of this break-down. If the payment is not broken down in this fashion, the IRS could treat the entire payment as wages subject to employment taxes.

Travel expenses paid or incurred in connection with a **temporary** work assignment away from home are typically qualified travel expenses. **However, travel expenses paid in connection with an indefinite work assignment do not qualify as deductible travel expenses and therefore are classified as wages. Any work assignment in excess of one year is considered indefinite.**

Also, if it is realistically expected that the employee will work at an assignment for more than one year, *whether or not the employee actually works there that long*, the assignment is considered indefinite. Likewise, an assignment that starts as a temporary assignment will become an indefinite assignment as soon as it is known that the assignment is expected to last more than one year and then becomes wages from that point forward, according to Rev. Rul. 93-86. Any allowance paid for travel expenses incurred on an indefinite assignment is supplemental wages to the employee and fully taxable.

In published rulings, the IRS has stated that it is not proper to exclude advances from wages unless the employee is required to account to the employer to verify that the reimbursements or advances are actually expended for business purposes. For example, if an employer provides an automobile allowance for an employee to cover his

daily travel expenses, but does not require any verification whether the employee uses his own automobile or travels for free with others, the employer will not be entitled to treat the payments to the employee as reimbursements or advances, and employment taxes will have to be paid on the amount of the automobile allowance.

INCOME TAX DEDUCTIBILITY SUBSTANTIATION REQUIREMENTS

The requirements imposed by Notice 894 for employment tax purposes overlap with the requirements imposed by Section 274 of the Code with respect to an employer's taxable income.

Unless the employer satisfies the substantiation requirements imposed by Section 274, the employer will not be permitted to deduct the amount of the travel advances or reimbursements, regardless of whether the employer has excluded these payments from wages for employment tax purposes. Furthermore, although Code Section 162 generally permits the deduction of all ordinary and necessary business expenses, this general provision is limited by Section 274(n) which permits only 50% of the cost of meals to be deducted. This restriction applies regardless of whether the meal expense is incurred while on travel away from home.

The regulations under Section 274 explicitly state that taxpayers bear the burden of proof to substantiate each element of expenditure for travel. There are two alternative methods for satisfying this substantiation requirement with respect to reimbursements or advances for travel and subsistence.

1. The first alternative is to satisfy the substantiation requirements generally imposed on all travel and entertainment expenses.

To satisfy these requirements, the employer must obtain from each employee an accounting of how particular advances or reimbursement payments were actually expended. A simple written statement from the employee as to how he expended the funds will not be sufficient. Rather, the employer must require the employee to provide it with a detailed breakdown of particular expenses, together with copies of receipts, bills, invoices or other corroborative evidence establishing the specific amount, date, place and purpose of each travel expenditure. These records should be generally sufficient so that a person reviewing them would be able to verify that the funds advanced or paid as reimbursements were actually expended for travel away from the employees' tax home, including the costs of airfare or other transportation, meals, lodging and incidental expenses of a non-personal nature. It is suggested that the employer audit or review its files maintained for substantiation purposes, with a critical eye to recognizing whether an IRS auditor would question the reliability and degree of substantiation maintained. If the employer maintains records sufficient to satisfy this general substantiation requirement, it will be entitled to deduct 50% of the amount of the employee's meal expenses and the entire amount of airfare, lodging and other travel expenses.

2. The Internal Revenue regulations provide an alternative substantiation method which an employer who provides specific subsistence, transportation or meal allowances may use.

These regulations allow the substantiation requirement to be

satisfied even though the detailed type of receipts, bills and other substantiation necessary to satisfy the general substantiation requirement discussed above is not satisfied. This alternative relates only to per diem or other reimbursement arrangements relating to subsistence expenses, such as meals, lodging, laundry and other incidental expenses, incurred during an employee's travel away from home. It does not apply to the transportation cost to and from the away-from-home destination.

Because the deductibility of meal expenses is limited to 50% of the cost of the meals, an employer who uses a per diem method must allocate the per diem payment between the allowance for meal expenses and the allowance for other expenses. The employer will be entitled to deduct only 50% of the meal expenses allowance but will be entitled to deduct the entire amount of the other element of the per diem payment. The IRS has stated that it will permit any employer that pays a single per diem amount to cover both meals and lodging to allocate the amount between meals and lodging "on a reasonable basis." To establish such a reasonable basis of allocation reflecting the average meal expenses ordinarily incurred by employees while traveling in the same geographical area would be sufficient.

INCOME TAX CONSEQUENCES TO THE EMPLOYEE

If an employer does not report a reimbursement or advance on the Form W-2 provided to the employee, the employee can exclude the amount of the reimbursement or advance from his income. If a reimbursement or advance

is listed on the Form W-2 as wages, the employee must report the listed amount as income. The employee will be entitled, however, to claim deductions for the ordinary and necessary expenses incurred for his subsistence while traveling away from home. In this case, the burden of satisfying the Section 274 substantiation requirements will be solely upon the employee, rather than the employer.

The employee should be aware that he should deduct these business expenses "below the line," i.e., he should deduct the expenses from adjusted gross income in order to arrive at taxable income, rather than deducting them from gross income to arrive at adjusted gross income. Because the deduction is below-the-line, the employee's ability to deduct these expenses will be restricted by Section 67 of the Code. Section 67 restricts a taxpayer's right to deduct certain types of below-the-line business expenses except to the extent that the aggregate amount of such expenses for the year exceeds two percent of the taxpayer's adjusted gross income.

This bulletin is not intended to be legal or tax advice. Contractors should seek local legal and tax advice for specific information regarding the information found in this bulletin.



Bulletin

Federal Prompt Payment Act

INTRODUCTION

The federal government has enacted rules mandating prompt payment to its contractors and vendors. The Federal Prompt Pay Act (PPA) assesses late interest penalties against federal agencies in certain instances including when it pays construction contractors working on federal government construction projects after a payment due date.

The PPA is found in 31 U.S. Code Section 3901, et seq. and the rules implementing the PPA are found in the Code of Federal Regulations at section 5 CFR Part 1315. Subsection 1315.14 contains requirements specific to payments on federal construction projects. Additionally, the federal construction contract clauses reflecting the PPA in federal construction contracts are found at FAR § 52.232-27 (set forth in its entirety below).

These regulations govern payment terms between the government and its construction contractors, as well as between those contractors and their lower tier subcontractors.

PROPER INVOICE

The time within which the government must pay its contractor starts ticking from the government's receipt of the contractor's "proper" invoice. Thus, the most common way a contractor undermines the benefits of the PPA is by failing to submit a proper invoice.

Under FAR 52.232-27, a **proper invoice** includes:

(i) Name and address of the contractor. Be sure the firm name on the invoice matches that on the contract.

(ii) Invoice date and invoice number. The invoice date establishes when the invoice was prepared and dispatched should any disputes arise later with respect to the date of receipt of the invoice. The PPA defines receipt of invoice as the ". . . date on which the place or person designated by the agency to first receive such invoice actually receives such invoice." The invoice receipt date then prevails over the date of the invoice to establish when the payment clock begins. There are two exceptions to this general rule: if a time discount is offered, and if the agency fails to date-stamp the invoice upon receipt. In both these cases, the invoice date is used to start the payment clock.

(iii) Contract number or other authorization for work or services performed (including order number and contract line item number). The contract number helps the government match contract data against invoice data. Without this information the invoice might be declared defective.

(iv) Description of work or services performed. The data in this portion of the invoice should be compatible with comparable data of the contract.

(v) Delivery and payment terms. Include the discount for prompt payment terms, if applicable.

(vi) Name and address of contractor official to whom payment is to be sent. This must be the same as that in the contract or in a proper notice of assignment.

(vii) Name, title, phone number, and mailing address of person to notify in the event of a defective invoice. The government has a duty to promptly notify the contractor if the invoice is deemed defective, but the contractor must include individual's contact information in the invoice.

(viii) For progress payments, substantiation of the amounts requested and certification. Progress payments are typical under federal construction contracts. Per FAR 52.232-5, the contractor's progress payment application must include a very specific certification (see full FAR language below) as well as:

- 1) An itemization of the amounts requested related to the various elements of work specified in the contract;
- 2) A listing of the amount included for work performed by each subcontractor under the contract;

- 3) A listing of the total amount for each subcontract under the contract;
- 4) A listing of the amounts previously paid to each subcontractor under the contract; and
- 5) Additional supporting data and detail in a form required by the contracting officer.

(ix) Taxpayer Identification Number (TIN). The contractor must include its TIN on the invoice if required elsewhere in the contract. TIN information is also required to make electronic funds transfer payments.

(x) Electronic funds transfer (EFT) banking information. The contractor must include EFT banking information on the invoice if required elsewhere in the contract or other applicable regulation or requirement. Note: *the government can waive the requirement to pay by EFT*.

(xi) Any other information or documentation required by the contract. Carefully review the contract and note any other substantiating documentation or information that is required. Most federal contracts will require a specific invoice form be used. Typically, a request for progress payment on a federal project will be on Form SF 1443 "Contractor's Request for Progress Payment."

GOVERNMENT RESPONSE AND RECEIVING REPORTS

The government should date-stamp the contractor's invoice on the day it is received. Thereafter, the government has seven days to determine if it disputes that the invoice is proper (i.e. adheres to the above standards), or is defective. The agency must return to the contractor any payment request which is defective within seven days

after receipt, along with a statement identifying the defects. The payment clock does not begin until the contractor resubmits a proper invoice. Per section 1315.14(a)(3), when computing an interest penalty owed the contractor, the government must take into account any untimeliness in its notification to the contractor of an improper invoice.

Once the government receives a proper invoice, it will process a receiving report or other government documentation authorizing payment and indicating that there was no disagreement over progress payment amount, quantity, quality, or contractor compliance with any contract provision.

INTEREST PAYMENTS

The due date for making progress payments under the PPA is 14 days after the government notes receipt of a proper request for progress payment. However, if the government fails to note the actual date it received the request for progress payment, the payment due date is 14 days after the date of the contractor's proper request for progress payment. Under the PPA, final payment is due 30 days after invoice and final acceptance. (Note that a contract may specify longer periods to afford the government a practicable opportunity to fully inspect the work and to determine the adequacy of the contractor's performance).

If payment is not timely made, the government should pay an interest penalty automatically, without request from the contractor. The government's remittance must show the invoice amount, the interest, and the interest rate used to compute the interest penalty. The PPA interest rate is published semiannually by the Department of Treasury, in the *Federal*

Register on or about each January 1 and July 1.

If the contractor becomes aware that the government has overpaid on a contract invoice payment, the contractor must remit the overpayment amount to the payment office cited in the contract along with a description of the overpayment. The contractor may owe the government interest on such overpayments.

LOWER-TIER SUBCONTRACT PAYMENTS

The PPA requires contractors to pay subcontractors and suppliers within seven days of receipt of payment from the government. Subcontractors must similarly make prompt payment to their lower tier subcontractors and suppliers.

The PPA requires the contractor to include provisions in its subcontracts expressing PPA requirements and the interest obligation assumed by the contractor for late payments to its subcontractors. Similarly, subcontractors must include such clauses in their lower tier subcontracts.

Nothing in the PPA precludes the government or contractor for withholding retention. However, contractors must be sure not to include in their invoice to the government any retention withheld from their subcontractors. The PPA specifically prohibits any subcontractor retention in the contractor's progress payment request. Likewise, a subcontractor may not requisition for retention amounts it withholds from its lower tier subcontractors.

The contractor may not invoice the government for any other amounts it does not intend to pass on immediately to its subcontractor. If the contractor intends to withhold funds from a

subcontractor, it may do so provided it properly notifies the subcontractor and the government. Under FAR 52.232-27(d), if cause exists to withhold payment from a subcontractor, the contractor must give notice to the subcontractor (with a copy to the government) of the amount withheld, reasons for the withholding, and remedial actions the subcontractor must take to take to get paid. If payment is not made and is otherwise due, the subcontractor can recover interest on the unpaid amount.

Note also that should a contractor decide to withhold monies from a subcontractor that it has already invoiced the government, the contractor must furnish the government notice of such withholding in accordance with FAR 52.232-27 (e). In this situation, the contractor may need to reimburse the government for interest during the period it withholds such sums from the subcontractor.

CONCLUSION

As described above, the key to timely payments on federal government projects is careful submission of proper requests for progress payments and/or invoices. Though this bulletin focused on the federal regulations, the states have passed similar laws governing state and local projects. Thus, on state and local projects, standards similar to those described above will likely be in place. For a survey of prompt pay laws by state, see *Fifty State Survey of Prompt Payment Acts for Construction Contracts*.

<http://www.eckertseamans.com/%5Cfile%5Cpdf%5Calerts%5CPromptPaymentActManual2012.pdf> ©Eckert Seamans Cherin Mellott, LLC. Revised 4/10/2012

The information in this bulletin should not be construed as legal advice. Contact your local counsel for specific legal advice regarding the information contained in this bulletin.

FAR Clauses:

52.232-5 Payments under Fixed-Price Construction Contracts.

- (a) *Payment of price.* The Government shall pay the Contractor the contract price as provided in this contract.
- (b) *Progress payments.* The Government shall make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer.
 - (1) The Contractor’s request for progress payments shall include the following substantiation:
 - (i) An itemization of the amounts requested, related to the various elements of work required by the contract covered by the payment requested.
 - (ii) A listing of the amount included for work performed by each subcontractor under the contract.
 - (iii) A listing of the total amount of each subcontract under the contract.
 - (iv) A listing of the amounts previously paid to each such subcontractor under the contract.
 - (v) Additional supporting data in a form and detail required by the Contracting Officer.
 - (2) In the preparation of estimates, the Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site also may be taken into consideration if—
 - (i) Consideration is specifically authorized by this contract; and
 - (ii) The Contractor furnishes satisfactory evidence that it has acquired title to such material and that the material will be used to perform this contract.
- (c) *Contractor certification.* Along with each request for progress payments, the Contractor shall furnish the following certification, or payment shall not be made: (However, if the Contractor elects to delete paragraph (c)(4) from the certification, the certification is still acceptable.)

I hereby certify, to the best of my knowledge and belief, that—

- (1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;
- (2) All payments due to subcontractors and suppliers from previous payments received under the contract have been made, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of Chapter 39 of Title 31, United States Code;
- (3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract; and
- (4) This certification is not to be construed as final acceptance of a subcontractor’s performance.

(Name)

(Title)

(Date)

- (d) *Refund of unearned amounts.* If the Contractor, after making a certified request for progress payments, discovers that a portion or all of such request constitutes a payment for performance by the Contractor that fails to conform to the specifications, terms, and conditions of this contract (hereinafter referred to as the “unearned amount”), the Contractor shall—
 - (1) Notify the Contracting Officer of such performance deficiency; and
 - (2) Be obligated to pay the Government an amount (computed by the Contracting Officer in the manner provided in paragraph (j) of this clause) equal to interest on the unearned amount from the 8th day after the date of receipt of the unearned amount until—
 - (i) The date the Contractor notifies the Contracting Officer that the performance deficiency has been corrected; or
 - (ii) The date the Contractor reduces the amount of any subsequent certified request for progress payments by an amount equal to the unearned amount.
- (e) *Retainage.* If the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, the Contracting Officer shall authorize payment to be made in full. However, if satisfactory progress has not been made, the Contracting Officer may retain a maximum of 10 percent of the amount of the payment until satisfactory progress is achieved. When the work is substantially complete, the Contracting Officer may retain from previously withheld funds and future progress payments that amount the Contracting Officer considers adequate for protection of the Government and shall release to the Contractor all the remaining withheld funds. Also, on completion and acceptance of each separate building, public work, or other division of the contract, for which the price is stated separately in the contract, payment shall be made for the completed work without retention of a percentage.
- (f) *Title, liability, and reservation of rights.* All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Government, but this shall not be construed as—

(1) Relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or

(2) Waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(g) *Reimbursement for bond premiums.* In making these progress payments, the Government shall, upon request, reimburse the Contractor for the amount of premiums paid for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor has furnished evidence of full payment to the surety. The retainage provisions in paragraph (e) of this clause shall not apply to that portion of progress payments attributable to bond premiums.

(h) *Final payment.* The Government shall pay the amount due the Contractor under this contract after—

(1) Completion and acceptance of all work;

(2) Presentation of a properly executed voucher; and

(3) Presentation of release of all claims against the Government arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned under the Assignment of Claims Act of 1940 (31 U.S.C. 3727 and 41 U.S.C. 15).

(i) *Limitation because of undefinitized work.* Notwithstanding any provision of this contract, progress payments shall not exceed 80 percent on work accomplished on undefinitized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes.

(j) *Interest computation on unearned amounts.* In accordance with 31 U.S.C. 3903(c)(1), the amount payable under paragraph (d)(2) of this clause shall be—

(1) Computed at the rate of average bond equivalent rates of 91-day Treasury bills auctioned at the most recent auction of such bills prior to the date the Contractor receives the unearned amount; and

(2) Deducted from the next available payment to the Contractor.

52.232-27 Prompt Payment for Construction Contracts.

Notwithstanding any other payment terms in this contract, the Government will make invoice payments under the terms and conditions specified in this clause. The Government considers payment as being made on the day a check is dated or the date of an electronic funds transfer. Definitions of pertinent terms are set forth in sections 2.101, 32.001, and 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see paragraph (a)(3) concerning payments due on Saturdays, Sundays, and legal holidays.)

(a) Invoice payments—

(1) *Types of invoice payments.* For purposes of this clause, there are several types of invoice payments that may occur under this contract, as follows:

(i) Progress payments, if provided for elsewhere in this contract, based on Contracting Officer approval of the estimated amount and value of work or services performed, including payments for reaching milestones in any project.

(A) The due date for making such payments is 14 days after the designated billing office receives a proper payment request. If the designated billing office fails to annotate the payment request with the actual date of receipt at the time of receipt, the payment due date is the 14th day after the date of the Contractor's payment request, provided the designated billing office receives a proper payment request and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) The due date for payment of any amounts retained by the Contracting Officer in accordance with the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts, is as specified in the contract or, if not specified, 30 days after approval by the Contracting Officer for release to the Contractor.

(ii) Final payments based on completion and acceptance of all work and presentation of release of all claims against the Government arising by virtue of the contract, and payments for partial deliveries that have been accepted by the Government (*e.g.*, each separate building, public work, or other division of the contract for which the price is stated separately in the contract).

(A) The due date for making such payments is the later of the following two events:

(1) The 30th day after the designated billing office receives a proper invoice from the Contractor.

(2) The 30th day after Government acceptance of the work or services completed by the Contractor. For a final invoice when the payment amount is subject to contract settlement actions (*e.g.*, release of claims), acceptance is deemed to occur on the effective date of the contract settlement.

(B) If the designated billing office fails to annotate the invoice with the date of actual receipt at the time of receipt, the invoice payment due date is the 30th day after the date of the Contractor's invoice, provided the designated billing office receives a proper invoice and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(2) *Contractor's invoice.* The Contractor shall prepare and submit invoices to the designated billing office specified in the contract. A proper invoice must include the items listed in paragraphs (a)(2)(i) through (a)(2)(xi) of this clause. If the invoice does not comply with these requirements, the designated billing office must return it within 7 days after receipt, with the reasons why it is not a proper invoice. When computing any interest penalty owed the Contractor, the Government will take into account if the Government notifies the Contractor of an improper invoice in an untimely manner.

(i) Name and address of the Contractor.

(ii) Invoice date and invoice number. (The Contractor should date invoices as close as possible to the date of mailing or transmission.)

(iii) Contract number or other authorization for work or services performed (including order number and contract line item number).

(iv) Description of work or services performed.

- (v) Delivery and payment terms (e.g., discount for prompt payment terms).
 - (vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).
 - (vii) Name (where practicable), title, phone number, and mailing address of person to notify in the event of a defective invoice.
 - (viii) For payments described in paragraph (a)(1)(i) of this clause, substantiation of the amounts requested and certification in accordance with the requirements of the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts.
 - (ix) Taxpayer Identification Number (TIN). The Contractor shall include its TIN on the invoice only if required elsewhere in this contract.
 - (x) Electronic funds transfer (EFT) banking information.
 - (A) The Contractor shall include EFT banking information on the invoice only if required elsewhere in this contract.
 - (B) If EFT banking information is not required to be on the invoice, in order for the invoice to be a proper invoice, the Contractor shall have submitted correct EFT banking information in accordance with the applicable solicitation provision (e.g., 52.232-38, Submission of Electronic Funds Transfer Information with Offer), contract clause (e.g., 52.232-33, Payment by Electronic Funds Transfer—Central Contractor Registration, or 52.232-34, Payment by Electronic Funds Transfer—Other Than Central Contractor Registration), or applicable agency procedures.
 - (C) EFT banking information is not required if the Government waived the requirement to pay by EFT.
 - (xi) Any other information or documentation required by the contract.
- (3) *Interest penalty.* The designated payment office will pay an interest penalty automatically, without request from the Contractor, if payment is not made by the due date and the conditions listed in paragraphs (a)(3)(i) through (a)(3)(iii) of this clause are met, if applicable. However, when the due date falls on a Saturday, Sunday, or legal holiday, the designated payment office may make payment on the following working day without incurring a late payment interest penalty.
- (i) The designated billing office received a proper invoice.
 - (ii) The Government processed a receiving report or other Government documentation authorizing payment and there was no disagreement over quantity, quality, Contractor compliance with any contract term or condition, or requested progress payment amount.
 - (iii) In the case of a final invoice for any balance of funds due the Contractor for work or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.
- (4) *Computing penalty amount.* The Government will compute the interest penalty in accordance with the Office of Management and Budget prompt payment regulations at 5 CFR Part 1315.
- (i) For the sole purpose of computing an interest penalty that might be due the Contractor for payments described in paragraph (a)(1)(ii) of this clause, Government acceptance or approval is deemed to occur constructively on the 7th day after the Contractor has completed the work or services in accordance with the terms and conditions of the contract. If actual acceptance or approval occurs within the constructive acceptance or approval period, the Government will base the determination of an interest penalty on the actual date of acceptance or approval. Constructive acceptance or constructive approval requirements do not apply if there is a disagreement over quantity, quality, or Contractor compliance with a contract provision. These requirements also do not compel Government officials to accept work or services, approve Contractor estimates, perform contract administration functions, or make payment prior to fulfilling their responsibilities.
 - (ii) The prompt payment regulations at 5 CFR 1315.10(c) do not require the Government to pay interest penalties if payment delays are due to disagreement between the Government and the Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with the terms of the contract. The Government and the Contractor shall resolve claims involving disputes, and any interest that may be payable in accordance with the clause at FAR 52.233-1, Disputes.
- (5) *Discounts for prompt payment.* The designated payment office will pay an interest penalty automatically, without request from the Contractor, if the Government takes a discount for prompt payment improperly. The Government will calculate the interest penalty in accordance with the prompt payment regulations at 5 CFR Part 1315.
- (6) *Additional interest penalty.*
- (i) The designated payment office will pay a penalty amount, calculated in accordance with the prompt payment regulations at 5 CFR Part 1315 in addition to the interest penalty amount only if—
 - (A) The Government owes an interest penalty of \$1 or more;
 - (B) The designated payment office does not pay the interest penalty within 10 days after the date the invoice amount is paid; and
 - (C) The Contractor makes a written demand to the designated payment office for additional penalty payment, in accordance with paragraph (a)(6)(ii) of this clause, postmarked not later than 40 days after the date the invoice amount is paid.
 - (ii)(A) The Contractor shall support written demands for additional penalty payments with the following data. The Government will not request any additional data. The Contractor shall—
 - (1) Specifically assert that late payment interest is due under a specific invoice, and request payment of all overdue late payment interest penalty and such additional penalty as may be required;
 - (2) Attach a copy of the invoice on which the unpaid late payment interest was due; and
 - (3) State that payment of the principal has been received, including the date of receipt.
 - (B) If there is no postmark or the postmark is illegible—
 - (1) The designated payment office that receives the demand will annotate it with the date of receipt provided the demand is received on or before the 40th day after payment was made; or
 - (2) If the designated payment office fails to make the required annotation, the Government will determine the demand's validity based on the date the Contractor has placed on the demand, provided such date is no later than the 40th day after payment was made.

(b) *Contract financing payments.* If this contract provides for contract financing, the Government will make contract financing payments in accordance with the applicable contract financing clause.

(c) *Subcontract clause requirements.* The Contractor shall include in each subcontract for property or services (including a material supplier) for the purpose of performing this contract the following:

(1) *Prompt payment for subcontractors.* A payment clause that obligates the Contractor to pay the subcontractor for satisfactory performance under its subcontract not later than 7 days from receipt of payment out of such amounts as are paid to the Contractor under this contract.

(2) *Interest for subcontractors.* An interest penalty clause that obligates the Contractor to pay to the subcontractor an interest penalty for each payment not made in accordance with the payment clause—

(i) For the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made; and

(ii) Computed at the rate of interest established by the Secretary of the Treasury, and published in the *Federal Register*, for interest payments under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(3) *Subcontractor clause flowdown.* A clause requiring each subcontractor to—

(i) Include a payment clause and an interest penalty clause conforming to the standards set forth in paragraphs (c)(1) and (c)(2) of this clause in each of its subcontracts; and

(ii) Require each of its subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.

(d) *Subcontract clause interpretation.* The clauses required by paragraph (c) of this clause shall not be construed to impair the right of the Contractor or a subcontractor at any tier to negotiate, and to include in their subcontract, provisions that—

(1) *Retainage permitted.* Permit the Contractor or a subcontractor to retain (without cause) a specified percentage of each progress payment otherwise due to a subcontractor for satisfactory performance under the subcontract without incurring any obligation to pay a late payment interest penalty, in accordance with terms and conditions agreed to by the parties to the subcontract, giving such recognition as the parties deem appropriate to the ability of a subcontractor to furnish a performance bond and a payment bond;

(2) *Withholding permitted.* Permit the Contractor or subcontractor to make a determination that part or all of the subcontractor's request for payment may be withheld in accordance with the subcontract agreement; and

(3) *Withholding requirements.* Permit such withholding without incurring any obligation to pay a late payment penalty if—

(i) A notice conforming to the standards of paragraph (g) of this clause previously has been furnished to the subcontractor; and

(ii) The Contractor furnishes to the Contracting Officer a copy of any notice issued by a Contractor pursuant to paragraph (d)(3)(i) of this clause.

(e) *Subcontractor withholding procedures.* If a Contractor, after making a request for payment to the Government but before making a payment to a subcontractor for the subcontractor's performance covered by the payment request, discovers that all or a portion of the payment otherwise due such subcontractor is subject to withholding from the subcontractor in accordance with the subcontract agreement, then the Contractor shall—

(1) *Subcontractor notice.* Furnish to the subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon ascertaining the cause giving rise to a withholding, but prior to the due date for subcontractor payment;

(2) *Contracting Officer notice.* Furnish to the Contracting Officer, as soon as practicable, a copy of the notice furnished to the subcontractor pursuant to paragraph (e)(1) of this clause;

(3) *Subcontractor progress payment reduction.* Reduce the subcontractor's progress payment by an amount not to exceed the amount specified in the notice of withholding furnished under paragraph (e)(1) of this clause;

(4) *Subsequent subcontractor payment.* Pay the subcontractor as soon as practicable after the correction of the identified subcontract performance deficiency, and—

(i) Make such payment within—

(A) Seven days after correction of the identified subcontract performance deficiency (unless the funds therefor must be recovered from the Government because of a reduction under paragraph (e)(5)(i) of this clause; or

(B) Seven days after the Contractor recovers such funds from the Government; or

(ii) Incur an obligation to pay a late payment interest penalty computed at the rate of interest established by the Secretary of the Treasury, and published in the *Federal Register*, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty;

(5) *Notice to Contracting Officer.* Notify the Contracting Officer upon—

(i) Reduction of the amount of any subsequent certified application for payment; or

(ii) Payment to the subcontractor of any withheld amounts of a progress payment, specifying—

(A) The amounts withheld under paragraph (e)(1) of this clause; and

(B) The dates that such withholding began and ended; and

(6) *Interest to Government.* Be obligated to pay to the Government an amount equal to interest on the withheld payments (computed in the manner provided in 31 U.S.C. 3903(c)(1)), from the 8th day after receipt of the withheld amounts from the Government until—

(i) The day the identified subcontractor performance deficiency is corrected; or

(ii) The date that any subsequent payment is reduced under paragraph (e)(5)(i) of this clause.

(f) *Third-party deficiency reports—*

(1) *Withholding from subcontractor.* If a Contractor, after making payment to a first-tier subcontractor, receives from a supplier or subcontractor of the first-tier subcontractor (hereafter referred to as a "second-tier subcontractor") a written notice in accordance with the Miller Act (40 U.S.C. 3133), asserting a deficiency in such first-tier subcontractor's performance under the

contract for which the Contractor may be ultimately liable, and the Contractor determines that all or a portion of future payments otherwise due such first-tier subcontractor is subject to withholding in accordance with the subcontract agreement, the Contractor may, without incurring an obligation to pay an interest penalty under paragraph (e)(6) of this clause—

(i) Furnish to the first-tier subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon making such determination; and

(ii) Withhold from the first-tier subcontractor's next available progress payment or payments an amount not to exceed the amount specified in the notice of withholding furnished under paragraph (f)(1)(i) of this clause.

(2) *Subsequent payment or interest charge.* As soon as practicable, but not later than 7 days after receipt of satisfactory written notification that the identified subcontract performance deficiency has been corrected, the Contractor shall—

(i) Pay the amount withheld under paragraph (f)(1)(ii) of this clause to such first-tier subcontractor; or

(ii) Incur an obligation to pay a late payment interest penalty to such first-tier subcontractor computed at the rate of interest established by the Secretary of the Treasury, and published in the *Federal Register*, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(g) *Written notice of subcontractor withholding.* The Contractor shall issue a written notice of any withholding to a subcontractor (with a copy furnished to the Contracting Officer), specifying—

(1) The amount to be withheld;

(2) The specific causes for the withholding under the terms of the subcontract; and

(3) The remedial actions to be taken by the subcontractor in order to receive payment of the amounts withheld.

(h) *Subcontractor payment entitlement.* The Contractor may not request payment from the Government of any amount withheld or retained in accordance with paragraph (d) of this clause until such time as the Contractor has determined and certified to the Contracting Officer that the subcontractor is entitled to the payment of such amount.

(i) *Prime-subcontractor disputes.* A dispute between the Contractor and subcontractor relating to the amount or entitlement of a subcontractor to a payment or a late payment interest penalty under a clause included in the subcontract pursuant to paragraph (c) of this clause does not constitute a dispute to which the Government is a party. The Government may not be interpleaded in any judicial or administrative proceeding involving such a dispute.

(j) *Preservation of prime-subcontractor rights.* Except as provided in paragraph (i) of this clause, this clause shall not limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or a subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or nonperformance by a subcontractor.

(k) *Non-recourse for prime contractor interest penalty.* The Contractor's obligation to pay an interest penalty to a subcontractor pursuant to the clauses included in a subcontract under paragraph (c) of this clause shall not be construed to be an obligation of the Government for such interest penalty. A cost-reimbursement claim may not include any amount for reimbursement of such interest penalty.

(l) *Overpayments.* If the Contractor becomes aware of a duplicate contract financing or invoice payment or that the Government has otherwise overpaid on a contract financing or invoice payment, the Contractor shall—

(1) Remit the overpayment amount to the payment office cited in the contract along with a description of the overpayment including the—

(i) Circumstances of the overpayment (*e.g.*, duplicate payment, erroneous payment, liquidation errors, date(s) of overpayment);

(ii) Affected contract number and delivery order number if applicable;

(iii) Affected contract line item or subline item, if applicable; and

(iv) Contractor point of contact.

(2) Provide a copy of the remittance and supporting documentation to the Contracting Officer.

NOTE: The FAR's are updated periodically. Please check the most recent version which can be found at:

<https://www.acquisition.gov/far/current/html/FARTOCP52.html#wp372482>



Bulletin

Contract Clauses

INTRODUCTION

Each time a mechanical contractor executes a contract to perform certain services, he pledges the assets of his company, and sometimes his personal assets, to faithfully and properly perform in accordance with the terms of the contract and will assume all the obligations, responsibilities and limitations contained in that agreement.

Therefore, it would seem prudent that he would examine all the requirements of that document to assure himself that they are proper and equitable, and that he is willing to accept all aspects of the agreement. Yet, it is all too frequent that a contractor, in his haste to sign a contract, will not read the document thoroughly, will minimize the importance of certain terms of the contract, will not explore the potential danger of certain phrases, or will simply feel willing to gamble that those “murder clauses” will never surface.

The purpose of this bulletin is to highlight many of the most dangerous clauses that are frequently found in contracts, so that the contractor or subcontractor may make a reasonable judgment regarding acceptance of those

clauses, taking into consideration the possible disastrous effect it could have on his company and/or himself.

CONDITIONAL PAYMENT CLAUSES

There are two types of conditional payment clauses: “Pay When Paid” and “Pay If Paid.”

The “Pay When Paid” clause is a typical clause that often is contained in a general contractor’s agreement. The clause states that the general contractor will pay his subcontractors when he has been paid by the owner. This places the subcontractor in the position of being paid subject to the action or inaction of a third party over whom he has no control. If the owner does not pay the general contractor for any reason (lack of funds, dissatisfaction with performance of the general or some other subcontractor, or a dispute with the general), payment to the subcontractor may be delayed. Since the subcontractor has no legal relationship with the owner, he has no options for obtaining payment (other than a lien or sometimes bond suit).

Under the “Pay When Paid” clause, the courts have held that a general

contractor may not hold up payment to his subcontractors for an unreasonable length of time if the agreement merely states that he must pay the subcontractor when he receives payment from the owner. Therefore, this clause only shifts the timing of the payment because the general contractor will have to pay the subcontractor within a reasonable time, even if the owner ultimately does not pay the general contractor.

A potentially deal-breaking conditional payment clause is the “Pay If Paid” clause. This clause stipulates that payment from the owner to the contractor is a “**condition precedent**” to payment of the subcontractor. Therefore, the contractor is under no obligation to pay the subcontractor unless the owner pays the contractor. The subcontractor assumes the risk of non-payment by the owner. Some states, including California, have found these clauses invalid.

Furthermore, under the “Pay If Paid” clause, the subcontractor can even lose his lien rights under such conditions because technically the payment is not due the subcontractor until the owner pays the general contractor, which could be after the timing to file a lien. Check with local counsel regarding this issue.

There are ways of ameliorating such qualified payment clauses. For example:

1. **Insert in the contract a clause** stating that notwithstanding any other provisions of the contract, payments to the subcontractor shall not be unreasonably delayed for reasons unrelated to the subcontractor’s performance.
2. **Secure a statement from the general contractor** granting the subcontractor power of attorney to act in his name to take any action

against the owner that might be necessary to secure payment from the owner. This is less desirable since it requires extensive legal action and opens questions as to the owner’s obligations under his contract to make payments to the general contractor.

WAIVER OF LIEN

Liens are usually the final means subcontractors have available to obtain payment for work performed, and care should be exercised in reviewing a contract to make certain that he has not directly or indirectly waived his rights to file a lien. Waiver of lien clauses can be artfully drawn so that a contractor waives those rights without being aware of it.

In some states, no lien clauses are unenforceable and in others, “no lien” projects may be legalized (usually those projects must be recorded in public documents.) On such projects, the contractors are prevented from filing liens. It is suggested that a letter be obtained from the general contractor, or any other party having a contract with the owner, stating that the work is not recorded as a “no lien” project.

Additionally, monthly partial waivers of lien forms are usually worded in such a manner that the contractor waives his lien rights up to the date of the waiver. This effectively includes retentions withheld as well as items of work performed but not yet paid. It is suggested that words relating “to the date of payment” be deleted and the words “to the extent of payment received pursuant to this waiver” be substituted.

General contractors usually require subcontractors to present their waivers of lien along with their payment requests prior to receiving payments. If a

subcontractor is reluctant to waive his lien rights before he receives payment, it is suggested that the waiver of lien be modified to read that it is a “conditional” release and is not effective until the subcontractor receives the payment due. After receipt of such payment, the subcontractor might be asked to substitute an unconditional release for past amounts received.

CANCELLATION CLAUSES

In the event of a project cancellation, many agreements only provide for payment to the subcontractor for work in place as of the date of cancellation. This does not take into consideration legitimate costs incurred or committed by the subcontractor covering work not yet incorporated in the construction. It is suggested that the contract agreement be modified to also include payment for all costs incurred up to the date of cancellation, including payment for material on hand or en route but not in place, and other charges for which the subcontractor is liable as well as any costs arising out of the termination itself (e.g., restocking charges) plus profit on all of these costs.

WORK TO THE SATISFACTION OF THE CONTRACTOR

Frequently, statements are included in the general contractor’s contract to the effect that the subcontractor’s work is to be “to the satisfaction of the general contractor.” This unilaterally gives the general contractor the privilege of determining the compliance by the subcontractor of his contractual responsibilities and could be capriciously used. It is suggested that the entire clause be stricken as compliance with the contract documents should be the sole criterion, and not be subject to the general contractor’s “satisfaction.”

WAIVER OF CLAIMS BY FINAL PAYMENT

Occasionally, a contract may contain a clause stating that any pending or asserted claim is waived upon acceptance of final payment. Be careful of these clauses since merely by accepting an undisputed final payment, subcontractors could be giving up their claim rights. However, even if this clause is present, some states have declared it void and unenforceable as against public policy. Check with counsel in your state. Moreover, always preserve by written agreement with the general contractor any claims that remain outstanding at the time of final payment.

NO WAIVER OF BOND RIGHTS

Some states have declared waiver of a subcontractor’s right to sue against a prime contractor’s surety bond **void and unenforceable as against public policy**. It is important that you know the laws of your state in order to preserve a claim. Check with counsel in your state.

CODE COMPLIANCE

Often, contracts include provisions requiring that the subcontractor’s work is to be “in compliance with governing codes.” Since governing codes often involve design capacities (ventilating requirements, heating, etc.) the contractor should be certain that he does not assume these responsibilities, which should rest with the architect/engineer through his specification requirements, but should limit such code compliance to installation methods required by public authorities.

ASSUMPTION OF GENERAL CONTRACTOR'S OBLIGATIONS TO OWNER

The subcontractor is usually required to assume to the general contractor all the obligations that the general contractor is bound through his contract with the owner. This is not an unfair requirement, but it is important that the subcontractor insist upon examining that document to assure himself that there are no objectionable features in the general contractor's agreement and that the subcontractor can accept all of the applicable requirements. Refusal by the general contractor to allow the subcontractor to check his agreement with the owner should be cause for concern.

RETENTION REDUCTION

Often the bidding documents and specifications describe the formula for reducing the retention as work progresses. When reviewing the general contractor's contract to the subcontractor, it is often noted, however, that the retention provisions are not as favorable as those mentioned in the specifications or other upstream documents. It is suggested that the subcontractor compare the two and require the general contractor to comply with the upstream documents.

"PRIMARY" INSURANCE

Contract agreements frequently require the subcontractor to provide "primary insurance" to the general contractor. This could be a dangerous clause as it may obligate the subcontractor, possibly at additional expense, to furnish more coverage to the general contractor than a general liability insurance policy normally provides. The subcontractor should check with his insurance agent when such a clause appears to see

whether he has coverage, and if not, what the requirements involve.

COMPLIANCE GENERAL WITH CONTRACTOR'S CONSTRUCTION SCHEDULE

If a subcontractor is required by the general contractor's contract to comply with the general's construction schedule, it is suggested that that schedule be checked by the subcontractor before the contract is signed to make certain it can be met. Otherwise, the subcontractor is obligated to take whatever means are needed to meet the schedule (i.e., additional manpower, overtime, etc.) or face a penalty for breach of contract if he fails to meet the schedule. An alternative solution would be to insert the words "as approved by the subcontractor" where reference is made to the general contractor's schedule.

LABOR AND MATERIAL PROVISIONS

Occasionally, a contractual requirement is encountered to furnish labor and material to prevent strikes. This is a reasonable inclusion where the subcontractor has knowledge and authority to comply with trade jurisdiction requirements of the trade union with which he has an agreement and also provide material as specified and required, as long as that specified material does not violate any trade union restrictions.

The subcontractor should not, however, be in breach of contract if a dispute arises between unions relative to jurisdiction or other inter-union matters or if the material he provides, according to contract requirements, results in a union dispute. It is suggested that where such a clause appears in a contract, a qualification be inserted that it be limited

to conditions within the subcontractor's control.

Occasionally, a contract requires the subcontractor to furnish the maximum number of apprentices his union agreement allows. The subcontractor is cautioned to review the local trade collective bargaining agreement and qualify any requirement that could require an inordinate number of apprentices.

COMPENSATION FOR UNREASONABLE DELAYS

While contracts usually provide for an extension of time for delays outside the subcontractor's control, some do not allow for additional compensation. It is suggested that, where such a clause appears, the question of reasonableness be considered.

Short term delays can usually be accepted, but where delays are extensive, and not the fault of the subcontractor, he should be compensated for additional costs caused by such delays. These causes could be as basic as construction stoppages due to lack of funding, governmental intervention, changes in design, change orders involving other trades, work stoppages, etc., and it is obviously unjust to expect the subcontractor to assume all the additional expenses, such as increased labor rates and material costs, resulting from same.

Additionally, for delays caused by the owner or prime contractor or their agents during construction, check your state's laws as a clause that only extends days but not dollars might be void and unenforceable.

EXAMINATION OF WORK OF OTHER TRADES

A contract clause that requires a subcontractor to examine all other trades' work and to be responsible that his work fits, as is sometimes found, should be noted as it imposes great potential exposure upon him. This is usually the duty of the designing engineer, and the subcontractor might wish to delete this requirement.

INCLUSION OF ALL WORK WITHIN SUBCONTRACTOR UNION'S JURISDICTION

Frequently, one will find inconspicuously hidden in the contract or remotely located on one of the general sheets of the plans a notation calling for the subcontractor to include in its contract scope all work within his trade union's jurisdiction. Therefore, even though work is not included in the applicable portion of the specifications, if it comes within the jurisdiction of the union employed by the subcontractor, he becomes responsible for same. The subcontractor is cautioned to be alert for this "murder clause" and either knowingly accept this obligation or take exception to it.

INCLUSION OF ALL WORK IN SUBCONTRACTOR'S JURISDICTION

Frequently, one will find inconspicuously hidden in the contract or remotely located on one of the general sheets of the plans a notation calling for the subcontractor to include all work within his trade jurisdiction. Therefore, even though work is not included in the applicable portion of the specifications, if it comes within the jurisdiction of the union employed by the subcontractor, he becomes responsible for same. The contractor is cautioned to be alert for

this “murder clause” and either knowingly accept this obligation or take exception to it.

PLACEMENT OF PAYMENTS INTO SEPARATE TRUST FUND

Occasionally, a clause is contained in a contract requiring a subcontractor to place all payments made by the general contractor into a separate trust fund rather than into the subcontractor’s regular account. This technically limits the use that the subcontractor can make of these payments, and he should be aware of this limitation.

BUILDERS’ RISK DEDUCTIBLE

Contracts frequently stipulate that the general contractor or owner will provide a builders’ risk insurance policy having a sizable amount as a deductible. The subcontractor should be aware of this limitation and protect himself accordingly. It is also recommended that the subcontractor review the bidding documents to make certain that the general contractor’s contract is not at variance with the bidding documents.

INDEMNIFICATION CLAUSES

Inclusion of unreasonable and excessively broad indemnification clauses might not be insurable and therefore might not be covered in contractual liability policies. These clauses should be reviewed by the subcontractor’s insurance carrier to assure that he is covered or what the impact might be. Moreover, a subcontractor should insert language limiting his indemnity obligation for damages/injuries to the extent they arise from the subcontractor’s fault or negligence.

SUMMARY

The above are examples of some of the pitfalls that are found in many contracts used by general contractors. The subcontractor would be well advised to carefully scrutinize the contracts offered him to make very certain that, in addition to those mentioned above, there are not terms contained which could place him in a dangerous position. Acceptance, modification or rejection of these is a decision that a subcontractor must make, but it should be pointed out that there are extreme exposures present and the subcontractor would be prudent to give serious thought, or to seek professional advice, before he agrees to accept them.

The information in this bulletin should not be construed as legal advice. Contact your local counsel for specific legal advice regarding the information contained in this bulletin.



Bulletin

Liability of a Prime Contractor for Interference with a Subcontractor

NOTE: The court decision discussed below focuses on a serious problem which subcontractors encounter from time-to-time—a prime contractor's interference with the ability of a subcontractor to perform his work.

Typically, when a subcontractor is in a contract relationship with a prime contractor, there are certain activities that the prime contractor can do because of the terms of the contract. However, that does not mean the prime contractor can interfere with the subcontractor. Some courts have held that the prime contractor cannot reasonably hinder another party's performance, the prime contractor has an implied good faith and fair dealings, and in the future, could collect tort damages from breach of contract action.

In *H.H. Robertson Company, Cupples Products Division v. V.S. DiCarlo General Contractors, Inc.*, the Eighth Circuit Court of Appeals upheld a jury verdict in which DiCarlo, the prime contractor, was held to have breached its subcontract with Cupples by interfering with Cupples' ability to perform its work in a timely manner and in a logical sequence.

DiCarlo was the prime contractor for construction of a high-rise office building in Kansas City, Missouri, and

was responsible for the construction of the concrete skeleton of the building. DiCarlo awarded Cupples the subcontract for the installation of glass curtain walls and strip windows.

The subcontract and its riders required Cupples to begin layout of the work on January 27, 1986, and to begin erecting curtain walls after DiCarlo had finished its work on five floors and had removed most of the from those floors. Cupples was required to substantially complete its work within 28 weeks with two key conditions to their contract obligations: 1. that at least three floors of precast work had to be ready within 30 days after Cupples began erecting the curtain wall, and 2. that DiCarlo had to make available to Cupples one additional floor every two weeks for curtain wall work.

The entire project was not completed on time. DiCarlo blamed Cupples for failure to enclose the building and render it watertight within the stated 28-week period, which DiCarlo calculated from the date Cupples began layout work. DiCarlo withheld Cupples' last progress payment and Cupples subsequently

sued for breach of contract, alleging that DiCarlo had delayed and disrupted the performance of its work. The jury awarded Cupples \$373,039.46 on its breach of contract claim and \$25,664.94 on its quantum merit claim and rejected DiCarlo's counterclaim.

In support of its breach of contract and quantum merit claims, Cupples presented evidence that: 1. it had performed work outside the scope of its contract; 2. it had to help another subcontractor fix layout lines to facilitate the proper installation of precast panels; 3. some of the concrete panels had been installed incorrectly; and, 4. as a result of DiCarlo's mismanagement of the project, these items hampered Cupples' efficiency and contributed to the delay in completing the project.

The Eighth Circuit Court of Appeals upheld the jury's verdict in favor of Cupples. The court found that DiCarlo had a duty not to unreasonably hinder another party's performance under the contract and that DiCarlo had breached this duty by failing to provide Cupples with timely access to the work areas and by failing to coordinate its own and other subcontractors' work in a manner which would have allowed Cupples to perform its work in its normal, logical sequence. DiCarlo essentially maintained that under the contract, Cupples was required to adjust its schedule to fit DiCarlo's. The court rejected that argument and upheld Cupples argument that a contractor has a duty not to unreasonably hinder its subcontractor's performance.¹

While the decision came down in favor of the subcontractor, please be aware

¹ Reprinted with permission of Kasimer & Ittig, P.C. Article by Joseph H Kasimer, Esquire originally appeared in The Supplement, Vol. 2, No. 6, June 1992.

that many general Contractors and owners often attempt to contractually protect themselves from these types of delay damages by inserting a "no damage for delay" clause into the contract. While some States have started to enact legislation holding that "no damages for delay" clauses are void and unenforceable, some states will enforce such clauses.

In *Scherer Construction v. Hedquist Construction*, the Supreme Court in Wyoming ruled in favor of a subcontractor stating that the contractor did not deal in "good faith and fair dealing." In this decision, the court held that in all construction contracts, there is an implied good faith and fair dealings. An implied provision is something not directly stated in a contract but is implied by the courts of arbitration panels to address equity and address fairness and avoid injustice. Note: many states do not recognize a separate cause of action for the breach of good faith and fair dealing and it must be combined with another cause of action under a breach of contract theory.

Scherer was a subcontractor who subcontracted with Hedquist, the general contractor, to provide special rubberized asphalt paving work for a street renovation project.

The subcontract stated that Hedquist could order extra work from Scherer or make changes by altering, adding to, or deducting from the work, and the price would be adjusted accordingly.

Before the project started, Hedquist approached the owner and requested to change the asphalt paving to concrete. The owner agreed and signed a change order. Because of this change, Scherer's contract was changed from approximately \$448,240 to a \$105,093 project, along with an unrecoverable equipment cost of \$35,000. Despite the

contract language, Scherer sued for breach of an implied covenant of good faith and fair dealing.

The court found that Hedquist's act of seeking a pavement material change to concrete from the owner while under contract with Scherer was a breach of implied covenant of good faith and fair dealings.

The court has recognized an implied duty of good faith and fair dealing in commercial construction contracts permitting a court to go beyond the "four corners" of the negotiated contract document in adjudging the parties' conduct for breach. In Wyoming, this will have a big impact on contracting parties and in other states, contracting parties will use this argument as persuasive authority.

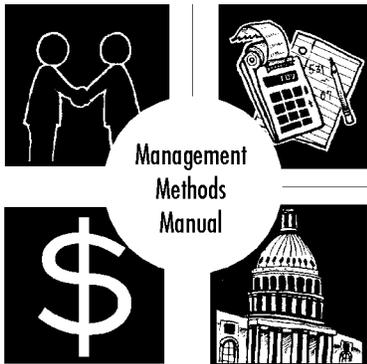
Other examples of the implied covenant of good faith and fair dealings are: overbearing or excessive administration of a contract, coercive withholding of payments, failure to provide site access, retaliatory or overzealous inspections.

In another case, *Kishmarton v. William Bailey Construction, Inc.*, the supreme court in Ohio held that tort damages were available in a breach of contract action without a tort action. In *Kishmarton*, a home purchaser was awarded emotional distress damages in their breach of contract action against the builder.

Typically in construction cases, damages in tort (emotional distress damages are tort damages) are not awarded. However, in this minority decision, the court held that to continue to disallow emotional distress damages unfairly exposes innocent persons to harm.

This supreme court case is significant to the whole construction industry because it may "open the door" to other parties injured by a breach of contract. Therefore, in the future, this holding might evolve so that any party in the construction industry (including prime contractors) that contracted with another party have a potential claim for tort damages by bringing a breach of contract action. However, many courts have limited tort damages to matters involving personal injury or property damage and will deny recovery for purely economic loss in a breach of contract setting.

This bulletin is not intended to be legal advice. A person should seek local counsel for specific information regarding the information found in this bulletin.



Bulletin

Business and Politics

INTRODUCTION

Numerous laws mandating the regulation of business affect all business enterprises, from the multinational corporation to the corner store. Mechanical contracting firms are no exception; in fact, the construction industry often feels a special burden because it seems to be buffeted at every turn by regulations overseeing everything from workplace safety to equal employment opportunity.

For many years, business people felt that "you can't fight city hall;" they complied with regulations, but did not think of attempting to affect the legislation that had such an effect on them. Now, however, businesses are trying to make themselves heard on legislative issues.

Business people are sometimes intimidated by government since it is an area with which they are not familiar. The U.S. Congress has special rules and special language, all of which serve to frighten outsiders into inaction. (See the glossary of congressional terms attached to this document.) With attention to legislative information coming from the daily news or from trade associations, the typical business person can learn enough to feel comfortable in

trying to get his point of view expressed to elected officials. Certainly a mechanical contractor knows the problems of the industry better than any elected representative.

YOUR ASSOCIATION IS A GOOD PLACE TO START

Belonging to an association like MCAA gives you an advantage that non-members do not have. As government has become more and more present in business operations, MCAA has tracked legislative activities that affect your business, has informed you of the impact of legislation, and has tried to make the voice of the mechanical contractor heard in Congress. To give members the additional clout that comes from a concerted voice, MCAA joins in coalitions with other business groups when appropriate, and takes an active part in the activities of the Associated Specialty Contractors, a coalition of contracting organizations that strives to better the conditions of the construction industry. Most of all, your association tries to educate members on the importance of individual participation in the legislative arena.



WHAT INDIVIDUAL CONTRACTORS CAN DO

Educating yourself on this unfamiliar topic is the first step. You should know who represents you in Congress. Then keep track of how he or she votes so you can be prepared to discuss or raise questions about specific legislative positions. If you find that your representative works in the interest of business and the construction industry, you may want to contribute time and money to his or her reelection effort. If the opposite is true, you may want to lend your support to his or her political opponent.

Remember, though, that if we are Republicans and our Congressman is a Democrat who knows we have not supported him in the past, we should get to know him anyway. Often, party members cast more votes for issues promoted by the opposite party than for issues promoted by their own party. A Congressman should represent district Democrats and Republicans alike. He or she should desire to please all his people all the time, even though he knows this is impossible. He should be eager to find some common ground to win support. A professional politician knows that the best way to destroy enemies is to make them into friends.

So, whether or not you are pleased with your representative, it is important that you make your point of view known. Often, your input alone or as part of an industry-wide information campaign may express an idea or viewpoint that the legislator has not heard often enough. The old proverb about the “squeaky wheel getting the grease” is perhaps more true in politics than in any other social sphere.

If possible, make your political involvement more than a one-time effort, since continuing energy in explaining the problems of our industry to elected politicians can accomplish

much. First, it tends to make us more consistent in our efforts with regard to our legislators in that we tend to establish a dialogue with him or her in an area in which we are knowledgeable. In addition, this consistency and the credibility our continuing efforts engender soon identifies us to our legislator so that when we or our industry is mentioned, we are remembered and our views readily come to mind.

THE QUESTION OF MONEY

The subject of money and politicians brings to mind unfortunate historical overtones, not all of them in the distant past. It is a mistake, however, to think that a political contribution is just a pleasant phrase that really means buying influence. In some rare cases, of course, it means exactly that. Much more frequently, however, it is a method of ensuring that your message will be heard, not that your message will be acted upon. Most politicians cannot be bought, but a political contribution will at least mean that your ideas can get a hearing.

If you decide to make a contribution to a politician's campaign, remember that it must be large enough to be noticed—\$1,000, \$2,000 or more. Politicians do remember substantial individual contributors because in today's lengthy and expensive campaigns, money contributed really can mean the difference between winning and losing.

COMMUNICATING WITH CONGRESS

MCAA's national office, through periodic reports, advises members on pending legislation affecting our industry. Subsequent correspondence to our legislators, or to others, will add considerably to our influence as an association. Next to voting, writing a letter to your elected officials is one of the most im-



portant and effective ways that you can participate in the American political system.

Writing an effective letter outlining your legislative concerns does not have to be a frightening prospect. Here are a few hints.

HOW AND WHAT TO WRITE

Before starting to write your letter, make sure you have the proper name and address of the elected official. If you are not sure who is the proper legislator, call MCAA, or your local Board of Elections, Chamber of Commerce or League of Women Voters to get the information.

If the issue you are writing about has an impact on your business, use your business letterhead. Make sure your letter is legible, preferably typed. Be sure your letter has your return address on it. Envelopes frequently get thrown away.

Clearly identify the subject of your letter. State the name of the legislation and the appropriate House or Senate number. State your reason for writing, citing arguments in support of your position. Explain how this issue will affect you, your family, or your business. It does not hurt to include its impact on your community and on the state and national economy as well. If you are writing about a bill that addresses a real problem but which offers the wrong solution, suggest alternatives. Don't write to complain, but to bring about change.

Be sure your letters are reasonable. Don't ask for the impossible and don't threaten. Don't say you will vote against the individual unless he does what you ask. Threats will end up hurting your case much more than they will help it. At any rate, most legislators are aware that if they do not please a constituent, they are not likely to receive his future vote.

Avoid phrases or sentence structures that might give the appearance of form letters. This could tag a letter as part of an organized pressure campaign, which may cause it to be "filed" in a waste basket.

As a constituent, you have the right to know your legislator's position on an issue. Be sure to ask him for his specific opinion of a bill.

Last, "thank you" letters to Congressmen are surprisingly few and are well remembered when received. Besides being a polite gesture for a job well-done, the note will be remembered. On the other hand, if a vote is contrary to your position, don't hesitate to let it be known. That will be remembered also.

WHEN TO WRITE

It is always best to write your legislator during early consideration of an issue, since early information can help develop his or her position on the issue. Later correspondence aimed at changing a legislator's mind will be less effective. The best time to write is when a bill is in committee. It is at this stage that an individual legislator can have the greatest ability to impact the outcome and language of a bill.

Once you have written, don't expect a response right away. Elected officials' mail is read and answered, but not always quickly. If you are not pleased with the response that you get—that is, if the response is a form letter, or very noncommittal—write again. It never hurts to let your legislator know about your concerns.

On the following page, you will find a sample letter on an issue that is important to MCAA members—repeal of the Davis-Bacon Act.

Notice how the letter identifies the letter-writer then goes on to show knowledge of the subject and to express a definite point of view.



Legislation _____

**SAMPLE LETTER TO CONGRESS REGARDING
DAVIS-BACON LEGISLATION**

The Honorable _____
U.S. House of Representatives
Washington DC 20515

The Honorable _____
U.S. Senate
Washington DC 20510

Dear Representative _____:

Dear Senator _____:

As a member of the construction industry and as a concerned citizen, I am writing you to express major concern for the repeal of the Davis-Bacon Act. We support the continuation of the Davis-Bacon Act with appropriate periodic adjustments for reform as may be needed such as the threshold ceiling.

The Act was—and still is—intended to protect a local economic environment from being undermined by an out-of-area employer who may have significantly lower costs but who operates in the area only temporarily. Without the Davis-Bacon Act local jobs, earnings and taxes are lost.

Davis-Bacon is a critical force in sustaining a well-trained, skilled work force in the increasingly high-tech areas of construction and the training programs which produce these workers. The industry cannot attract craftsmen capable of doing the quality job necessary in today's high-tech installations without an adequate wage structure. If skilled workers leave the industry to find better-paying jobs, the already existing shortage of capable, trained labor in construction will become even more acute.

Sincerely,

George Contractor

NOTE: Any personal anecdotes or experiences you can use to illustrate your comments will make your letter(s) even more effective.



Visiting Capitol Hill

Another effective way to communicate with your legislator is to visit his or her Capitol Hill office. If you choose to do this, make sure you observe the following recommendations.

Make an appointment. If you want to make sure that your visit is productive. Even if there is only a few minutes' notice, give the legislator or the staff assistant the opportunity to prepare themselves for your arrival.

Sell yourself. Remember that you are not selling a legislative proposal or your company (or association), but yourself. If you are friendly, helpful, and understanding—not hostile—you will be more successful.

Get to the point. When making a visit to any elected official, don't take forever to make your pitch. Tell them who you represent, the number of members and employees you represent, what your primary concerns are, and how and why these concerns are related to an individual piece of legislation.

Keep your meeting short. Don't take longer than 10 or 15 minutes to express your concerns, unless you are asked to expand on your views. If you are respectful of your legislator's time constraints, you will get in a second time.

Use good manners. When making a visit to a legislator's office, make sure that you do not use any facilities in the office unless offered (this includes the telephone, copy machine, and restroom).

Be kind to staff members. Whether in person or speaking over the telephone, always be kind to staff members. They will end up being the individuals who have the greatest potential to help or hinder you and your cause.

Don't make any promises unless you intend to deliver. Just as it is not very good to threaten an elected official, it is also not wise to make false promises.

Don't forget to say "please" and "thank you." On Capitol Hill you can never say "thank you" too often.

Check your facts and figures. Make sure that you are presenting accurate facts and figures, not ones that you made up.

Don't try to sell a bad bill. If you do not truly believe in the merits of a bill, don't expect others to. If a bill is ill-conceived or poorly written, it could end up hurting you and your industry far more than benefiting it.



Don't become discouraged. As you become more familiar with the legislative process, you will discover the many ways that legislation and people can become thwarted. If you are looking for a big win the first time out, don't be discouraged if you fail. Remember, visiting elected officials rarely activates or converts them; it reinforces them.

Getting involved can be productive. Many people who have studiously ignored politics find, to their surprise, that such involvement can be rewarding, even if specific efforts to influence legislation are not entirely successful. At the very least, you will learn more about your own industry when you view it in the legislative context and become aware of the many competing viewpoints. At most, you will contribute a great deal of knowledge to the continuing political debate.

The following glossary of legislative terms, "Hill Talk," will assist you in learning the language of legislators. It was prepared by the Associated Specialty Contractors, a coalition group in which MCAA is an active participant.

HILL TALK

Adjournment sine die—The adjournment of Congress without setting a day to reconvene. This usually officially marks the end of a congressional session.

Clerk of the House—Chief administrative officer of the House of Representatives with duties corresponding to those of the Secretary of the Senate.

Closed or Gag Rule—This type of rule prohibits amendments that have not been approved by the committee which brought the bill to the House floor. The rule is granted by the Rules Committee and forces the House either to accept or reject the bill as it stands. The procedure is usually limited to tax and security bills which are complicated and highly technical.

Cloture—A method of limiting debate in the Senate. Under cloture, debate is limited to one hour per Senator. Three-fifths of the Senate must approve cloture before it can take effect.

Conferees—Those members of the House and Senate who are appointed to conference committees. They are generally appointed by the Speaker of the House and by the Senate Majority Leader.

Congressional Record—A printed account of the proceedings in both the House and Senate chambers which is produced daily.

Enacting Clause—A clause contained in every bill which states: "Be it enacted that . . ." At any time during debate on the bill, any member may "move to strike the enacting clause", whereupon immediate vote is taken on the motion. If the motion passes, the bill is virtually dead.

Engrossed Bill—A passed and amended bill in one House which is rewritten, printed on blue or engrossed paper, and delivered in a formal ceremony to the other House.



Executive Session—A meeting of a Senate Committee, a House Committee, or the entire chamber which is closed to the public.

Filibuster—A method of postponing or preventing a vote. Filibusters are used mainly in the Senate and generally come in the form of unlimited debate or continuous talking. Filibusters are prevented in the House by its strict rules.

Floor Manager—A member, usually representing sponsors of a bill, who attempts to steer it through debate and amendment to a final vote in the chamber.

Germaneness—In the House, rules require that amendments to a bill pertain to the subject matter under consideration. In other words, they must be germane. In the Senate, amendments are not required to be germane except when they are offered to a general appropriations bill. However, in the case of appropriations bills, a majority vote of the Senate can accept them as germane. Additionally, all amendments proposed after cloture must be germane regardless of the bill.

Grandfather Clause—An exemption of people who are already engaged in an activity from a rule which restricts or prohibits that activity.

Journal—An official record or the proceeding of both the House and the Senate. Unlike the Congressional Record, the Journal does not include the verbatim report of speeches, debates and the like.

Majority Leader—The leader of the majority party in the Senate is called the Majority Leader. The Majority Leader in the House is second in command of the majority party, after the Speaker of the House.

Minority Leader—The leader of the minority party in the House and Senate.

Omnibus Bill—A legislative proposal concerning several separate but related items.

Override A Veto—Congress overrides a veto when the president vetoes a bill and Congress cancels the veto by a two-thirds vote in each chamber.

Point Of Order—An objection by a member of Congress that the chamber is violating its rules. The presiding officer must accept or reject the objection which is then subject to appeal to the full House or Senate. A point of order can stop any pending business in the House and force a quorum call, remove bill language that does not pertain to the purpose of the bill, and remove from the record any words that are in violation of the rules.

President of the Senate—The presiding officer of the upper chamber. The President of the Senate is normally the Vice President of the United States.

President Pro Tempore—The temporary presiding officer of the Senate. The President Pro Tempore is elected by the Senate to serve when the Vice President of the United States is absent, which is most of the time.



Quorum—The number of members whose presence is necessary to conduct business. In the absence of death or resignations, this is 51 members in the Senate and 218 member in the House. Senators may object to the absence of a quorum and force a roll call.

Ranking Member—The second in seniority on a committee, of the majority party, after the chairman.

Ranking Minority Member—The first in seniority on a committee of the minority party.

Recommit—The minority party of the House has the right to recommit a bill to its originating Committee just before the final vote is taken. Such a motion, if voted, usually means that the bill is dead. The motion may include instructions to the Committee to revise the bill along certain definite lines and return it forthwith. These changes can usually be made quickly and the bill often passes the same day. If the minority party does not recommit, a member of the majority party may move to recommit.

Secretary of the Senate—The chief administrative officer of the Senate, responsible for taking votes, certifying passage, printing and distributing documents, internal budgeting and accounting, and other duties which are necessary for the continuing operation of the Senate.

Senatorial Controversy—The tradition of allowing Senators of the President's party to veto presidential appointments in or nominations from their own states.

Well—The area in front of the Speaker's rostrum from which House members may address the House, Senators speak from their desks.

Whip—Both parties, in both Houses, elect a "whip" or assistant leader. The whip keeps members advised on legislative programs, rounds up members for important votes, and keeps his party's leadership informed on how many votes it can expect for and against a measure.



Bulletin

5S's – Road to Improvement

Introduction

The 5S's is a technique of **Lean Thinking**, which Kinetics adopted from manufacturers in Japan and applied to its operations to improve productivity. Toyota, the automobile manufacturer, originated the idea, and it has been successfully implemented by many American companies, including General Motors, Boeing, Honeywell and TRW.

Although the original 5S's are Japanese, Kinetics adopted Boeing's English interpretations:

- **Sorting** – straighten up
- **Simplifying** – put things in order
- **Sweeping** – clean up
- **Standardizing** – use consistent ways to do things
- **Self-Discipline** – monitor your own actions

With each word are specific actions taken to improve work areas and processes. By applying these actions, Kinetics' employees were able to reduce wasted time, materials and information, thereby increasing their productivity.

The following are the implementation guidelines for each step of the 5S's.

How the 5S's Work

Kinetics staff first learned about the 5S's while studying ways to improve shop productivity. Next, the company participated in a pilot **Lean** training course with a local consultant. Through the course, Kinetics staff started implementing the 5S's in one of its shops. After a learning curve and some adjustment to the new procedures, the following changes became apparent:

- Craft employees enjoyed coming up with ways to apply the 5S's;
- Shop space increased by 1000 square feet at a time when an expensive shop expansion was being considered;
- The distance products traveled through the shop was reduced, saving time and employees' energy;
- Returned unused material was valued at \$5,000;
- Flow of materials through the shop improved, reducing cycle time; and
- A safer and cleaner shop environment was created.

After developing the 5S's in that shop, Kinetics applied the program to other shops, its tool and equipment repair operations, its purchasing office and

to some of its field construction sites. The following Improvements resulted:

- Streamlined the tool return and repair process by eliminating the tracking of tools valued less than \$50;
- Labeled the bins to ease and simplify retrieval of returned tools;
- Eliminated several steps in the tool repair process which reduced paperwork and time (about nine hours per week) and increased productivity;
- In purchasing, buyers reorganized their desks so that material requests, pending purchase orders, and other records could be processed more efficiently, making it easier to clear work bottlenecks and to cover staff who were out of the office;
- At work sites, gang boxes were organized so that tools could be found more quickly (i. e., harnesses were labeled with the employee's name and placed on vertical racks, which reduced the morning routine by 20 minutes for a crew of 22 employees); and
- At other shops, carts were modified for the storage of tools in specifically designed holders when not in use; clamps on jig tables were color-coded to indicate the type of clamping needed (reducing the time needed to adjust clamps); and clean rooms were kept fully stocked with clean-room consumables for easy access when needed.

Implementing the 5S's

Based on Kinetics' pilot training at its first shop, an in-house training process was developed to introduce the 5S's that consisted of the following:

- **Management Overview:** one-hour sessions to introduce managers to the program and to help them understand their role;
- **5S's Training:** two-hour sessions for employees that included briefings on the program's concepts, discussions on how those concepts should be applied within their own work areas, and where to begin;
- **Monthly Reviews:** Customized check sheets were developed for each shop or office that the department could use to perform self-audits of progress achieved in implementing the 5 S's. The check sheets also helped staff to identify additional ways to apply the techniques.

A basic part of the training is a 5S's video tape that Kinetics borrowed from Boeing showing how the program was applied in a Boeing office and shop. The visual tool helped the employees see how others had applied the concepts and how it could be used in both shops and offices. Discussion followed on how the 5S's concepts could be applied in Kinetics' operations.

Kinetics' 5S's Implementation Guidelines

Sorting

Step 1: Red-tag or mark all items to be considered as unnecessary, such as materials or parts stacked around the site, excess parts or inventory, rusted and or age-deteriorated items, outdated posters, notices, memos and disorganized paper piles on desktops.

Step 2: Review all items and sort them into the following groups:

- In use, or will be used;
- Not used or will not be used; and

- Unlikely to be used.

(Tip: Hold a “use” auction with employees to determine if unused or unlikely to be used items can be used.)

Step 3: Get rid of all items that are not, or are unlikely, to be used and inventory those that are or will be used.

Step 4: Sort those items that are in use or are likely to be used into three groups:

- Rarely used (once or twice each year);
- Occasionally used (once or twice each month); and
- Frequently used (daily or weekly use).

Simplifying

This concept involves creating a designated and marked place for everything according to the frequency of its use. The goal is achieved when:

- Items used most often are easily accessible, thus reducing to almost zero the time spent finding an item; and
- Anyone, including an employee who does not work in the area, could put an item back in its designated place according to the markings used.

Step 1 : Review all frequently used items and determine where to put them. Those items used most often should be stored closest to the work area, and those used less often should be stored further away. Tools and supplies should be stored safely.

Step 2 : Develop a process for storing items that will enable even new employees to return items to their designated places and allow anyone to readily

determine when items are misplaced or missing.

Consider the following:

- Shadow boards;
- Mark the item and its location;
- Color-code; and
- Label drawers with lists of their contents.

Step 3: Develop ways to replace usable items daily, such as:

- Establishing lead times for replacement of supplies used daily;
- Determine minimum and maximum supply levels and mark them accordingly.

Sweeping

Studies show that a clean work environment is safer, more productive, and more inviting to workers. Sweeping is visually and physically reviewing a work area to place items in their designated storage areas and to clean the work area. Sweeping occurs after clean-up procedures are completed and work areas are orderly and safe.

Suggested activities include:

- Determine regular schedules for cleaning work/break areas;
- Acquaint all employees, including those with daily 5S’s responsibilities, with the program’s goals, objectives, and procedures;
- Post area cleaning guidelines and schedules;
- Keep tools, machinery and office equipment maintained and in operating condition;
- Keep work/break areas, office and conference rooms clean and orderly;

- Establish a dependable, documented procedure to reduce hazardous waste and minimize the use of chemical products; and
- Perform safety inspections on a regular basis.

Standardizing

Standardizing involves the development of consistent processes for each key work function and for the application of the 5S's throughout the operating area to achieve a high level of quality. For standardization to succeed, employees must understand the value of using and maintaining methods, such as:

- Documenting all current processes;
- Using the standard 5S's format for communications board/binders;
- Installing standard visual controls for the area (i. e., signboards, shadow boards, outlines, etc.);

- Using the 5S's agreements;
- Documenting all 5S's agreements; and
- Incorporating and documenting all changes.

Self-Discipline

Self-discipline involves making and keeping commitments and agreements on all the 5S's and includes:

- Ensuring that employees follow all 5S's rules for Sorting, Simplifying, Sweeping and Standardizing;
- Documenting all changes;
- Posting in work areas a daily activity checklist for the 5S's;
- Regularly updating the 5S's communication board/binder with current personnel assignments; and
- Keeping the work area orderly and clean.

The management innovation described in this *Management Methods Bulletin* was recognized by MCAA with the presentation of the **2001 E. Robert Kent Award for Management Innovation**, one of the association's most distinguished awards. For information about the award and the nomination process, please call 800-556-3653.



Bulletin

Managing Office Operations with PaperVault™

Introduction

PaperVault™ is a data and paperwork management system that its inventor – Don Pheil, CEO of DPW, Inc. (S. San Francisco, CA) – developed to manage the company's finances, projects, invoicing, bids, change orders, and other operations. Originally designed for DPW, Inc., the software has been revised and expanded to fit most any size or type of company needs, which is why DPW, Inc. won MCAA's 2006 *E. Robert Kent Award for Management Innovation*.

Initially, PaperVault's functions were relatively simple; it logged jobs, bids, and change orders and retrieved internal documents easily and quickly. Over time and as the company grew, its needs changed and PaperVault evolved to meet them.

Counters

One of the features that distinguishes PaperVault from other data management software packages is patent pending counters that focus employees' attention on tasks that must be completed within a certain time frame. By monitoring the counters, the 78 employees responsible for specific tasks can more effectively manage their daily work schedule. The more immediate the need for a task to be completed, the higher the increment

assigned to a counter so the employee is aware that it must be completed by a certain time. And, once the employee completes the task, the counter is decremented accordingly.

Completion of a task may not be all there is, however. Sometimes, the end of one job triggers another task for another employee in the company. Then, the counter for the new task is initiated which alerts the responsible person that a task needs his or her immediate attention.

To be sure DPW, Inc. employees and management are on top of the work flow, PaperVault provides an instant visual display of who is responsible for what tasks company-wide and when they must be completed. Management can see at a glance where potential bottlenecks exist.

Tracking Project Bids

An excellent example of how PaperVault's counters work is how the system manages bids. When DPW, Inc. receives a bid invitation from a general contractor, the information is logged and assigned to an estimator. The walk-through and due dates trigger the task counters that are unique to each employee in the bid process within the company. Because PaperVault makes

bid information available to everyone on the bid team, critical information (i.e., due date) is not overlooked.

The system works especially well when DPW, Inc. receives bid invitations from several general contractors for the same project. Once a bid letter is created for the first contractor, it becomes the template for letters and other documentation for the other contractors. PaperVault also modifies the bid documents as appropriate for each contractor. If DPW, Inc. wins the bid, all the bid information is instantly converted to project information.

Document and Correspondence Management

Document and correspondence management is the heart of PaperVault. The system was created so that all DPW, Inc. employees could quickly view all the documents associated with a job. The system allows the company to send and receive documents and correspondence from clients and vendors in hard-copy, e-mail and facsimile forms.

What makes PaperVault so much more effective than other document management systems is the manner in which it associates and displays project documents. The program's three-paned display allows users to view internal documents in the uppermost pane and external documents in the middle pane. The bottom pane chronologically displays all relevant/related documents and correspondence once an item from the upper or middle pane is selected, thereby providing the user with an instant history of all communications received for that particular issue. And, issues can involve a paper trail of change orders, RFIs, account receivables, insurance and much more. PaperVault, therefore, enables anyone to quickly and easily understand the background on an issue.

Electronic Mailing

PaperVault knows what information goes in which e-mails. When an employee chooses to create a particular type of e-mail, (RFI, change order, quote, etc.) for a project, the system automatically generates a customized message, including default text and all relevant reference numbers, in the body of the message. The user can fine-tune the text as well. When the message is ready, PaperVault will send it by e-mail or fax to the client, as specified by the user.

Another useful feature of PaperVault is that all associated documents for a bid or project are instantly available for quick selection to be added as an attachment to an e-mail or fax message. Users may either open a dialog box to find a document in the system or use the "browse" function for documents outside PaperVault.

PaperVault also manages incoming documents associated with electronic messages. The system automatically files replies to the relevant bid or project file using a proprietary process. After the reply is filed, PaperVault removes it from the employee's in box, thereby reducing clutter. This e-mail becomes another "link" in the communication chain and will display as a related item.

Billing

PaperVault's features also ensure that invoices are received by clients on specific days each month, as they require. Each project form has a field for the billing due date. Once that information enters the system, a counter is initiated for the responsible employee.

Several days in advance of the billing date, the projects and change orders designated for billing are presented to the assigned employees who immediately know how many billing tasks they must complete for that day.

A screen provides them with the information they need to calculate the billing. Once the task is complete, the counter is decremented. At the same time, a new accounting counter is initiated with the accounting department to prepare and send the invoices. This process is simple and easy and prevents delayed payments.

Although PaperVault cannot guarantee a client will pay his bill on time, it does simplify the billing process and ensures that DPW, Inc. employees and their clients do not miss due dates and deadlines. And, if there's any question about a bill, PaperVault eases the response because the system documents the billing and payment history so completely and logically.

Accounts Receivable

The "crown jewel" feature of PaperVault is the accounts receivable module. While the system is not an accounting program, it effectively manages accounting information to ease the tasks facing DPW, Inc.'s accountants. With a few keystrokes, PaperVault can send an e-mail to the general contractor's accounting department staff reminding them that action is needed on an invoice. The DPW, Inc. employee can attach the relevant invoice and all associated documents, such as signed invoice packages, lien releases and insurance certificates. When a reply

comes in, PaperVault logs and files the message and generates counters for needed actions. The module, therefore, displays accounts receivable information for each project and each customer as well as each invoice. And, PaperVault draws all its information from the construction accounting program without entering into the financial accounting system.

Built-in Flexibility

PaperVault is as nimble as it is comprehensive. The system provides for custom tasks that can be initiated from any screen in the system. Any employee can take on the task, a note field dispenses information and follow-up dates, and counters are triggered to ensure the work is completed. Searches are easy and quick; employees can search the system with a project number, contractor name or address. And, a contractor can adopt portions of PaperVault, rather than the entire system.

Pheil said that PaperVault has helped DPW, Inc. grow. "PaperVault permits us to take on additional work and scale our staff properly as we grow. It is easy to integrate and monitor the work of a new employee."

If you are interested in adopting PaperVault for your office operations, please contact Don Pheil at DPW, Inc. at dp@dpwinc.com or 650-588-8482.



Bulletin

Serviceeye

H.T. Lyons, Inc.
Allentown, PA

INTRODUCTION

The 2010 winner of MCAA's E. **Robert Kent Award for Management Innovation** is **H.T. Lyons, Inc.** (Allentown, PA) for its custom-design service software, **Serviceeye**. Service mechanics, project managers and dispatchers worked internally to create a service software package that would reduce the costs of service technicians' paperwork associated with equipment maintenance and repairs and construction. Serviceeye provides detailed work and billing history for each piece of equipment covered by H.T. Lyons, eases access to documents, simplifies the payroll process, provides an affordable solution to remote monitoring, saves the company over \$40,000 per year in unbillable labor costs and much more.

Since winning the E. Robert Kent Award, contractors from across the U.S. have contacted H.T. Lyons about logistics and costs involved in installing Serviceeye in their operations.

WHAT IS SERVICEEYE?

Serviceeye is an informational tool that allows users to log onto serviceeye.net from anywhere to view the details of service activity immediately after work is performed. Electronic service reports greatly reduced the time, costs and paper previously used to administrate and document service and maintenance work.

Serviceeye is also a communications tool that allows users to post messages and action items to one another on a "bulletin board," assuring that critical communications are transferred to all concerned parties.

Serviceeye is also a remote monitoring tool on working screens, making live data readily available 24/7 to users on five parameters. Historic trend reports are also easily viewed on-screen.

Serviceeye allows service and repair data to be tracked by each piece of equipment, thereby simplifying replacement cost analyses and quantifying the cost of unreliable equipment.

Serviceeye is also a document management tool that allows critical operation and maintenance documents, such as wiring diagrams and parts lists, to be stored for easy access by any user at any time.

HOW DOES SERVICEEYE WORK?

The following provides a step-by-step breakdown of the procedures involved in Serviceeye's operation:

1. Project Managers set up project folders and service supervisors create service contract folders for each client. The folders are organized to create a logical file "tree" and include basic information, such as the appropriate union rate for the associated work.
2. Dispatchers schedule projects, preventive maintenance visits and service calls by creating Work Orders in the company information management/accounting system.
3. Every 15 minutes, Work Order information is automatically exported to the appropriate Serviceeye folder and made available to technicians via the Internet to their workbooks.
4. Technicians use their wireless workbooks to view Work Order information, O&M documents, comments and any other information stored in Serviceeye folders. They can select open Work Orders and create Electronic Service Reports (ESRs) as they perform their tasks.
5. When performing service work, technicians assign ESRs to specific pieces of equipment which in turn causes a service and cost history to be created for the piece of equipment.
6. When the work is completed, the technician clicks "save" and the ESR is instantly e-mailed to the customer contact associated with that folder, dispatch and the technician's supervisor.

7. Each evening, Serviceeye summarizes the ESRs created that day and e-mails a Daily Summary Report (DSR) to dispatch and service supervisors.

8. Each morning, dispatch reviews the prior day's DSR to confirm the data is correct.

WHAT ARE SERVICEEYE'S BENEFITS?

Companies that adopt Serviceeye into their operations will realize a number of important and valuable benefits:

- **Easily accessible O & M records**
Serviceeye makes available O&M records, as-built information, start-up records, digital photos and more at any time, day or night.
- **Prompt delivery of service reports**
Once a service visit is complete, Serviceeye instantly e-mails a copy of the service report to the customer and makes a PDF version available for viewing on the Serviceeye website.
- **Simplified tracking of the service history and expense for specific pieces of equipment**
Serviceeye maintains an electronic folder for each individual piece of equipment. Service reports, invoices, comments and documents related to each piece of equipment are stored in this file and can be sorted and viewed in a variety of ways.
- **Provides inexpensive remote monitoring and trending of a customer's facility**
Serviceeye has the capability of monitoring five parameters for less than \$1,000 in hardware and one day's labor. The Serviceeye screen is designed to keep the five monitored parameters viewable

whenever Serviceeye is being used, alerting users to unusual or problem situations. Serviceeye also produces trends and can be programmed to send e-mails at pre-determined times.

- **Eliminates downtime**
Serviceeye instantly e-mails service reports to service supervisors and dispatch when a visit is complete. Dispatch and supervisors also receive a summary of daily activities.
- **Improves communication between technicians, the office and customers**
Serviceeye's electronic bulletin board feature allows users and customers of specific accounts to post and respond to comments. Management instantly sees all comments requiring their action.
- **Simplifies and expedites the payroll process**
When projects and service contracts are created in Serviceeye, dispatch provides the proper rate class for each piece of equipment. Technicians never need to enter pay rates, and all payroll information is automatically entered into the payroll system each Sunday night.

- **Reduces management time spent reviewing service reports and preparing invoices**

Serviceeye's electronic service reports are pull-down boxes and auto-fill data from dispatch to simplify the technician's job. The reports can be quickly and easily checked for accuracy by dispatch as the work is completed. The reports are entered into the billing system, allowing billing clerks to check for accuracy.

For more information about Serviceeye, please contact Richard U. Perosa, president of H.T. Lyons, at RUPerosa@htlyons.com.



Bulletin

Articulating Weld Boom

INTRODUCTION

The 2008 ***E. Robert Kent Award for Management Innovation*** went to Shinn Mechanical, Inc. (Kent, WA) for its Articulating Weld Boom.

Shinn Mechanical's fabrication workers designed the boom as part of its effort to establish a new fabrication shop at the company's new location in Kent, WA. The boom and other fabrication equipment were intended to provide the most efficient pipe fabrication operation possible for the space available.

WHAT IS THE ARTICULATING WELD BOOM?

The boom was designed, constructed and installed by Shinn Mechanical fabrication workers.

It uses a lattice-style design, extending from a 20-inch diameter, Schedule 160 steel column. The boom has three sections, with pivot points between the sections, providing a true articulating boom that allows the working end to be placed anywhere within a 30-foot radius from the base. A welding machine is suspended from the end of the boom, and mounts for grinders are also included.

The boom is equipped with the necessary power to make it work—wiring for electricity to power the boom, a grinder/convenience outlet, compressed air, argon, welding gases (98-2, 75-25), water coolant for the weld torch and a plug-in for foot control of pipe positioners. The design allows the fabricators to perform any type of welding, including TIG, without any cords or hoses on the floor.

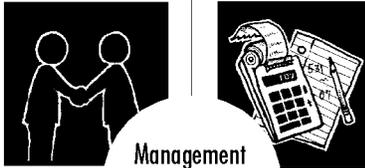
BENEFITS

The Shinn Mechanical boom was designed to greatly improve safety, the ergonomics for the fabrication workers and the ambient air quality in the fabrication facility.

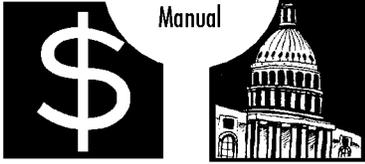
First, the boom will greatly reduce hazards and potential for injuries. The boom moves easily and locks into position with air brakes that are controlled by switches at the working end. The boom is also equipped with a 20-foot picking boom mounted on the same column; it has a 4,000 pound lifting capacity. The boom holds all the cords and hoses overhead and out of the welders' way, thereby eliminating the potential for electrocution and tripping.

Shinn Mechanical also designed the boom to remove noxious fumes and gases from the work area. The boom is equipped with a complete industrial duct system mounted with a point-of-use exhaust hood at the end for removal of gases and smoke. A VFD-controlled exhaust fan expels the gases, filters the exhaust and re-circulates the cleaned air into the shop. With these features, the air quality in the fabrication shop is greatly improved.

For more information about the Articulating Weld Boom, please contact Mike Shinn at mikes@shinnmech.com or call 425-373-9800.



Management
Methods
Manual



Bulletin

Bulletin No. MK 1
File: Marketing

Fundamentals of Marketing Your Own Services

BACKGROUND

What Is Marketing?

Marketing is the art and science of getting people to realize: 1) that they need what you offer, 2) that what you offer is unique in some way, 3) that your services are worth what you charge, and 4) that you want their business.

This seems an easy enough task until you realize that no one listens readily, especially to a sales message. Call it ignorance. Call it sales resistance. It's really suspicion. People are naturally suspicious of anyone trying to sell them something, especially if: 1) they are not certain that they need what you offer, 2) they have always purchased what you offer from someone else, or 3) they have no evidence of the quality and value of what you are selling or the reliability of your company. As long as suspicion stands in the way, you have virtually

no hope of communicating your sales message, let alone making a sale. So, in addition to informing people, effective marketing also overcomes suspicion.

How Marketing Works

Effective marketing grabs your audience's attention, suspends their suspicion, and makes it easy for them to understand what you're trying to tell them. And it does it all in 30 seconds or less.

In 30 seconds?

Absolutely. Think about your own reactions to marketing. How quickly do you make up your mind whether to read, file or throw away a sales brochure? How much of a television commercial do you watch before you decide to go to the kitchen for a sandwich? When a manufacturer's rep telephones, how long do you give him to make his pitch?



How Marketing Uses Time

Marketing compresses time. It squeezes minutes into seconds. It shaves a paragraph down to a single word and crams a thousand words into a single picture. And this is where the art and science of marketing meet. The science of marketing pinpoints the audience, identifies what motivates them to buy, and defines the sales message in the briefest possible terms. The art of marketing devises symbols that the audience instantly recognizes, symbols that suspend suspicion and arouse curiosity. A symbol may be a catchy phrase ("Reach out and touch someone"), a logo (Coca-Cola's red-and-white wave), a familiar face (sports celebrities selling Miller Lite), or a visual image (the Coppertone girl lying on a surfboard). These symbols communicate a lot of information at a glance and have become increasingly familiar through repetition. They have become a natural part of the environment, so natural that we are no longer suspicious of the sales messages they communicate.

A PRACTICAL APPROACH

Avoid The Marketing Mystique

Many businesses believe that successful marketing is impossible without an ad agency and big dollars. For enormous corporations marketing to consumers nationwide, this is probably true. For the mechanical construction and service industry, it is not.

Any mechanical contractor can successfully market his services with a high-priced marketing consultant. And the advantages go far beyond saving money. Doing your own marketing gets you and your staff thinking about your customers and your company in fresh ways. It opens up whole new areas of endeavor, stimulates involvement at all levels of the company, boosts morale and generally

makes the entire company stronger. And, if done properly, marketing can even be fun.

Treat Marketing Like Any Other Project

Treat marketing the same way you treat any construction project. Determine a scope of work, a budget and a schedule, assign a project team, plan, establish procedures for reporting and tracking progress, and follow up. Delegate specific responsibilities and hold people accountable. Use the team approach for problem-solving. Subcontract work that is beyond your in-house capabilities.

Start with Commitment

Start by committing time and money to the effort. Six months and 10 percent of your annual net profit are good rules of thumb.

The six months are for thinking, planning, researching and producing your first promotional materials. A 1- to 2-hour meeting of everyone involved in the marketing effort should be held at least every two weeks during that period. After the initial materials are finished, monthly meetings are usually sufficient.

Ten percent is the figure most marketing consultants recommend. You can spend less, you can spend lots more. What you spend depends on what you want your marketing effort to do and what media are required for the job. Set up a marketing account and be certain that all outside services (writers, photographers, printers, video producers, etc.) and in-house staff hours spent on the effort are charged against it.

Pick a Team

Start with a core team of no more than six people, including yourself. Select people



from different levels of the company—top management, estimating, project management, office operations, field supervision, service department—to avoid “ivory towerism” and insure that people who actually work with clients and other trades (and know these people best) can contribute.

Pick people who have good communications skills, are enthusiastic about the company, and are team players.

Brainstorm

The first meeting should be a brainstorming session aimed at getting specific answers to the ten fundamental questions listed on the Marketing Planning Sheet (Figure 1). Use this sheet as an agenda for the first couple of meetings, as well as a guide for further research.

Research

All ten questions cannot be answered at meetings. Assign specific questions to team members to research. Have them talk to office staff, mechanics in the field and the shop, other trades, current and former customers. Find out everything you can about your target audience, your audience’s perception of your company and its services, and how your own employees and your subcontractors view your company. Without this information, you cannot define a believable sales message.

Expect surprises. Unless you regularly conduct the kind of project review sessions recommended by MCAA’s “Project Manager’s Manual,” where you meet with project owners, architects, engineers and general contractors to gather frank comments on your company’s performance, you’ll likely discover that your customers see you quite differently from the way you see yourself.

Pool Ideas

At the second and third meetings, pool the information the team members gather, figure out what it means, and make further research assignments to fill in gaps. By the end of the third meeting, everyone on the team should have a pretty clear idea of what kind of image your marketing materials should project and what information about your company and services is most likely to convince your audience to buy from you.

In the two weeks between the third and fourth meetings, the team members should think about ways to communicate that image and message to the audience.

Consider All Options

Figure 2 is a partial list of effective marketing materials and techniques. Consider all of them, as well as any others that come to mind. Each one addresses a different audience and communicates a different kind of image and information. Consequently, each one is useful in a different set of circumstances. This is why you can’t start your marketing effort with the announcement, “We want to do a series of radio ads.” Limiting your options before you brainstorm and research puts you on a track that may not really suit your audience and your company.

Get Professional Help

You’re in the mechanical contracting business. If you wind up as a general contractor on a project, you always subcontract the excavation, concrete and masonry. You’re certain that an owner can tell the difference between a brick facade built by a mason and one built by a plumber.

By the same token, always subcontract the writing, photography, graphic design,



videography, and other production activities involved in your marketing effort. Your project managers might write passable reports, your estimator take wonderful vacation photographs, and your office manager draws creative doodles, but they're not professionals. And though you may not see the difference, your customers will!

Hire outside help the same way you hire construction subcontractors. Look at the work they've done and hire people who have experience in the type of project you're proposing. Get references and check them. Avoid people who are difficult to work with, don't listen, or don't fully explain what they offer. Don't be embarrassed to ask simple questions, and don't trust subcontractors who avoid giving you straight answers.

Take your time. Allow 4–6 weeks to find good support firms.

Give clear instructions as to what you want. If you can show a writer or designer samples of other companies' materials (not just contracting firms' but any company's) that you like and dislike, it gives them an idea of your tastes and goals. Listen to reasonable recommendations. Get a clear idea (rough sketches, outlines, layouts, storyboards) of what the finished product will look like before work begins.

Have a specific contract with each firm. Know what the work will cost, what standards must be met, how corrections will be handled, what schedule will be followed, and how you will be billed.

FOLLOW THROUGH

You are ultimately responsible for proofreading, for okaying final editing, for approving ink colors, type styles and design elements. Have as many sets of eyes as possi-

ble review camera-ready copy, rough cuts of audiovisuals, and plans for press conferences, open houses and other events.

Take your time. That's why you allow yourself six months.

FOLLOW UP

After you distribute your new brochures, stage your open house or show your new video, find out what your audience thinks. Your sales statistics will give you some idea, but telephone calls and face-to-face conversations give you more specific information. You'll be surprised how willing people are to offer comments and suggestions when you express interest in their opinions.

Record all customer comments on index cards and maintain them in a file. When it comes time to update your marketing materials or design new ones, that file will prove invaluable.

CONCLUSIONS

- Do your homework.
- Identify your audience, its needs and its suspicions.
- Involve people at all levels in your company.
- Plan and project a specific image.
- Address your audience's suspicions.
- Communicate a specific sales message to a specific audience with each marketing piece; don't try to cover all the bases with one brochure or one ad.
- Keep everything simple and brief.
- Once you decide on your message and approach, hire professional talent to give your marketing effort muscle and polish.
- Listen to as many recommendations and



points of view as you can, but do what feels right to you.

- Repeat marketing efforts regularly and frequently to keep your name in front of your target audience.
- Go first class. The investment is almost always worth it.

- Take as much time as you need to do it right the first time. It's embarrassing and difficult to undo a mistake distributed to 500 potential customers!

NOTE: You should refer to MCAA's "Mechanics of Marketing Manual" for additional information.



Figure 1

MARKETING PLANNING SHEET

1. What are we selling?
 - Construction services
 - Maintenance services
 - Equipment
 - Other

2. Who are we trying to sell to?
 - Owners, architects, engineers
 - General contractors
 - Commercial building operators
 - Industrial building operators
 - Residential customers
 - Other

3. What motivates our target audience to buy?
 - Quality of work
 - Low price
 - Guarantees & warranties
 - Company reliability (reputation)
 - Company responsiveness to customer needs and situations
 - Good communications and working relationships
 - Experience or familiarity with a particular company
 - Other

4. Why should they buy from us?
 - Unique service
 - Quality of work
 - Low price
 - Guarantees & warranties
 - Our reliability (reputation)
 - Our responsiveness to customer needs and situations
 - Our good communications and working relationships
 - Our experience
 - Other

5. Who are our competitors and what do they offer that is unique?
 1. _____
 2. _____
 3. _____



Figure 1 (continued)

6.	<p>What makes our services worth the price we charge?</p> <p><input type="checkbox"/> Uniqueness</p> <p><input type="checkbox"/> Quality</p> <p><input type="checkbox"/> Low price</p> <p><input type="checkbox"/> Guarantees & warranties</p> <p><input type="checkbox"/> Our reliability (reputation)</p> <p><input type="checkbox"/> Our responsiveness to customer needs and situations</p> <p><input type="checkbox"/> Our good communications and working relationships</p> <p><input type="checkbox"/> Our experience</p> <p><input type="checkbox"/> Other</p>
7.	<p>What is our company's reputation in the marketplace? What strengths and weaknesses are we known for? (State in one sentence of ten words or fewer.)</p> <p>_____</p> <p>_____</p>
8.	<p>What do we want our company's image to be? What do we want to be known for? (State in one sentence of ten words or fewer.)</p> <p>_____</p> <p>_____</p>
9.	<p>What customer suspicions must we overcome?</p> <p><input type="checkbox"/> Our lack of prominent image</p> <p><input type="checkbox"/> Our prices, which are higher than our competitors'</p> <p><input type="checkbox"/> Our poor reputation or recent poor performance</p> <p><input type="checkbox"/> Our lack of experience in a particular area</p> <p><input type="checkbox"/> Recent change in our company's structure or management</p> <p><input type="checkbox"/> Our company size</p> <p><input type="checkbox"/> Other</p>
10.	<p>What kind of message will our target audience respond to?</p> <p><input type="checkbox"/> Person-to-person sales contact</p> <p><input type="checkbox"/> Personal letters from our company president</p> <p><input type="checkbox"/> A sales brochure</p> <p><input type="checkbox"/> A short videotape or slide/tape presentation</p> <p><input type="checkbox"/> An article in a newspaper or magazine</p> <p><input type="checkbox"/> Radio ads</p> <p><input type="checkbox"/> Television ads</p> <p><input type="checkbox"/> An open house where prospective customers can tour our facilities</p> <p><input type="checkbox"/> A local sports event sponsored by our company</p> <p><input type="checkbox"/> Having employees speak at civic club dinners, visit classrooms to introduce students to the contracting business or donate time to community service projects</p> <p><input type="checkbox"/> Other</p>



Figure 2

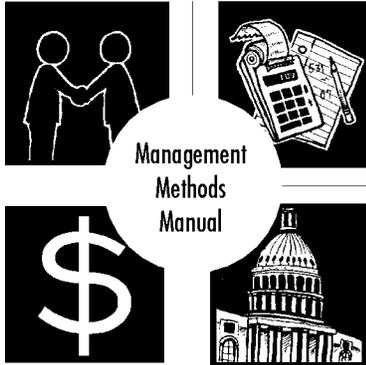
A PARTIAL LIST OF PROFITABLE MARKETING OPTIONS

1. Effective use of the telephone
 - Training people to answer the telephone politely and handle calls efficiently every time
 - Training people to sell directly by telephone
 - Following up every service job with a call to the customer to make sure the job was done satisfactorily
2. Print media
 - Sales brochures (a different one for each target audience)
 - Advertisements in newspapers, magazines and trade journals
 - An article in a local newspaper or magazine about your company's 10th anniversary, the recent completion of a big project, the opening of a new office or shop facility, or your sponsorship of a local event
 - An article in a trade journal about an innovative construction technique or management procedure
 - A monthly or bimonthly newsletter that keeps your customers and potential customers informed about your company and what it offers
3. Direct Mail
 - A one-page letter on fine stationery, announcing new services and signed by the company president (for small, targeted mailings)
 - A sales brochure accompanied by brief cover letter addressed to a specific person and signed by the company president
 - Flyers mass-mailed to residential customers and including a discount coupon for specific work
4. Audiovisuals
 - A slide/tape program of no more than 5 minutes, featuring your company's facilities and services. (Slide programs are less expensive than video and are easier to update. A slide program can also be transferred to videotape for easy viewing and distribution)
 - A videotape program of no more than 5 minutes. (The program can either be shown to the prospective client during a sales presentation or simply mailed to him/her with a cover letter and/or brochure.)
 - A professionally narrated audio cassette of no more than 3 minutes, briefly describing your company and its services. (Can be mailed directly to prospective customers at low cost.)
5. Personal contact
 - Interviews with past customers regarding your company's performance
 - Scheduled meetings every six months between your company rep and current, prospective and past clients to find out what their needs are and to explain new services you offer



Figure 2 (continued)

6. Media
 - Radio ads promoting residential construction and maintenance services
 - Television ads promoting residential services
 - Sponsorship of local Public Broadcasting System radio and television programs
7. Community Service
 - Active membership in the local Chamber of Commerce
 - Having company managers offer their services as speakers to civic clubs and schools, to explain the role of construction in the community and the opportunities the industry offers young men and women
 - Sponsorship of a local school or youth club sports team
 - Participation in local business community sports leagues
 - Participation in local government-sponsored events (parades, community picnics, Town Appreciation Days, etc.)
8. Company Events
 - An open house for invited prospective clients to tour your facilities and find out about the services you offer
 - An annual summer picnic or Christmas party for special customers and guests
 - Grand Opening Celebrations for events such as the opening of a new shop facility or the introduction of a new type of major equipment
 - Press conferences announcing the launching of large new projects or company participation in significant community activities



Bulletin

Why Mechanical Contractors Should Furnish Equipment

Close examination of the major operating problems of owners, architects, consulting engineers, general contractors and mechanical contractors reveals one simple, yet almost startling fact: nearly all of these problems are common to all members of the construction industry, and can be solved only through a better understanding of the problems among these diverse groups.

It usually follows that any new construction method or procedure that benefits the owner of construction is readily accepted by everyone in the construction process.

One procedure, commonly known as "direct purchase" or "prepurchasing," while not new, is becoming a more widespread practice because on the surface it appears to offer some definite advantages in keeping down costs. However, there are some hidden pitfalls which ultimately not only increase costs, but also could delay completion of the construction project.

Further, it is not unusual for the total cost of prepurchased machinery, equipment and/or supplies plus the contractor's installation charges to total more than the contractor's bid were the contractor furnishing the total bill of material as well as installation.

However, it may be well to consider some of the advantages sought by Direct Purchasing:

A. To Permit Early Purchase of Long-Delivery Items to Insure Timely Deliveries and to Avoid Construction Delays

This objective at first appears reasonable and commendable, particularly when viewing stretched delivery days as a result of product shortages. (It is not unreasonable to believe long delays will exist at least for as long as worldwide demand continues for equipment, pipe, valves and fittings.) However, it seems appropriate to mention that first-time buyers or irregular purchasers



should not be surprised to find that entering an order does not necessarily or automatically insure the purchaser a place in line for delivery. Manufacturer's personnel, similar to other people, respond to pressure from repeat buyers or to emergency demands. Normally the Owner/Buyer is not personally acquainted with purchasing people and unfortunately may find himself being shuffled, stalled, juggled, or sometimes misled.

Looking at the reverse situation to long deliveries—such as a “down economy”—it is not surprising to find manufacturers lumping orders in order to fill out a production run. While such a practice effects production economies, it does not necessarily insure timely delivery.

The mechanical contractor, on the other hand, has long-standing acquaintanceships with suppliers, vendors, and manufacturers, and as a repeat, experienced buyer can expect and demand commitments to be honored.

B. To “Save” the Contractor’s Markup for Overhead and Profit

It is only good business for an owner to seek maximum value in his construction contracts. The key phrase here is maximum value. An owner seeks a profitable return on his investment over the life expectancy of the contemplated plant. In like manner, a contractor is in business to realize a return on his “plant,” which consists of men, money, material and expertise. For overhead and profit the contractor renders a service. It is not unreasonable to assume the owner will ultimately pay (at least, and perhaps more) the same price for service he renders himself. Any wise owner recognizes he gets things done through other people, people who know what they are doing. This is to suggest the qualified mechanical contractor is the owner’s “other people.”

C. To Provide the Engineer With Closer Control of Compliance with Specifications in Equipment Bids

This seems only logical, since the mechanical contractor would submit data to the engineer for approval prior to release for shipment anyway. There is no doubt an engineer has the knowledge and experience required in order to evaluate compliance with specifications.

However, closer control of compliance with specifications does not take into account one manufacturer's customary practice of providing certain required auxiliary apparatus installed as factory assembled vs. another's practice of shipping auxiliary apparatus as his subcontract from a distant sub-supplier; or one vendor providing drilled/tapped motor mounts and isolation units where another plans for the purchaser to make these arrangements.

Saying it another way, then, the owner's interest is output within certain tolerances, and this implies installed/operating outputs. While close compliance with specifications in individual components is an ingredient, it is not the entire recipe. While the engineer and owner's representatives can vouch for the soundness of each component, only the mechanical contractor is qualified to combine these components into an operative mechanical system.

D. To Incur Possible Cost Savings by Beating Price Increases

Certainly placing an order today gives price protection against a price change tomorrow, assuming the vendor doesn't, for perfectly legitimate reasons, change his mind. Here again the owner as an infrequent buyer finds himself at a purchasing disadvantage.



mechanical contractors, buying as repeat buyers, are in a strong position to insist that vendors/manufacturers keep their price and delivery commitments. If there is a critical scheduling problem, a letter of intent quite often accomplishes the same purpose, thereby giving the owner the best of all worlds.

E. If the Owner is Purchasing Production Equipment, the Owner Would Naturally Feel He had the Expertise in Selection Rather than the Installing Contractor

There is no quarrel with this premise. Usually it is the Owner's experience that triggers the decision "to buy direct and save all that time and money" in the other listed circumstances.

It is not the intent of this bulletin to dispute this action because this is probably the "exception" that justifies an Owner's prepurchasing decision. However, this bulletin emphasizes the risk the owner takes in prepurchasing. Not only is the owner undertaking tasks wherein he often is untrained and unskilled, but he is additionally exposing himself to the risk of his final completed cost being more than the cost would have been if he had issued a contract for furnishing and installing an operating system to a competent mechanical contractor.

Direct purchasing generally follows one of two procedures:

1. Equipment is purchased by owner, architect, or engineer prior to the awarding of a construction contract. Then, when the contract is awarded, the purchase order for the equipment is assigned to the mechanical contractor, thereby transferring responsibilities and rights having to do with purchase and payment for the equipment.

2. Equipment is purchased by owner, architect or engineer and merely turned over to the contractor for installation when it arrives at the jobsite. Under this arrangement, the purchaser retains full control and responsibility, both administratively and financially. Under the second procedure, the purchasing authority not only assumes the purchasing function of the mechanical contractor, but also assumes all other functions (except installation) normally provided by the contractor—including advertising for equipment bids, evaluating the bids, issuing the purchase order, handling procurement, expediting delivery, arranging receipt and unloading of equipment, and issuing payment.

Assuming for the moment that equipment has been ordered, it may be wise to now consider some responsibilities that normally belong to the mechanical contractor but which now become the domain of the purchaser.

It may be appropriate to recommend that the contractor should meet with the owner well ahead of time to clear up any possible misinterpretation of the meaning of: "the owner will furnish the equipment." It is not unusual for costly wrong assumptions to be made at this point, wherein the owner assumes he is buying some of the below-listed items while the contractor assumes the contract to be an equipment hookup only. It is possible neither party has considered where the equipment to be furnished is coming from, what pieces are included, what is required for proper installation, or who is responsible for a wide range of particulars.

Among items to be considered are:

- Transportation to town
- Delivery on the jobsite
- Rigging into final position



- Foundation and foundation bolts
- Electrical starter and controls
- Hookup to the chilled water/hot water distribution system
- Duct work tie-in
- Care, custody and control
- Warranty labor
- Output of the equipment
- Startup, test, balance and adjust.

Additional questions to consider might very well include:

1. What happens if the manufacturer failed to complete the shipment and some of the required parts and pieces are back-ordered? (To really illustrate this point, imagine the site on which the plant is to be built is remote, with limited or seasonal accessibility, foreign, or government classified; and there is no way to ascertain prior to final assembly if all the pieces are present.) Or if there were a checklist, who ascertains whether the bill of material is complete?
2. What happens if the foundation bolts or templates are incorrect or missing altogether?
3. What happens if, because of a partial backorder, the equipment is shipped in cartons rather than assembled, even if specified "assembled"? Who assumes this responsibility?
4. If there is a change in the work due to a change order that requires a change in the equipment, who pays the difference and who is responsible for the "domino-effect" changes that could result from the equipment change?

Finally, it is only fair to note that the list does not include the coordination necessary between the vendor, the transporting carrier, the drayage/cartage company, the storage company and the insurance representative.

From years of experience, the mechanical contractor has developed knowledge and expertise of those seemingly unimportant details that can make or break a successful job. Being in a high-risk industry, the Mechanical Contractor has learned not to overlook or forget to plan for potential hazards. Here are some examples of details that are often overlooked when mechanical equipment is purchased by parties other than the mechanical contractor:

1. **Transit Insurance.** A mechanical contractor's normal insurance program covers damages to equipment in transit. The Contractor carries this special insurance because he knows that the insurance provided by railroads and trucklines is inadequate. The insurance provided by these freight carriers is either limited to a predetermined number of cents per pound (generally much less than the value of the goods) or, in the case of nonregulated freight carriers, liability claims can be collected only through legal action. In no case does the equipment manufacturer assume liability for in-transit damage of equipment purchased F.O.B. factory.

2. **Advertising for Bids.** While this function does not appear complex, the mechanical contractor's purchasing knowledge should be put to advantage in: (1) advertising or requesting bids from the most qualified manufacturers and sales representatives, (2) setting a uniform bid time and bid format, (3) advising equipment bidders of planned construction schedule, and (4) advising of any special or unique aspects of the project.



3. Receiving and Analyzing Bids. Although several different bids for mechanical equipment may meet the technical specifications, manufacturers vary in the manner in which they quote items of equipment. The experienced mechanical contractor can quickly spot subtle differences that might result in unforeseen extra costs to himself or to the owner as the project progresses. For example, the mechanical contractor is watchful for:

- Inclusion of accessory items which may or may not be specified, but which are sometimes not directly furnished by the manufacturer, such as safety relief valves, thermometers, etc.
- The stated exclusion of certain accessory items
- Types of vessel connections, e.g., flanged, threaded, plain end, grooved for Victaulic fittings, etc.
- Method of shipment (air, ship, motor transport . . . and what named carrier)
- Terms of payment
- Delivery commitments
- Method of packaging, including size, weight, number of pieces and unloading requirements
- Mounting details of motors and drives
- Extent of prefabricated refrigeration piping included for large refrigeration machines
- Whether bolts, nuts and gaskets are shipped/packed separately.

4. Issuing Purchase Orders. Specified wording is needed to cover inclusions, exclusions, terms and conditions of payment, warranty responsibilities, etc.

5. Obtaining Proper Submittal Data and Approval. Vendor's submittal data should be reviewed not only for compliance with Specifications prior to submittal, but also for dimensions, space requirements, piping connections and entry clearance requirements for installation.

6. Releasing for Production and Establishing Delivery Schedule. Follow-up is necessary to assure timely and official release, acknowledgement by manufacturer, and definite scheduling for delivery at the right time and place.

7. Expediting. Most manufacturers are locked into a fixed production cycle which cannot be altered or shortened once a certain point has been reached. Skilled expediting, therefore, should be conducted before reaching that point. Mechanical contractors are experienced in this function. During times when most manufacturers can obtain all the business they want, it is not uncommon to find many of them fail to expedite their own vendor-purchased items such as motors, drives, gears, coatings and even steel plate for vessel shells. This leads to numerous unnecessary delays in fabrication of the equipment. Through persistence and proper expediting techniques, a skilled mechanical contractor can assist the manufacturer in checking out all possible delays on vendor-furnished items.

8. Shipping. The mode of shipment can be critical. Details considered should include method of shipment (airplane, steamship, truck, rail, and in some foreign situations, pack animal), location of proper rail siding, need for open-top trailer, additional in-transit insurance, arrangements for straight-through truck and drivers if necessary, etc.



9. Receiving. Coordination and timing are extremely important in accepting delivery of equipment, especially heavy items such as boilers and chillers. Scheduling of trained personnel and proper unloading equipment must coincide with arrival of the shipment for proper handling. In many cases, mechanical contractors must obtain advance information from vendors regarding lifting lug points, distribution of weight and other necessary details for proper and safe handling and hoisting.

10. Clarifying Guarantee. Many more disputes concerning manufacturer's versus contractor's guarantee obligations arise in cases of direct purchasing than when equipment is purchased by the contractor. Such disputes never serve the owner's interests and result in time-consuming and expensive delays.

11. More Than a Purchase Order. It is generally agreed that if there is any single most important benefit resulting from direct or prepurchasing, it is that long-delivery items can be purchased early to avoid construction delays.

However, the mere issuance of a purchase order does not necessarily trigger the machinery to assure delivery at the designated time. Mechanical contractors know from experience that the only way to assure delivery is through constant follow-up. It takes a well-planned methodical system of checks and cross-checks to do that effectively. Some manufacturers (more accurately, some employees of some manufacturers) will give the novice expeditor a quick satisfying answer—one which, if not checked out thoroughly, will later result only in dissatisfaction when promises are not kept.

As a case in point, consider what happened on one recent project in Houston, Texas. Seven months before a mechanical

contract was awarded, a major nationwide industrial firm issued over \$2,000,000 worth of purchase orders to 12 major manufacturers for 59 items of air conditioning and mechanical equipment. The purchase orders contained provisions for reassignment to a mechanical contractor as well as specifying shipping dates—some over one year in the future. The only reason for prepurchase was to gain lead time on long-delivery items so construction schedules could be maintained.

When the mechanical contract was later awarded and the purchase orders assigned, the mechanical contractor immediately communicated with all vendors to confirm the delivery dates. In virtually every case the vendor had neglected to pursue the terms of the original purchase order with respect to delivery dates, had failed to expedite paper work, and most importantly, had totally neglected the all important function of expediting outside-purchased accessory items of equipment, such as motors, gear drives, and even steel plate for vessel shells.

The results of prepurchasing on this project were:

- Of the 12 manufacturers, five replied they would in fact meet the originally promised schedules, but did not furnish satisfactory evidence that the current status of production would ensure on-time delivery, thus calling for additional checking. The other manufacturers replied they would not meet their originally promised schedule.

- Of 59 items of prepurchased equipment, only 12 items were shipped on-time as had been specified in the original purchase order. Twelve items were delivered 1 to 8 weeks late; 22 items were more than 4 months late.



These delays were incurred despite the best effort on the part of the mechanical contractor, but he was handicapped by not having been involved in the purchase from the outset. The contractor's expediting efforts included phone calls, telegrams, letters and personal visits to factories (one factory was visited six times!). In conclusion, no amount of expediting will help if not done at the proper time—and the proper time begins immediately after issuance of the purchase order!

Other recent examples of direct purchasing that were self-defeating are:

- An owner's representative took direct bids on major mechanical equipment for a school project the same day as mechanical construction bids were taken.

- Directly purchased roof-top air conditioning units, prepurchased for a school project, were shipped from the manufacturer's stock soon after purchase, and arrived at the project before any contractors were even set up to begin construction at the site. Special arrangements had to be made for a contractor to unload the equipment at the jobsite in an open field.

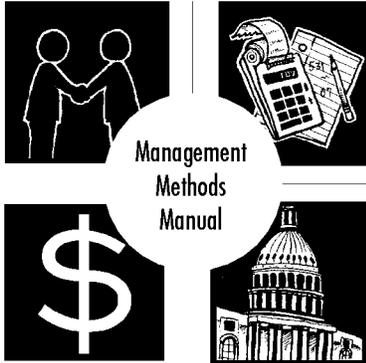
In neither of these cases were the client's best interests served. In the first case, where equipment and construction bids were taken at the same time, no time advantage whatsoever was gained for any long-delivery items. In the second case, the owner suffered extra costs for non-coordinated receiving, and now risks damage to equipment which is unattended and unprotected at the jobsite.

Under normal circumstances, the mechanical contractor can provide a valuable

service in coordinating and expediting equipment delivery. But when another party issues the purchase order, even with subsequent assignment, the mechanical contractor loses leverage in the expediting function. The responsiveness of manufacturer to contractor is an all important leverage, without which the contractor is limited in his ability to elicit full cooperation from the manufacturer in terms of expediting submittals, expediting deliveries, obtaining information, and other forms of vitally needed cooperation.

12. Even After Installation There Are Problems. Warranty date, start-up procedures, test-balance-adjust arrangements, punch-list corrections and warranty labor are just beginning at the end of the job. While a qualified professional mechanical engineer may be able to write a set of specifications that spell out these details in favor of the owner, nevertheless, this is just one more area in which the mechanical contractor has the expertise. The owner's competence is in the area of production or finance. The contractor's competence and advantage are in the areas of coordination of men, machines, materials and money.

Most construction is on a contract basis and the contractor is ultimately responsible that the system produces the specified output. The owner who purchases by contract can fairly anticipate his final cost. When equipment, materials or supplies are prepurchased, however, the owner hazards a "pay-as-you-go system", and nobody benefits—especially the owner!



Bulletin

Diversification for Profit and Growth

Positioning our companies to maximize profits and survive has become a greater challenge today than in past years when the U.S. economy was growing at a rapid rate and profitable work was more attainable.

Most mechanical construction firms concentrated their efforts on performance of work. Little or no effort was made to develop marketing techniques that could increase profitability, diversification and growth.

A few mechanical firms recognized early that many opportunities for profit improvement and growth were open to them when they thought of themselves as being in the business of providing "construction services" in the broad sense. They recognized that mechanical expertise should be viewed as the talent base, rather than the more limited definition of services offered as a piping, plumbing or mechanical contractor in the traditional role of subcontractor.

When management recognizes and accepts the view that they should be selling their mechanical expertise as a construction ser-

vice, this allows them to develop and broaden their marketing strategy. In turn they can take advantage of projects offering opportunity for increased profit margins.

The widening scope and increasing sophistication of services in the interest of growth—reducing competition and increasing opportunities for profit and survival—requires that we look beyond, while not neglecting, the subcontractor role. A contractor should seek direct contracts with owners and their representatives as part of a plan to market selected special projects where the mechanical work is predominant. Selling services on an all-trade basis as a "prime contractor" requires an intense study of the nature of services needed by construction users in your general market area. Conducting such a study will more than likely reveal that many construction users need construction services calling for multi-trade involvement (trades in addition to mechanical trades) under one firm's responsibility. Developing customer relationships with owners and their representatives and diversify-



ing services will also reveal opportunities to broaden management, make it more sophisticated, and challenge and motivate employees to upgrade their performance.

This diversification will change a firm's corporate philosophy and create a "corporate culture," which views the diversified markets as opportunities for personal and corporate profit growth.

The following is a partial list of conditions open to a diversified mechanical contractor, which are "projects of opportunity."

1. Direct award and contractual dealings with a responsible owner as a prime contractor, or with a firm representing the owner when that firm is contracted on an open-end negotiated contract. (Control over your own performance).

2. Project conditions calling for maximum performance to comply with tight schedule requirements of a profit-making owner firm. (Time is money).

3. Projects of a special nature that, due to complexity and schedule requirements, limit competition.

4. Special projects, predominately mechanical in nature, requiring direct contracts with owners for multi-trade services, where the sophistication involved places mechanical contractors in competition with large construction or engineering constructor firms of the type we historically can compete well against.

Preparing for this slot in the market place opens the sophisticated mechanical contractor to many opportunities to provide process and power retrofit services.

5. Special projects where the nature of the contracted services are semifast

tracked and the complete scope of work cannot be defined.

6. High volume, short duration projects as per (5) above, involving multi-trade staff and field forces, who must accomplish sophisticated, complex system repair, upgrading and additions.

Projects of this nature require large expenditures and turn finances over (usually without retainage) relatively quickly, allowing total profit margins to be absorbed in a short period of time for reinvestment in other projects. (Corporate and profit growth).

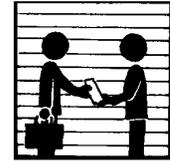
7. Special process and possibly power projects, contracted as a prime contractor to an owner, that call for mechanical systems and prefab piping erection, where the prefabricated piping is provided by others.

Opportunities for profit margin improvement are usually available in this type of project.

8. Special projects, usually process-oriented, where the work is multi-trade and contracted directly with an owner. In these there is limited design and construct capability required of the mechanical contractor working in concert with an owner's engineering department or owner's hired engineer. Projects of this nature can offer opportunity for negotiation.

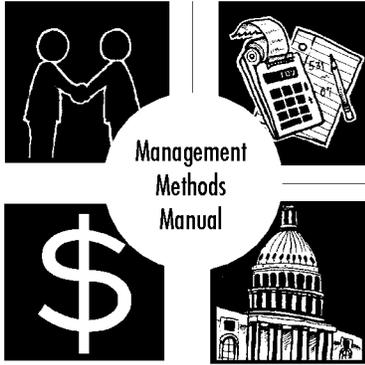
9. Projects of a commercial, institutional or process nature, that offer opportunity to negotiate directly with owners in the "team concept of building." (See Management Methods Bulletin JM 1—Job Management Section.)

Diversification is a natural road to growth for any construction firm. The mechanical contractor, however, has many built-in advantages, not the least of which is that most work



is performed and managed by his in-house forces. This makes the transition to sophisticated “projects of opportunity” as a prime contractor (without competing or conflicting with the general building contractor he works with) an easy one for those so motivated.

Broadening services motivates personnel to grow. However, it requires management to select bright, competent people, suited to the rigors of the construction industry. Marketing will help create your future rather than waiting for it to happen.



Bulletin

Value Engineering

INTRODUCTION

Contractors had better become well informed on Value Engineering (VE) because it is fast becoming a way of doing business in the construction industry. With construction costs rising at an alarming rate, applied Value Engineering is an effective way to offset these costs. The contractor who understands VE and becomes practiced in applying it can be more competitive and broaden his profit margin.

Value Engineering usually concentrates on the 20 percent of a project that represents about 80 percent of the cost. In building construction, this includes the mechanical/electrical areas almost every time. To the building owner, the control of costs in this area can mean a project completed within budget at a time when rising costs and material delays threaten it to be otherwise.

Value Engineering is the management technique that achieves the required function at the lowest cost. Defined by the Society of American Value Engineers, "Value Engineering (Value Analysis) is the system-

atic application of recognized techniques which identify the function of a product or service, establish a value for that function, and provide the necessary function reliably at the lowest cost." The systematic part is embodied in a method called the Value Engineering Job Plan.

VE JOB PLAN PHASES

The Information Phase is the first step in the VE Job Plan. In VE, some questions are asked that are not ordinarily asked. The faithful pursuit of these questions is part of the power of VE. One of the questions to be answered in this first phase is: "What *must* the project item accomplish?" This may not be the same as what it now accomplishes. The answer being sought is one that identifies the function or functions that the item is supposed to perform. These functions, reduced to a verb and a noun description to provide clarity, are another power of VE.

The natural creativity of people on the study team is brought out in the job plan's second phase, Speculation. Several methods are used to stimulate the generation of ideas as al-



ternatives for performing the basic function. These ideas are reviewed with care and serious consideration is given to each one during the third phase, Analysis. A few choice alternatives are then worked up in detail during the Development or fourth phase of the VE Job Plan. The idea that shows the best promise for technical and economic feasibility is proposed for implementation. This last or fifth phase is the Report phase. The finished proposal is presented to those responsible for making decisions necessary to put it into effect.

CONTRACT CLAUSES

The Federal Government has led the way in contractual VE with the Corps of Engineers and the General Services Administration (GSA) as the chief users of VE incentive clauses in construction contracts. The General Accounting Office (GAO), the top fiscal investigative arm of Congress, recommended recently that all federal agencies adopt a Value Engineering incentive clause to be included in all contracts for \$10,000 or more. The GAO also urged a more intensive promotional effort to encourage VE change proposals from both contractors and subcontractors. GAO leaves little doubt as to its endorsement of the VE incentive system by which contractors can propose cost-saving measures and share in the dollar savings derived therefrom. These shares under the GSA clauses, as an example, provide 50 percent of the savings to the prime contractor originating a VE proposal, and for a subcontractor-initiated proposal, 30 percent for the sub and 30 percent for the prime. Those outside the Federal Government also recognized its value, i.e. American Telephone and Telegraph, a major building owner, now asking for VE management for all construction among its twenty-four Bell systems.

Although the incentive clause is titled Value Engineering, the application of the formal VE technique is not required in order to submit a cost reduction proposal under the clause. It is also not required in order to submit a cost reduction proposal that an engineer carry out the VE studies or to submit a VE change proposal.

ADVANTAGES IN USING VE

If the application of VE is not required, why all the noise about VE? It has been demonstrated that using the VE method is very effective and can result in significant savings. The application of VE results in reduced cost, but cost reduction is not necessarily VE. Typical cost reduction activities often result in item cost reductions ranging from 10 to 25 percent. In comparison, it is not unusual for VE reduction to range as high as 75 percent or more. An extensive study made a decade ago showed that on the average, a saving of \$10 could be expected as a return for every \$1 invested in VE activity. A more recent study has shown that that ratio is still valid. The \$1 is for managing a VE program which includes training and engaging in VE studies. One cannot logically deny the value of VE techniques, but management should realize that both time and money must be allocated to VE if results are to be achieved.

Value Engineering potential should be considered as bids are prepared. Check to see if a VE incentive clause is in the bid package. If it is not, push for its inclusion in the contract. The existence of the VE clause should not alter the bid. Estimators, suppliers, and subcontractors should be asked to point out potentials for VE immediately following contract award. The effort to do VE should be done early. Discovery later in the



contract of construction features where costs could be drastically reduced may not permit you to take advantage of Value Engineering because of the lack of time. Some of the clues for VE potential are unnecessary requirements and features, high-cost materials, difficult construction methods, high labor cost items, and outdated material and equipment items.

The area of mechanical equipment is especially ripe because VE is an especially effective way to get new products into a project. The specified equipment may have been arrived at by a "seat-of-the-pants" evaluation, or a limited catalog search or simply by tradition. The VE approach is to question *everything*, even back to the design criteria. In the opinion of the Board of Ethical Review of the National Society of Professional Engineers, it is not unethical for engineers or others employed by the contractor to present changes in engineering designs, plans or specifications prepared by the design engineering firm, such as would occur under a Value

Engineering incentive clause (based on Case No. 68-6).

To make VE really work for you, you should get training for your team. Also, you could temporarily hire a value specialist to lead the team. The training is usually obtained from VE consultants, although there are some schools that offer it. The Society of American Value Engineers has established a program of certification of value specialists. This was done to assist the public in identifying those individuals with a recognized level of knowledge and experience in value work.

The climate is right to negotiate a sharing arrangement for cost reduction proposals in contracts that don't initially have such a clause. The customer would like the contractor to use VE and so should the contractor, so that the larger benefits can be realized by both parties. Furthermore, if the contractor sees an area where cost reduction can be possible, he is encouraged by the VE clauses to submit a proposal, even though he may not use formal VE techniques to develop it.



Bulletin

Listening to Our Customers

To succeed in this industry, we all require feedback from our customers in order to change and/or improve. The objective is to get those customers talking. We have outlined a diverse list that will give us that opportunity. When we ascertain what our customers expect, we can attempt to meet those expectations. COMMUNICATION plus ACTION equals SATISFACTION.

INTRODUCTION

This bulletin is the result of a "Customer Service Survey" sent to the MCAA membership by the 1999 Management Methods Committee. The reply received most frequently in the survey was that "meeting the customers expectations" was the most important factor in customer satisfaction. This reply was the "bridge" which led to the development of the "Listening To Our Customers" bulletin.

A successful mechanical contracting company constantly seeks ways to enhance business operations by encouraging honest feedback from customers. Whether it is with a follow-up survey, telephone call, personal visit or post-job review, the best way to increase efficiency and profitability, and to demonstrate added value, is by "*listening to our customers*".

Customer expectations and satisfaction are important factors in the success, or failure, of any business. This bulletin will identify four different categories of customers -- Service, Design-Build, Industrial, and Bid/Plan & Spec -- and suggest ways to improve communications with each group. The bulletin identifies

the customer, addresses suggested approach strategies, specifies tools to increase marketability and offers ways to assess customer satisfaction after the project. An important reminder to all contractors is that they should not conduct a customer satisfaction survey unless they are prepared to take action on the results.

THE SERVICE CUSTOMER

The mechanical contractor that wants to expand into the service market must develop a service plan that suits not only their own needs, but also more importantly, one that satisfies the needs of their customers.

For the traditional "tools and materials" service work, the standard methods of marketing (i.e. Yellow Pages, completed newspapers, flyers, radio, etc.) can get one into the business. To retain customers and successfully enter into longer term service and preventative maintenance contracts, a personal relationship with your customers must be cultivated along with implementing methods of continuous communication and feedback (i.e., follow-up surveys, phone calls, personal visits, etc.).

To be a truly successful service contractor in the future you must become a valuable resource for your customer and meet their expectations...*expectations defined by them.*

Who is a Service Customer?

- Government agencies
- Industrial customers
- Health care providers
- Commercial customers
- Retail customers
- Consulting engineers and architects

Approach to Service Customers

- Provide a diversified group of technicians fully equipped to handle a wide variety of applications.
- Ability to provide service 24 hours a day, 7 days a week.
- Provide adequate support infrastructure including administrative, sales and engineering personnel.
- Computer systems for monitoring client systems and service management programs for dispatching, invoicing, preventative maintenance programs, etc.
- Obtain necessary licenses, bonding and insurance.

Tools for Marketability

- Timely response to service requests.
- Competent technicians.
- Diagnose and solve problems.
- A wide variety of services offered (Total Systems Responsibility)
- Design/build services.
- Flexibility in adapting to customer's business policies and procedures as they pertain to budgeting quoted projects, T & M work, etc.
- Solicitation of prospective customers through cold calling, employee and customer referrals, account development of existing construction customers.

- On new design build or plan/spec projects have service group handle the equipment start-up and/or building commissioning.
- Introduce your marketing group to the owners.

Suggested Questions to Get Your Customer Talking

- Was our dispatcher courteous and helpful?
- Was your billing accurate and timely?
- Was your problem(s) communicated properly to our technician?
- Was our Account Executive courteous and professional?
- Was the knowledge and skill of our salesperson up to your expectations?
- Did the sales staff offer professional advice?
- Were our quotes delivered in a timely fashion?
- Was the attitude/helpfulness of our salesperson professional?
- Was the skill level of our technicians professional and up to your expectations?
- Was the attitude of our technicians professional?
- Was the job conducted in a clean and efficient manner?
- Did the technician work in a safe manner in relation to himself and others?
- Was the communication of any findings and recommendations clearly explained?
- Did we respond to your needs in a timely fashion?
- Was the cost of service comparable to your perceived value?
- Did we meet your overall expectations?
- And, always be open to additional comments by the customer.

THE DESIGN-BUILD CUSTOMER

The mechanical contractor who is either trying to expand into the Design/Build market, or to strengthen his involvement in this market, will have the most success when he can develop a personal relationship with his customers. This requires personal contact, relationship building (and trust) and follow through after performance to be successful. The points and questions that follow are tools to utilize during this process. The more long term thinking that is applied to solving your customers' needs, the more successful you will be.

Who is a Design-Build Customer?

- Public or private owners
- General contractors
- Owners

Approach to Design-Build Customers

- When trying to learn more about a design-build customer, the best method is with a personal interview.
- The design-build approach to construction is best applied when a contractor can develop a relationship of trust between himself and the contractor.
- When a trusting relationship is developed, the design-build contractor can focus on the customer and his needs and not spend a great deal of time "selling" the process.

Tools for Marketability

- Ability to perform project mechanical design.
- Ability to responsibly subcontract a projects mechanical design.
- Ability to responsibly project budget and work with project mechanical consultant to assure design to assure design stays in budget (design/assist).

Suggested Questions to Get Your Customer Talking

- What was your assessment of the value received on the project?
- Did the project meet your expectations?
- Were you able to use the facility when we promised it would be ready?
- Did you receive a quality project?
- Are there any problems that have developed after you began using the facility?
- If another similar project were to come about would you use our company?
- Would you recommend us to another company starting this process?
- Do you feel that this process delivered the project earlier and at a reasonable cost as compared to the conventional design, bid and build process?
- And, always be open to additional comments by the customer.

THE INDUSTRIAL CUSTOMER

The mechanical contractor performing industrial work must be dedicated to the 24-hour needs of an industrial plant. The company needs to be capable of assisting the client in solving problems and flexible enough to work with several plant engineers at the same time. Being a "total system responsibility" contractor will be a great asset.

The greatest successes are achieved through the development of personal relationships. This requires personal contact, relationship-building (and trust) and follow-through after performance. The more long-term thinking that is applied to meeting the industrial customer needs, the more successful you will be. The following points and questions are tools to use in developing the industrial market.

Who is an Industrial Customer?

- Manufacturing firms
- Research laboratories
- Government agencies
- Water treatment plants
- Utilities
- Petrochemical plants

Approach to Industrial Customers

- Most industrial plants work 365 days a year. Contractors servicing these plants must be committed to their shifts and schedule.
- Must be available when the customer calls and have people that can respond nights, weekends and holidays.
- Have a list of suppliers where you parts can be found on an emergency basis.
- Must have adequate insurance coverage.
- Must be able to offer assistance in design and layout of piping and HVAC systems.
 - 1) Engineering
 - 2) CAD drawing
 - 3) Specifications
- Must be able to work effectively, efficiently and safely without impeding plant production.

Tools for Marketability

- Most industrial plants will not allow a company to work in the facility if their experience modification rate is over 1.0. Also, the total OSHA recordable frequency rate needs to be 7.0 or less.
- Customers look for safety programs that include:
 - 1) Weekly toolbox talks
 - 2) Investigation of all accidents
 - 3) An in-house drug testing program

Suggested Questions to Get Your Customer Talking

- Did we respond promptly to your needs?
- Was our safety program carried out to your satisfaction and did we follow all of your safety rules?
- Was the attitude of our employees professional?
- Did our employees communicate clearly?
- Can we negotiate your next project?
- And, always be open to additional comments by the customer.

THE BID / PLAN & SPEC CUSTOMER

The mechanical contractor who bids on plan and spec work is in a unique market. The owner/user may have little or no choice about from whom they procure their construction services. The most common exceptions are eliminating:

- 1) bidders who have failed to meet the qualifications of the bid applications; and,
- 2) contractors who have failed to perform for the specific owner on previous projects. The greatest success will be achieved through an in-house process that confirms that all the owner's prerequisites are met.

Who is a Bid/Plan & Spec Customer?

- Government agencies
- Engineering firms
- Architecture firms
- Private sector
- General contractor/construction manager

Approach to Bid/Plan & Spec Customers

- Usually the government agency must take the low bidder.

- Bids are due at a very specific date and time.
- Negotiations are rarely entered into.
- Projects out for bid are normally advertised.

Tools for Marketability

- Pre-qualification must be up to date with any public agency that has this requirement.
- Licenses must be current with any public agency that has this requirement.
- Review trade publications that identify jobs out for bid (i.e., F.W. Dodge Reports).
- Contact engineers about upcoming projects and be sure to be put on bidders list.
- Contact Owner / Architect / Engineer immediately upon knowledge that you are a low bidder. Provide decision-maker with documentation showing you are qualified.
- Meet any specific public agency requirements.
 - 1) Insurance modification rates
 - 2) Insurance limits and meeting specific government insurance specifications
 - 3) Bonding
 - 4) MBE/WBE participation
 - 5) Affirmative action

Suggested Questions to Get Your Customer Talking

- Were submittals timely and accurate?
- Did the construction schedule meet the contract requirements?
- Did our supervisory personnel perform adequately?
- Did we adequately supervise our subcontractors?
- Did we comply with your construction site safety regulations?
- Did we exhibit integrity and business ethics?
- Did we comply with all applicable labor relations' requirements?
- Was the attitude of our employees professional?
- Was the job conducted in a clean and efficient manner?
- Was our safety program carried out to your satisfaction and did we follow all of your safety rules?
- Was the communication of any findings and recommendations clearly explained?
- Did we respond to your needs in a timely fashion?
- How would you rate our overall performance?
- Can we negotiate your next job?
- And, always be open to additional comments by the customer.



Bulletin

Public Relations: An Important Marketing Tool For The Mechanical Contractor

INTRODUCTION

One area of most startling change in recent years has been the growing role of creative marketing in achieving recognition and success for the mechanical contractor. Until recently, executives of many companies refused to concede that every contractor, regardless of size, must be persistently promoted.

But in recent years, economic pressures, coupled, with newly uncovered sophistication and the rejuvenation of heightened competitive instincts, have convinced an increasing number of mechanical contractors that they now face a rare moment to tell the public, the government and the industry their impressive story of accomplishment, capabilities and convictions. Like the rest of us, they also have an immediate and serious obligation to contribute to the preservation of our free enterprise system, and they can easily achieve these worthwhile goals within the understandable restraints of time, energy, expertise and resources with the resultant benefits of

new and renewed customer confidence and enthusiasm.

If management is genuinely committed to sound expanded marketing and if it seeks the help of legitimate, creative public relations counsel already experienced in and sensitive to working with such a client, the contractor surely can realize abundant dividends from this investment, not only in terms of additional assets and goodwill, expanded exposure and a more satisfying business climate, but also in the fulfillment of a better standard of living for customers and employees alike. This valuable assistance does not have to be expensive, and it can successfully supplement your internal marketing ability.

SELECTING A PUBLIC RELATIONS CONSULTANT

Your company, regardless of size, must carefully select its public relations consultant . . . ideally an individual or firm that has broad



contacts, imagination, independence, integrity, knowledge, reliability, respect, self-confidence, a variety of services and talents—and perhaps most critically, a special and refreshing brand of finesse and vitality for handling your industry.

In return, your counsel should ask that you and your employees fully cooperate with him; that you first sanction an honest appraisal of your present image; that you solicit and ponder his expertise and judgement; that you take him into your trust; that you candidly concede your own imitations; that you encourage bright ideas; and that you allow his efforts sufficient time to bear fruit. Do not expect him to invent instant miracles to compensate for years of lethargy in developing and retaining customers.

MANAGEMENT'S PR ATTITUDE AND DEDICATION

After many years of working with clients in the construction industry, my associates and I are convinced that while a client's budget in some cases may be prerequisite to the impact of a marketing program, the real key is attitude—your attitude. Lavish finances simply cannot assure success unless the thrust receives highest priority.

Responsible public relations historically has always been utilized by the industry. Its justification is to challenge, to educate, to motivate, to serve . . . and in the process, to gain valuable visibility for your company, large or small, as an attractive instrument to help the public satisfy critical mechanical contracting requirements. Subtly tell your story—and customers readily stream forth. In countless cases, working as a team, public relations and advertising have substantially contributed to the growth—if not the survival—of the busi-

ness community. A huge budget is not required . . . just determination, innovation, consistency and vision.

PUBLIC RELATIONS AS A CRAFT

As a well polished and highly influential discipline, public relations has a mandate to show the client those tested techniques that can most effectively work for him. Our craft is alert, responsive, versatile. We must play to your strength; no need to respect marketing weaknesses. Let public relations express itself to you in many viable ways:

1. **General Publicity.** You and your executives can be interviewed on radio and television, and in newspapers, trade publications and magazines. They can author articles which should be reprinted and distributed. Do not overlook airline, alumni, city, corporate, consumer, foreign, fraternal and special interest magazines; "letters to the editor" sections; syndicated columns; graphics; brochures; seasonal letters; and mailing inserts.

2. **Government Involvement.** Where legally permitted, your reputation, assets and talents should be selectively channeled into support of political candidates, causes and parties. Get to know local, state and national elected and appointive public officials. Where appropriate consider a government appointment for important contacts, experience and exposure. Testify on behalf of your company or industry before administrative and regulatory commissions, government panels, and legislative committees. Make yourself available to government agencies and lawmaking bodies as expert counsel.

3. **Public Speaking.** The platform can help you attain precious credibility, visibility, personal development, and new business. Be



encouraged and trained to address prestigious groups, conventions, and conferences, forums, civic and philanthropic and youth clubs. Initiate, confirm and help plan engagements. Participate in news conferences. Tape speeches for radio and television. Reprint and distribute manuscripts. Invite community leaders to hear messages. Edit speeches into newspaper and magazine interviews and articles. Nominate best texts for awards and other recognition. Make certain that following every speech, each contact is followed up. The true value of an engagement is not simply the 30-minute speech but also all of the marketing activities which you can then schedule around it.

Public speaking, by the way, does not have to be a miserable ordeal. On the contrary, a growing number of contractors are not only enthusiastically acknowledging lecture requests but are actually seeking them out, and having fun fulfilling them. Influencing others, on behalf of your company and the industry, is rewarding.

If you need to improve your speech content and delivery, consider speech training. Learn how to organize cohesively and then communicate your thoughts before unfamiliar audiences, how to respond to unexpected questions from the floor, how to express your personality in a one-to-one relationship before and after an appearance, how to be courteous, prompt and resourceful in writing to the curious and concerned in an audience. Learn how to deal with the unpleasant.

The modern executive learns that a speech must be conceived, developed and rehearsed repeatedly to be polished. He learns to detect accurately the frequency and depth of the audience's laughs, tears and applause. He learns to make sure each listener hears, understands and reacts to the message.

His material must reflect contemporary rhetoric, convincing logic, concise organization, honest and substantial investigation of fact, sincerity of purpose, a spirit of optimism, and a genuine appeal to the listener to react. He must resolutely ignore the temptation to be crude, insensitive, offensive, pornographic or vulgar. The speaker must remember that his appearance, credentials, personality, temperament and overall conduct before an audience are just as critical to success as what he says and how he says it.

Improvement comes to the man who diligently and readily reviews each of his speeches. He should go over his notes, encourage listeners and lecturers to critique him, and analyze closed circuit television broadcasts, motion pictures and tape recordings of presentations. He should grab every opportunity to speak. Experience perfects skills of composition, delivery and timing. And with these skills, you can contribute immeasurably to your own personal and professional effectiveness as well as to a sounder understanding of our economic tenets and, more specifically, of your industry.

4. Civil Participation. Perhaps today more than any period in our history the mechanical contractor is becoming increasingly aware of economic, political and social frustrations, and is equally determined to share in civic activities, which at best may only indirectly relate to revenue and profits.

Because of mounting vicious attacks on business, and because our way of life is always susceptible to collapse from within, every mechanical contractor has an absolute charge to pitch in and help preserve our heritage; cleanse and guarantee the climate of opportunity; safeguard our liberties; revitalize our drive and determination; and strengthen



our national purpose. This is a burden, but commitment to the future is a burden that simply cannot be ignored. As in the past, why do we today not stand tall, proud, unafraid, unashamed and rekindle that positive attitude that earned America its envy, admiration and plenty?

For example, you and your management should seriously consider joining suitable Chambers of Commerce; charitable, cultural and youth organizations; industry and professional associations; and service clubs, and then work to assume leadership roles. You should also carefully weigh becoming a trustee of churches, colleges, foundations, hospitals and school boards. You can learn how, when, where and why to apply prudently your strengths in service to others while, at the same time, becoming acquainted with those who may enhance your company's growth.

5. Philanthropics. Assign a reasonable schedule of annual contributions. In some cases, tasteful publicity and recognition can be arranged at the time of gift presentation. A meaningful relationship can often be comfortably cultivated between you and the recipient. Corporate donations should be augmented by branch allocations. How about local fellowships and scholarships, a gift to the community, volunteers for United Way, sponsoring a Boy or Girl Scout troop, management guest lectures at the university, supervising a teenage Junior Achievement corporation, dialogue with the inner city, or counseling with senior citizens?

6. Special Events. Such significant events as anniversaries, dedications, employee additions and promotions, ground breakings, holiday observances, customer and company milestones, and office expansion

or relocation should be planned and promoted. It is all too easy to ignore these activities. To recognize, organize and publicize them, however, is in each instance to afford you one more excuse to create momentum and to suggest progress and prosperity.

7. Public Recognition. An executive, or other employee, having accomplished or contributed generously to the betterment and stability of community or industry, can rightfully be recommended for special tribute, such as a commemorative or congratulatory resolution, Congressional Record insert, Freedoms Foundations or other patriotic award, government recognition, honorary degree, or "Man or Woman of the Year" designation. Your public relations consultant or staff can instigate and supervise arrangements, presentation and publicity in the expectation that well-deserved acclaim will motivate the recipient toward greater heights of achievement; give authority and prestige to your endeavors; and challenge others to emulate your example. The company itself can similarly be honored.

8. Business Image. You and your employees can also achieve critical visibility and impact your customers and prospects by mastering such fundamentals as how and where to mix well socially; the art of meaningful conversation; proper dress; attractive office decor; gracious entertaining; knowledge on current topics; as well as the impact of a handshake, kind and prompt letter, warm word, smile, pleasant telephone call, friendly staff, thorough follow-up, and the proper handling of consumer complaints and concerns.

Imaginative, functional, forthright and discerning public relations is today within the easy grasp of every mechanical contractor who is seriously interested in marketing its important services to assure a prosperous and



satisfying tomorrow. It is never a question of whether you have an image—only whether that image is good or bad. It is also correct to point out that most of us prefer doing business with the competent—better yet the competent and successful, or at least the association perceived to be a winner.

This exciting new trend toward more creative and intensified public relations for

mechanical contractors offers you, your management and other personnel a precious chance for challenge, gratification and profitability. Indeed, a chance well worth grabbing.

NOTE: Additional public relations concepts are contained in MCAA “Mechanics of Marketing Manual.”



Bulletin

Guidelines to Using Social Media in Your Business

INTRODUCTION

About 10 years ago, a new form of communication came about that made our shrinking world even smaller and more connected. Social media has allowed people to easily, quickly and inexpensively connect with and stay on top of the lives of friends and family locally and around the world. Social media has also greatly expanded opportunities for businesses to promote their products and services at minimal or no cost to an audience as small or as large as they wish and can reach. It's a brave new world of communication!

As with any new phenomena, however, traps await the uninitiated and unaware, generally resulting from the fact that making available and sharing too much information is not always a good thing. All of the social networking services available grow and thrive because they encourage users to openly promote themselves, their daily activities, social relationships and their opinions about people and issues. Depending on the situation, that openness may work for or against you.

This bulletin provides guidance to those companies who choose to use social media services to promote their

business or connect more closely with employees, clients and customers.

Before using social media in your business, however, it is strongly recommended that you consult with your company's attorney to be sure you fully understand the legal concerns and how to avoid potential liability. Using social media in employee selection or performance evaluation or disciplinary proceedings is fraught with legal issues and companies should proceed with utmost caution.

WHAT IS SOCIAL MEDIA?

Social media are Internet-based services that allow users to exchange personal information, photos and videos and messages with other users, usually family and friends, or in a business situation, or with employees and customers.

Facebook

In February 2004, a Harvard University undergraduate student created a powerful new way for people to connect and communicate socially. **Facebook** became almost an overnight sensation by offering users an easy, convenient way to stay on top of each other's lives

through the Internet. The service allows users to post personal information in a “personal profile,” photos and videos and exchange messages with their group of “friends.” Facebook also offers users the option of joining common interest groups, such as through work, school or sports teams. Today, Facebook has over one billion users worldwide.

(<http://en.wikipedia.org/wiki/Facebook>)

Twitter

In 2006, **Twitter** entered the social networking arena. It allows users to send and receive brief messages—up to 140 characters—called “tweets.” Unlike Facebook, Twitter allows unregistered users to read tweets, and registered users can post tweets on the Twitter website or through several cell phone applications or “apps.” The service is gaining popularity rapidly; it currently has 140,000,000 users.

(<http://twitter.com/about>)

LinkedIn

LinkedIn is a social networking service for professionals; in a sense, it transforms a person’s professional network into an online network. Created in 2002, it allows users with common business interests or connections to link up and stay in touch about business issues, new job opportunities and more. Subscribers receive invitations from other subscribers to join their network. Currently, LinkedIn has more than 150,000,000 subscribers.

(<http://learn.linkedin.com/what-is-linkedin/>)

MARKETING IS ALL NEW AGAIN

When it comes to marketing a company’s brand, products and services, the Age of Aquarius is upon us. Social media marketing is a lot cheaper and more nimble than print, radio and television advertising, but it

also requires more hands-on maintenance to keep the message fresh and engaging for the intended audience.

If you decide to point your company’s marketing strategy in the social media direction, it is strongly suggested that you hire an expert in this area, or an agency of experts, to help you. Be aware of the opportunities and limitations that social media offers, and have ready some ideas about who you want to reach and what actions you want the audience to take to guide the experts’ thinking about how best to represent and promote your company’s interests. Consider these simple guidelines when you’re starting to plan your strategy:

- **Define your audience:** Most users of social media tend to be younger (teens to 30 somethings), but the older generation is catching on. Deciding on who you want to reach—the demographics of your audience—and what actions you want your audience to take will quickly define the options for your marketing plan.
- **Do your homework:** Social media is one of the places where one size does not fit all. Different audiences use different sites and different marketing strategies work differently with different audiences. Once you’ve defined your audience, then investigate what kinds of content and presentation approaches work best for them.
- **Care about sharing:** Keep an open mind about different ways to present your message that will inform and...yes, let’s be up front about it...entertain your audience. Social media users like to share intriguing information—that’s why videos of dancing cats and giggling babies get a lot of attention on morning television

talk shows—but a clever video or a colorful graphic that shows off the best characteristics of your company and/or its products and services will get the kind of attention from your current and potential customers that can build your business. The word will get around.

- **Interact with your audience:** Unlike traditional print and broadcast advertising, social media ads can and do invite immediate comments from users. Their interactive features are what make them so powerful as a marketing medium. Supposing you decided to announce your company's latest product or service offering. A flat statement may draw interest from your audience briefly, but including a video demonstrating the new product or service *and* inviting comments make that ad more engaging and interesting.
- **Blogs are ads too:** Blogs are online diaries authored by a single person, usually around a theme. The best blogs invite comments from viewers, which keeps the blog interesting and provocative. If you choose this option to promote your company and its offerings, be prepared for good and not so good comments. Use the good comments as testimonials on the quality of your offerings, and use the criticisms to guide improvements. By welcoming and acting positively and proactively on all comments, you will build relationships and trust with your intended audience.
- **Keep your cool:** You can control the message going out, but you can't control the input from your audience...or who else they may be sharing that input with. Know this going in and be

prepared should you receive an unfavorable comment about your company, its offerings or its performance. Have a plan in place that clearly spells out what steps who should take by when...and enforce it.

- **Decide who “speaks” for your company:** Not every employee of your company is best equipped to represent it in a social media advertising campaign. Decide what qualities about your company you wish to project and who is best suited by knowledge, experience, temperament and other characteristics to fill the spokesperson role. Once the decision is made, stick with it. That person will become the “gatekeeper” of what goes out and comes in to the company's social media sites.
- **Fresh is best:** Do not let your company's social media site and/or message become stale and stagnant. Keep new ideas and information flowing to keep your audience engaged and coming back for more. Remember what you've learned about your intended audience and what kinds of messages and approaches work best on them. Your media experts will know best how often to change messages or content delivery options to keep audience interest peaking.

These are just a few basic tips to help you sort out what needs to be done should you decide to take the plunge into social media to market your business. At the end of this bulletin, several online sources are listed to provide you with even more information and guidance in this area. For more information, go to <http://www.topRankblog.com/2011/12/20-social-media-dos-donts>

EMPLOYEE RECRUITING ISSUES

Current news is replete with stories about how employers are using social media sites to vet job applicants' personal and professional backgrounds. Those stories become even more interesting when an employer discovers unflattering or conflicting information about an applicant that may affect his/her suitability for a position. Depending on how those background searches are conducted and how the resulting information is used, the employer could face legal difficulties.

Background checks using social media sites are legal if they are job-related and are conducted in accordance with the provisions of the Fair Credit Reporting Act (FCRA). If negative information about a job applicant is uncovered in a background check using social media, the employer must:

1. Notify the applicant should he/she lose the position as a result of that negative information; and
2. Identify the source of that negative information (i.e., Facebook, Twitter, LinkedIn) so that the accuracy and completeness of the information may be verified by the applicant.

Other considerations when using social media as a recruiting practice or applicant screening or evaluation device:

- **DON'T** require a candidate to provide passwords to a social media site or "friend" the employer or other company staff. The practice is not currently illegal in most areas of the country, but the legal landscape is beginning to change. Maryland has a

measure prohibiting employers from requiring such information of job applicants and employees, and other states are considering similar proposals. Nevertheless, the privacy considerations make this an area that's best left alone.

- **DON'T** use false identification to gain access to a candidate's social media site.
- **DO** assign another staff person to conduct the social media background check on the applicant and direct him/her to *report only job-related information* after the applicant's qualifications for the position have been verified.
- **DO** a complete background check on the applicant using sources other than the social media network.

Consult with legal counsel on any planned use of social media for recruitment, applicant screening and evaluation or current employee performance as the law is rapidly changing in those areas with respect to privacy and other employment policies. For example, some employee postings about the company could be construed as protected concerted activities under the labor laws. Also, form responses to recruiting may be considered applications for employer recordkeeping requirements.

For more information, visit <http://www.hrmtoday.com/>.

EMPLOYEE USE/MISUSE OF SOCIAL MEDIA

When an employee chooses to publicly "vent" his or her opinions about a company's products, services or business practices on a social media site, it is not unexpected that he or she may face disciplinary actions, especially if

such behavior is expressly prohibited in a company's human resources policies. From the perspective of the employee, consider that free speech is protected in the U.S., and the National Labor Relations Board (NLRB) is in place to investigate employment actions that may impinge on an employee's rights, including when an employee speaks openly about his or her employer on a social media site.

The NLRB has taken an aggressive position when investigating these cases. See an NLRB statement issued on January 25, 2012

(<http://www.nlr.gov/news/acting-general-counsel-issues-second-social-media-report>):

- Employer policies should not be so sweeping that they prohibit the kinds of activity protected by federal labor law, such as the discussion of wages or working conditions among employees.
- An employee's comments on social media are generally not protected if they are mere gripes not made in relation to group activity among employees.

Below are some considerations as you shape your company's social media policies:

- **Employees' free speech is protected...**When employees complain about working too many hours of overtime or being overburdened with tasks and impossible deadlines, their right to voice those complaints in the office or on Facebook is a basic right that's protected by our Constitution
- **...with limitations:** Employee comments posted on a social

media site that disparage or slander other employees or disclose confidential company information are not protected.

- **Think before you act.** Whether you are an employer or an employee, think about the possible consequences of acting rashly. If you are an employee, venting your frustrations with your employer online for all the world to see may not be protected. And, if you are an employer, terminating that employee may prove more costly than less harsh disciplinary actions.

Below is a thoughtful article about some related employee social media issues. (<http://jobsearch.about.com/od/onlinecare/ernetworking/a/violating-company-social-networking-policy.htm>)

EMPLOYER...PROTECT THYSELF

If your company's employee policies have not been reviewed and updated recently to address its use of social media, now is the time to get it done. Work with an attorney who specializes in this area to determine whether the policies address employee use of social media, actions that are allowed and when, and those that will result in disciplinary action.

If you determine that your company's employment policies need to address social media use or they need adjustment in this area, consider whether the following is addressed

- Employees' social media interaction that is subject to company policies;
- Who has responsibility for accessing social media for recruiting actions and when;
- Posting of professional references on social media sites ... or not;

- Monitoring of employees' electronic communications using company equipment;
 - When or if social media access is allowed during working hours;
 - When or if social media access is allowed using company equipment;
 - Legal restrictions on use of social media regarding discrimination, harassment and confidentiality of company information;
 - Investigation of claims made on social media sites concerning harassment or discrimination;
 - Security procedures to address employer-sponsored blogs;
 - Procedures to protect the company logo or brand when used on social media to promote products and services;
 - Employees authorized to represent the company on social media sites; and
 - Conduct, practices or procedures used in social media that will result in disciplinary action.
- Consult legal and insurance counsel regarding the development and adoption of all electronic communications policies.
 - Consult with your insurance broker about coverages for electronic and social media concerns, particularly as they relate to unfair employment practices.
 - Ensure your supervisors and managers are informed about and trained on policies and procedures relating to employee use of electronic and social media.

For more information, visit the following online resources:

<http://socialmediagovernance.com/>

<http://www.topRankblog.com/2011/12/20-social-media-dos-donts>

<http://jobsearch.about.com/od/employeeerights/a/fired-for-facebook.htm>

<http://getworksimple.com/blog/2011/12/05/social-media-the-workplace-the-dos-donts>

http://humanresources.about.com/od/careernetworking/a/social_media.htm

<http://www.vistage.com/content-and-connectivity/vistage-library/ten-dos-and-donts-of-social-media.aspx>

http://www.sebrisbusto.com/publications/getEmploymentLawNotes.asp?employmentlawnote_id=0512

CONCLUSION

As stated earlier, social media is a powerful new communications tool that allows us to share our lives and our thoughts with anyone anywhere. It has reshaped the way we think, act and relate to one another, but we should be careful how and when we do so. This is especially true for those in business who choose to bring their company closer to their employees and customers through this communications medium.

Before you embark on this journey, take some cautionary steps to protect yourself and your company along the way:



Bulletin

Creating a Readable Corporate Newsletter

INTRODUCTION

Communication is a must for a modern business. Staying in touch regularly with customers, employees and others who may be interested in your company's products and/or services, upcoming events, or other business developments is critical to your company's growth and success.

Thanks to the availability of myriad print and electronic media, the Internet and social media, companies have many options for connecting with their internal and external audiences. This bulletin focuses on one option—newsletters.

WHAT IS A NEWSLETTER?

A newsletter is a collection of brief articles that interest a defined group of people, such as a company's customers or employees. Most newsletters contain photos or other graphics related to these stories to help visually break up the text.

Newsletters are published regularly (typically weekly, monthly, bimonthly or semi-annually) and may be printed and mailed or created and sent electronically.

A newsletter serves several purposes:

- Informs
- Educates
- Alerts
- Entertains (sometimes)

BACK TO BASICS

Whether you're starting from scratch or rethinking an existing publication, it's always a good idea to consider the basic elements of your publication because they tend to change over time.

Assess the Audience

Is the newsletter strictly an in-house publication for staff or is it shared with customers, equipment suppliers or others? Is your audience older, younger, middle-aged or of mixed generations?

There may be other questions that will help you define the newsletter's audience. Answering them accurately and completely will help you set the newsletter's content and style to build interest in the publication.

Develop a Mission Statement

Your company's newsletter has a purpose, so write it down. Keep it simple—one or two sentences will do. The mission statement will help you maintain control over the content and avoid straying into areas that are inappropriate and uninteresting to the newsletter's audience.

Consider the Content

Defining the newsletter's purpose and audience will help you determine its content. If the newsletter's audience is narrowly defined, the articles should be confined to the information that will

interest and appeal to that audience. For example, a newsletter for your sales team might include fast-read articles with selling tips, sales projections and goals and information about upcoming meetings. A more general audience, such as your entire staff, might be interested in articles about staff changes, benefits policies, programs and other corporate developments. And, your customers may be interested in articles about staff changes, new products and services, incentive programs and discounts, and your company's other projects.

When choosing the subjects for the newsletter articles, be careful not to stray from its purpose. For example, if the publication's purpose is to inform customers about new products, it is not appropriate to include announcements about upcoming internal meetings.

Develop a Budget

A newsletter's budget will be influenced by a number of factors, including whether the work will be done by staff or external vendors. The company's preferred distribution method (print and mail versus electronic) also plays a role in budgeting. Consider the following questions to see the impact various options will have on your bottom line.

- **Who will create the initial design?** Is there someone on staff who is willing and able to take on this task, or will the assistance of an outside designer be needed?
- **Who will write the content?** Do staff members have the time and expertise needed to write for a newsletter, or will a professional writer be needed to assist?
- **Who will proofread the content?** It is best to have someone with excellent proofreading skills check your newsletter for typographical and

grammatical errors. Never rely solely on automatic spell-checking programs. Content should also be checked for accuracy by those who are closest to the content area (i.e., a sales manager in the case of a sales-related article). This is especially important if you are working with an outside writer who is not familiar with the mechanical contracting industry.

- **Who will select images/charts that complement the content and lay out each issue?** This may be the same person who creates the initial design, or this task may be passed along to someone else in the form of a template with built-in styles.
- **How will the newsletter be distributed?** While electronic transmission is cost-effective, efficient and saves resources, many people still prefer printed publications. Survey your readers to determine their preferences. If they prefer a printed publication and your company does not have high-resolution photos, you would do well to invest in a digital camera. Lower-resolution images will, in most cases, be adequate for an electronic newsletter.

It is important that these decisions be made during the planning phase and evaluated on a regular basis.

Look at How it Looks

Even the best written and most interesting newsletter can turn off a reader if it looks cluttered and/or visually flat. A clean layout, a dash of color and well-placed graphics can do wonders for a publication.

There are many reasons for thinking about the look of your newsletters as well as its content. When doing so, consider the following items.

- **Type style and size** should be comfortable for your audience to read. Most publication experts recommend sans serif typefaces such as Arial and Calibri for headings because they are more attention-getting. These same experts recommend serif-style type (letters with a tail on their end, such as Garamond or Times Roman) for text because they are easier to read. Type size and the amount of space between lines (also called leading) will vary depending on the age of your audience. In general, the older the audience, the larger the typeface or, when smaller typefaces are used, the larger the leading. Smaller fonts (anything under 9 for a younger audience, 11 for an older audience) can be exhausting to read.
- **Consistent typeface**—use one typeface for text and one for headers and subheads. Most typefaces come in “families” that include options like bold, italics, or condensed versions of the type, so you can achieve a number of different looks within the typefaces you select. Using a variety of typefaces for each article makes your newsletter look disorganized, confusing and hard to read. When choosing typefaces, make sure to keep your mission in mind. If your mission states that you publish only business news to keep your clients informed, for example, you will want to avoid casual typefaces like Comic Sans.
- **Color**—even just one color plus black—gives your publication some zing and catches the eye.
- **Graphics**—such as photos, graphs and charts—break up the text and make articles more interesting and readable. Keep in mind when

selecting or developing graphics that, in order to be successful they must work within the context of the story. For example, a story about your company’s recent uptick in sales would benefit from a graph or chart that visually illustrates the information. A story about a current project, however, would be better served with photos of the project.

Keep in mind that your newsletter is not the only publication that your audience reads. Give your newsletter a distinctive look and your audience will want read its content—and look forward to doing so.

The Nameplate

The nameplate is the top area of the newsletter’s front page that presents its name, date, volume or issue number and the company name and/or logo. It sets the tone for the publication, and it’s the first thing readers see when they receive the publication.

It’s okay—in fact, it’s highly recommended—that you choose a clever name for your newsletter. For example, if you are in the pipe welding business, something like *The Pipeline*—rather than *ABC, Inc. Piping News*—is catchy and clever and will spark the attention of your reader.

Be creative when designing the nameplate. Choose a typeface that’s consistent with the typeface you’ve chosen for your headers and subheads. Consider using color and/or reversing out the name (white letters on a dark background). Organize the other information appropriately in the area underneath the name.

The Masthead

The masthead is a list of your company’s owners, departments, or officers and the company’s contact information (address, phone, fax, e-mail and website). It generally includes the

name of the person responsible for the newsletter (the editor) and their contact information, as well as the newsletter's mission statement.

The Format

The format or structure of the newsletter is also important to how well it reads. Important points to consider include:

- **Dimension**—Most printed newsletters are 8 1/2 inches x 11 inches. Electronic newsletters generally follow a standard size designed to work well with a variety of devices.
- **Number of Pages**—The number of pages will vary depending on your audience and the type of news you plan to share. Four to eight pages is a good start. You can always add pages later. If your newsletter will be printed in a booklet format, pages must be added in multiples of four.
- **Columns**—Newsletters are usually one, two or three columns. More than three columns will crowd the page.
- **Margins**—Decide how wide your newsletter's page margins should be, and how much space there will be between the columns. For example, page margins of one inch on all sides and a column margin of 1/2 inch.
- **Justification**—Choose whether your columns are even on the right (justified) or ragged. Justified columns may look neater than ragged right ones, but they tend to spread out the words in the lines, which can become difficult to read.
- **Paragraphs**—Decide whether your paragraphs will start flush left or with an indent. Either is fine, as long as they're consistent.

- **Design Elements**—These include the symbols at the end of articles (wingdings or dingbats), headers and subheads, page numbers (folios), ruled lines, charts and photographs.

Create a Style Sheet

Once you've decided on type, format, nameplate and all the other elements in your newsletter, write them down so others who work with you will have a guide. You may also want to create a template to keep these elements stored for the next edition of the newsletter.

GOING TO "PRESS"

Whether you print and mail your newsletter or send it electronically, keep in mind the following before you publish.

Sweat the Details

No matter how many times you read through the newsletter text, you will miss something. Have someone with a fresh pair of eyes read through it for grammar, typographical and spelling errors. The newsletter is a reflection of your company and the quality of work and/or service it provides. Make sure the publication looks good and reads well.

To Print or Not to Print

Once your newsletter is finalized, it will be reproduced and distributed according to the decision made during budgeting.

If your newsletter will be printed

either in-house on a color copier or outside with a commercial printing press, consider the following:

- Draw up a schedule with deadlines for copy, graphics, proofs and delivery. This schedule should be made in collaboration with the person who will be designing the newsletter (whether a member of your staff, a design firm or your printer's design services). A typical newsletter includes 2–3 rounds of

design proofs for review. These let you check the content for accuracy and completeness. The printer will provide a final proof of the processed files, called a blueline or digital blueline. This is your last chance to make sure that everything is in place and represents your company well. Changes are still possible at this stage; once you sign off on these proofs, printing will begin.

- Submit your newsletter materials to your printer. Each printer's requirements will vary, so it's best to work out the details with your vendor.
- Consider using recycled paper, particularly if your company is highlighting its "green" projects. There are many varieties of paper and the costs vary widely. The "greenest" papers sometimes involve complex chain of custody issues that add to their costs and require additional labeling and approval of your materials. Your printer can provide guidance on the options available in your area. If you choose to use a recycled paper that does not require specific labelling, consider including the recycled logo and text indicating that the newsletter was printed on recycled paper.

If you choose to distribute your newsletter electronically, there are two basic options for distribution.

- 1) Convert the document to a format such as Adobe Acrobat PDF and send it via e-mail.
- 2) Use an online e-mail marketing service such as Constant Contact to design and send the newsletter.

Both options allow your newsletter to be

viewed and navigated on a wide range of devices, including tablets and smartphones, and printed from any computer.

PDF requires that you first design your newsletter using another program, whether standard office software or design-specific software. The document is then easily converted into a PDF file for e-mailing, generally at the touch of a button or two. Keep in mind that some of your readers' companies may have e-mail size restrictions, so your PDF file should be no larger than 2MB.

E-mail marketing services offer a selection of design templates that can be adapted to create the look of your newsletter. These services generally include a "safe unsubscribe" feature that lets users change their subscription options and tracking reports so that you can tell which stories are of most interest to your readers (and which aren't being read at all.)

Regardless of the option you choose, consider sending your newsletter from an e-mail address such as `news@yourcompany.com`, which shows the name of your newsletter or company as the sender rather than an individual's name. This will help differentiate your newsletter from everyday business correspondence.

A consistent subject line will make it easy for readers who like to sort their incoming e-mails into folders. For example, you might use "Your Newsletter's Name for MM, DD, YYYY" where MM, DD and YYYY are replaced with the month, date and year on which the newsletter is distributed.



ABC Pipe Services, 1234 Anywhere Street, My Town, Anystate 01234
Web site address www.abc.com, Phone number 102-555-1234

ABC Wins New Refinery Job

By John Doe

ABC Pipe Services won the pipe welding subcontract for the new Worldwide Petroleum Refinery (WPR) that will be located just outside My Town. ABC CEO Mike Someone received notification of the award at 5:00 p.m. on June 1.

The pre-job conference will take place on July 1 at the office of Jones General Contractors. A meeting of ABC project estimators and managers will take place this week, so watch for the memo.

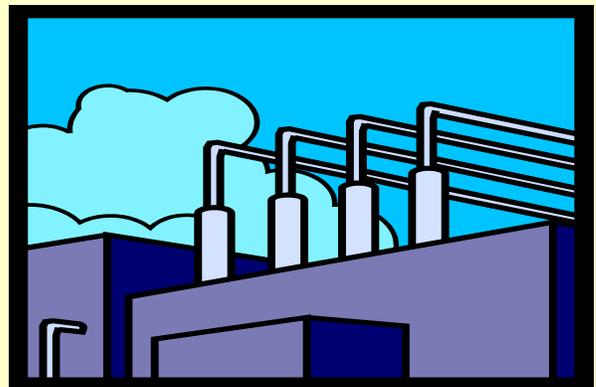
The new refinery will feature state-of-the-art piping systems that will produce approximately 100 barrels of refined petroleum products per day. WPR and Jones GC estimate the project will take three years to complete. The plant will supply WPR customers along the eastern U.S.

The project calls for up to six welders during peak work periods. Project managers and ABC Safety Director Mike Smith will be on hand to keep work flowing smoothly. Foreman Bill Legree will supervise the pipe installation crew.

“Thanks and congratulations to the proposal team for a job well done,” said Someone. ■

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Artist's drawing of new WPR refinery

ABC Breaks Ground on New Pre-Fab Facility

By Chuck Something

ABC started work on the construction of its new pre-fabrication shop last week. The new 10,000 square-foot structure will be located adjacent to the company's main offices.

The new facility will feature the articulating weld boom which won the MCAA 2008 E. Robert Kent Award. The device allows welders to move around the floor while keeping cords off the floor and includes an exhaust hood for venting welding gases. The boom's

features will make the facility a safer and healthier workplace for pipe fabricators.

Construction of the pre-fab shop is estimated to be completed by November 1 of this year. ABC contracted with General Supply Fabricators to design and construct the facility.

For more information, contact Chuck at cs@abc.com. ■



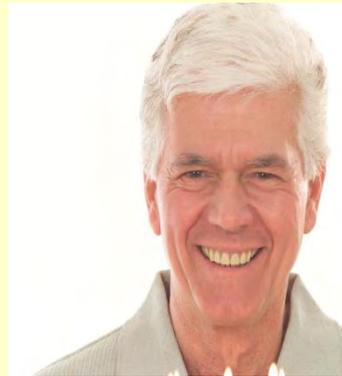
ABC Welcomes New Staff

ABC has just hired two new senior project managers for upcoming projects.

Joe Smith is an 18-year veteran of pipe installation projects for a variety of commercial and industrial facilities. Joe is relocating from the Chicago, IL area. He will join ABC on September 1.

Carl Jones has been a project manager for over 10 years with two Indiana companies. He will also join ABC on September 1.

Please welcome Joe and Carl. ■



Joe Smith



Carl Jones

Benefits Meeting Scheduled

[Note: For employees' newsletter only]

A meeting about changes to employee benefits is scheduled for August 15, 10:00 a.m. – 12:00 p.m. in the main conference room. All employees must attend.

The main subject of the federal Affordable Care Act (aka Obamacare), which will take effect on January 4, 2014. ABC employees are subject to the requirements of this law, and its provisions will be explained during the meeting.

Other benefits to be discussed include sick leave, vacation leave, per diem policies and educational reimbursement policies. Briefing materials will be provided and questions will be encouraged.

The meeting is expected to take about two hours, so be sure not to schedule any meetings in or outside the office during this time. ■



“Mandatory meeting scheduled for all employees on August 15, 10:00 a.m. – 12:00 pm.”



iPads Ordered for Project Managers

All ABC project managers will carry the latest version of Apple's iPads while in the field to stay in touch with ABC management, office staff, customers and owners.

These devices are a convenient way to stay connected with critical personnel for consulting purposes and to check invoices, permit filings, and more without returning to the office. The devices are also handy for reviewing project documents, CAD files, email, the status of equipment deliveries, schedules and upcoming meetings.

ABC management decided to purchase the devices because project managers were using too much time returning to the office on inquiries and other matters that could be handled with an iPad.

The order has been placed and all project managers will receive their iPads in two weeks.



A brief training session has been scheduled for August 10 in the conference room at 1:00 p.m.

Please direct questions to HR Director Joan Smith (js@abc.com). ■

ABC's Employee of the Month – Gary Speshal

Project Foreman Gary Speshal is the ABC Employee of the Month. ABC CEO Mike Someone announced the selection during a meeting of top managers.

Speshal was selected for his overall excellent performance supervising craft workers on projects and continued loyalty to ABC during his 15-year tenure with the company. Mr. Someone noted that, "Gary works hard to ensure craft workers are productive and efficient while they're on the job. He also makes sure they follow safety protocols and hazard avoidance procedures."

Speshal will receive a \$100 American Express Gift Card and one day extra leave.

Congratulations Gary! ■



Gary Speshal (r) examines blue print on a job site.



ABC Pipe Services
CEO and Owner: Mike Someone

The Pipeline
Editor: Joan Smith
js@abc.com

Phone:
111-555-1234 x23

Fax:
111-555-5678

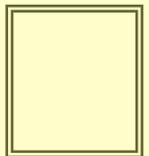
*Your source for ABC Pipe Services
news and information.*

Calendar of Upcoming Events

Pre-Job Meeting	July 1
Benefits Meeting	August 15
New Staff Arrives	September 1
Labor Day	September 2

Company Name
Street Address
City, ST ZIP Code

Note: Mailing Panel is unnecessary for internal newsletters.



Customer Name
Street Address
City, ST ZIP Code



Bulletin No. OT1 Revised
(Replaces 2005 version)
File: Overtime

Bulletin

How to Estimate the Impacts of Overtime on Labor Productivity

Introduction

The cost impact of unplanned extended overtime work¹ may exceed the increased costs of the premium pay associated with an overtime work schedule. This impact comes in the form of reduced worker productivity as compared with the productivity of work performed on a straight-time basis. A mechanical contractor confronting significant periods of unplanned extended overtime work must consider the reduced productivity associated with working an overtime schedule.

A number of published studies attempt to quantify the decrease in labor productivity associated with working extended overtime in the construction industry. This chapter will discuss the most frequently cited studies that have been used to quantify overtime labor inefficiency in the construction industry. The chapter also will set forth some general guidelines for a mechanical contractor's consideration in assessing the labor inefficiency impact of unplanned extended overtime. The principles set forth in this chapter can provide meaningful guidance in estimating the loss of labor productivity arising from overtime in the forward pricing of change orders as well as in a retrospective application.

Previous MCAA publications on overtime inefficiency included histograms that depicted loss of labor productivity data based on various overtime schedules. The histograms published in MCAA's Bulletin Nos. 18-A and 20 were based on the 1947 U.S. Department of Labor Bulletin No. 917, a study of prolonged overtime worked in the manufacturing sector. As several courts and commentators have recognized, the 1947 Bulletin No. 917 has limited application in the construction industry.² As a result, MCAA Bulletin Nos. 18-A and 20 have now been superseded by this version. This current publication is based on more recent studies that provide a basis of estimating labor inefficiencies utilizing data provided by construction contractors or from quantitative data actually measured on construction projects.

Background

Often mechanical contractors are directed by an owner or general contractor to accelerate the work for a variety of reasons. Acceleration can be achieved by adding crews, adding shifts, and/or working longer hours over and above 40 hours a week for the primary crew. This latter form of acceleration is known as "overtime," and the direct costs of this process (i.e., the overtime payroll premium costs) are reasonably

easy to compute. However, the indirect effects of working an overtime schedule can be more difficult to quantify. The primary indirect effect of working an overtime schedule is the loss of labor productivity by the workers performing the overtime work. The added cost in terms of the loss of labor productivity may, as noted above, exceed the direct payroll costs of supporting an overtime work schedule. The subject of this chapter is the added inefficiency costs of working overtime. While the MCAA has not prepared an empirical study within this chapter, the better-known overtime inefficiency studies have been revisited herein and compared, thus allowing the contractor to consider several sources of data in one set of tables.

Overtime inefficiency is the most generally accepted category of labor inefficiency within the construction industry. That is true because virtually everyone who has worked extended hours—executives, managers, technical and support personal, as well as the field labor forces—have personally felt the reduced productivity effects of overtime schedules. These effects can include fatigue, increased absenteeism, increased incidence of accidents, reduced morale, and a more negative work attitude.

While many prime contractors and owners may be willing to pay the mechanical contractor's direct cost of overtime if the acceleration was not caused by the mechanical contractor's delay, the mechanical contractor is much more likely to be denied its inefficiency costs for the overtime schedule. It is essential for the mechanical contractor to establish a range of inefficiencies that may arise as a result of embarking on an overtime work schedule such that payment for the direct costs as well as the inefficiency costs can be reimbursed. This chapter

seeks to provide the mechanical contractor with estimated inefficiency rates for various overtime schedules seen most frequently on construction projects. The percent inefficiency values offered herein are reasonable estimates of the inefficiency impacts that can be sustained by mechanical crews working various overtime schedules. The inefficiency percentages are to be applied to *all hours* worked by a crew performing on an overtime schedule and not just the overtime hours.³

The construction industry generally uses three terms to describe different overtime scenarios: shutdown or turnaround projects, spot overtime, and extended overtime. Shutdown or turnaround projects are those in which a system or plant is completely shut down for the project duration, and due to the production value of the system or plant, the construction schedule is highly compressed (often working 24/7 with multiple shifts) in order to minimize the duration of the shutdown. These working conditions are clearly understood during the bid/proposal process, and the contractor should include the associated inefficiencies in the mechanical contractor's bid or proposal.⁴

Spot overtime is short in duration (from as little as one day to a week) and is generally not planned in advance—it is usually caused by a delay or other unanticipated event that requires the mechanical contractor to make up quantities or finish work that was not completed during the preceding week.⁵ Spot overtime is also normally worked by only a few crews at a time—those responsible for the specific work scope in question. The impact of working periodic and infrequent spot overtime is normally considered negligible in terms of inefficiency effects. As a result, spot overtime is not normally calculated in industry studies that attempt to quantify

the lost labor productivity due to unplanned extended overtime.

Unplanned extended overtime is a condition wherein the entire project, or a significant portion of the project (e.g., all mechanical crews), work an overtime schedule for an extended period of time, sometimes without a planned return to a normal 40-hour week. Experience indicates that a return to a normal 40-hour schedule tends to “reset” the productivity of a crew, such that if the crew returns to an overtime schedule after a week or two of a normal schedule, the productivity loss would “reset” to that of the first week of overtime. Thus, when utilizing any of the data provided herein, it is important to know the work schedule of the crews working overtime. If using a study that shows a progressively increasing loss of productivity over time, should a crew cease overtime and return to a straight time schedule, the crew’s inefficiency upon resuming overtime work must be reset to normal production for the first measured period. Mechanical contractors should ensure that their bid or negotiated proposals clearly state that the base price for the work does not include any overtime, if in fact, no overtime was estimated. If overtime was estimated and its scope exceeds infrequent and limited spot overtime, an inefficiency factor should be included in the price for the work using a prospective estimate of inefficiency described in this chapter.

As previously noted, this chapter does not offer an empirical study based on new overtime loss of productivity data. Rather, this chapter reviews, analyzes, and summarizes four existing studies that have gained recognition in the construction marketplace and have been utilized to prove claims for overtime inefficiency. These studies are:

1) The November 1980 Business

Roundtable publication entitled *Schedule Overtime Effects on Construction Projects* (hereinafter referred to as “BRT”);

- 2) The 1989 study published by the National Electrical Contractors Association (NECA) entitled *Overtime and Productivity in Electrical Construction* (hereinafter referred to as “NECA”);
- 3) The 1997 study published by Dr. H. Randolph Thomas of Penn State University, et al, entitled *Schedule Overtime and Labor Productivity: Quantitative Analysis*, published in the June 1997 *Journal of Engineering and Construction Management*, which was based on data included in a 1994 Report to the Construction Industry Institute entitled *Effects of Scheduled Overtime on Labor Productivity: A Quantitative Analysis* (hereinafter referred to as “Thomas”); and
- 4) The July 1979 United States Army Corps of Engineers publication *Modification Impact Analysis Guide*, Publication No. EP 415-1-3 (hereinafter referred to as “the Corps”).

These studies have been in use in the construction industry for many years and have been generally accepted as reliable measures of lost productivity due to unplanned extended overtime.⁶ Each has its strengths and weaknesses, including criticisms ranging from the use of limited data sources to the withdrawal of reports from publication.⁷ However, the baseline data in any of these studies have never been proven to be inaccurate. Moreover, the concept that a contractor’s work force becomes less efficient as unplanned extended overtime is worked is generally recognized and has never been disproved as an underlying fact.

The four studies presented in this chapter as a basis for estimating a contractor's loss of labor productivity show striking similarities in their results. These studies and the resulting curves are not offered as precise or exact forecasts of impacts. Rather, they are reasonable guidelines to be used to estimate a loss of labor productivity caused by overtime. The courts and boards of contract appeals have clearly set forth the principle that a contractor does not have to prove its loss of labor productivity with mathematical precision, but can offer a reasonable estimate of its damages.⁸ These studies offer just that—a source from which to prepare a reasonable estimate of inefficiency damages arising from unplanned extended overtime.

In some cases a measured mile analysis can be performed that will compute, by use of the contractor's project payroll and field records of installed material, a comprehensive loss of labor productivity comparing actual impacted and non-impacted production on the jobsite. When a measured mile analysis can be performed, such an analysis usually subsumes all types of inefficiency categories on a project. Therefore, if a measured mile labor productivity study is utilized, there is no need for a separate inefficiency analysis for overtime loss of productivity using industry studies.

Discussion of the Four Studies

Business Round Table (BRT)

The BRT is a study of a Proctor & Gamble construction project that experienced overtime during the course of the work. The BRT has been frequently cited as a reasonable guideline to predict loss of labor productivity. While the BRT is sometimes criticized because it is based on only one project, its critics have not

undermined its underlying data. A positive facet of this study is that its data were based upon payroll records of the workers compared to actual units of material installed on the project by those workers. This study provided overtime loss of productivity data over a 12-week period at various overtime intensity levels and demonstrated that, in general, inefficiency increases as the overtime schedule extends in duration.

National Electrical Contractors Association (NECA)

NECA provides the user with various overtime models measured over a 16-week period. The underlying data for NECA was gathered by surveying electrical contractors who were members of the association.⁹ The survey data was compiled and presented as tables and graphs showing expected overtime productivity losses as "Low," "Average," and "High" for each one-week period. These categories allow the user to factor the weekly inefficiency by gradients defining more precise levels of impacts. For instance, if the contractor had been given substantial notice of the implementation of overtime to allow some pre-planning to lessen the effects of the overtime, the contractor could select a "Low" or "Average" impact. Alternatively, if the overtime schedule imposed upon the contractor created havoc on the project site, or if there was stiff competition for overtime on nearby projects, the contractor could select a "High" impact category. Like BRT, NECA demonstrates decreasing labor productivity as the overtime schedule extends in duration.

Dr. H. Randolph Thomas, P.E. (Thomas)¹⁰

Thomas compared various overtime inefficiency data with those independently derived from studies prepared under his supervision. Interestingly, Thomas opined that: "...it

is concluded that the BRT curve is a reasonable estimate of the minimum loss of productivity. For projects experiencing worsening degrees of distress and disruption, the loss of productivity will probably be greater.”¹¹ Thomas tracked labor inefficiency caused by overtime in the mechanical and electrical trades. In order to attempt to accurately isolate the effects of overtime on labor productivity, Thomas removed projects where overtime occurred at the outset of the work, projects that suffered from adverse labor action, and projects on which there were an “inordinate” number of changes in scope or other conditions that would exacerbate the inefficiencies arising strictly from overtime.

Thomas’ comparative curve utilized in *EP 415-1-3*, which contained the Corps’ overtime study, has never been repudiated by the Army Corps of Engineers, but was withdrawn without any criticism of the underlying data used in the overtime inefficiency graph. Thus, the Corps study and curve are included herein to compare its findings with those of other overtime charts.

Presentation of Data

The following charts present the loss of productivity as determined by the four referenced studies. The loss of productivity is presented in terms of a Productivity Index, or PI, such that

$$PI = \frac{\text{Planned Activity}}{\text{Actual Activity}}$$

where Productivity is in terms of work hours expended per unit of work installed. In this case, a PI of 1.0

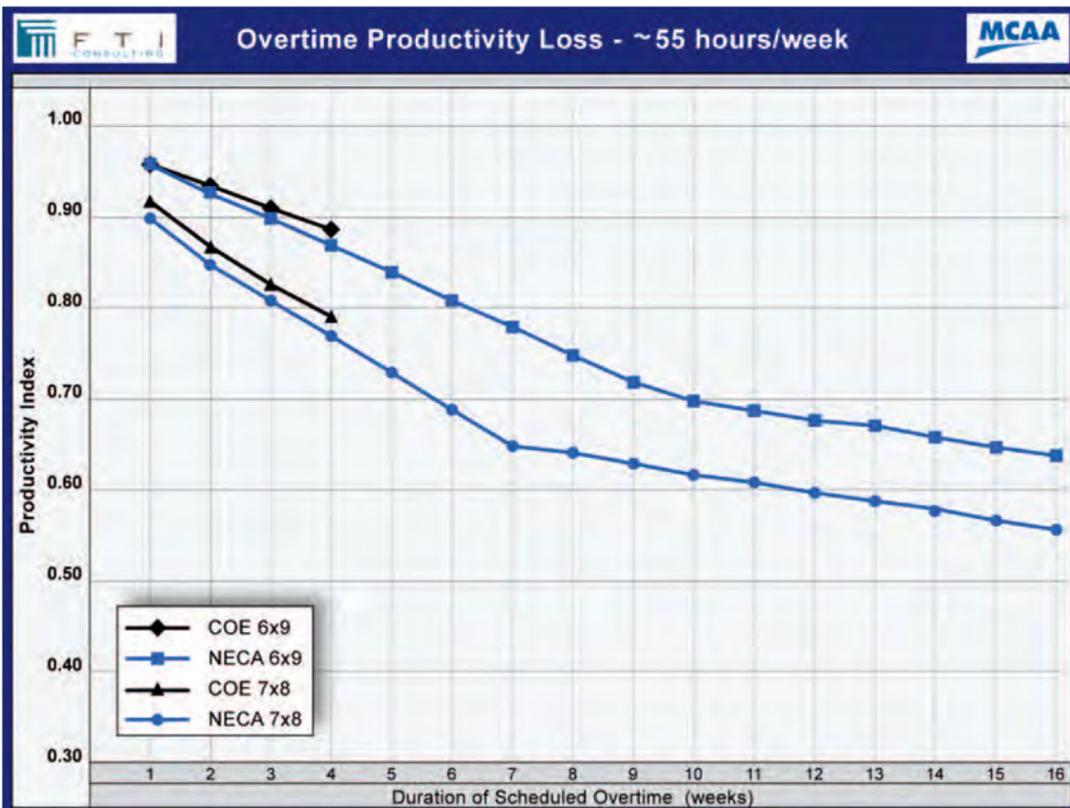
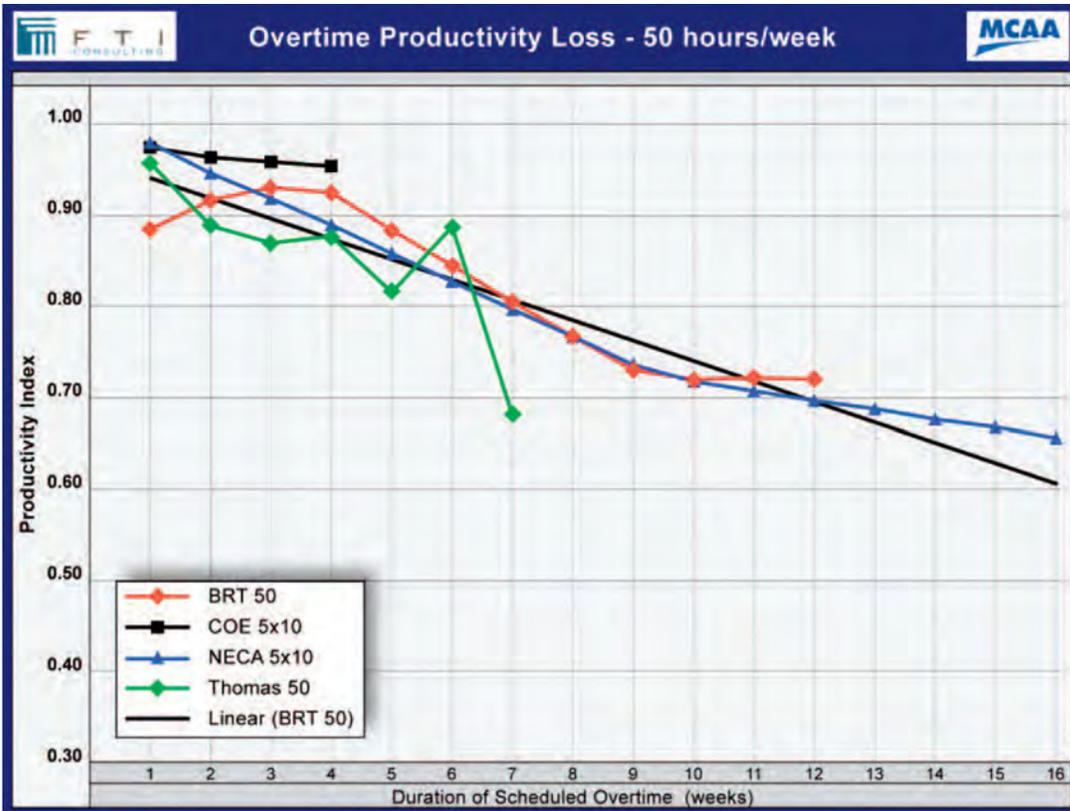
the aforementioned study was based on data collected on the project site by site personnel.

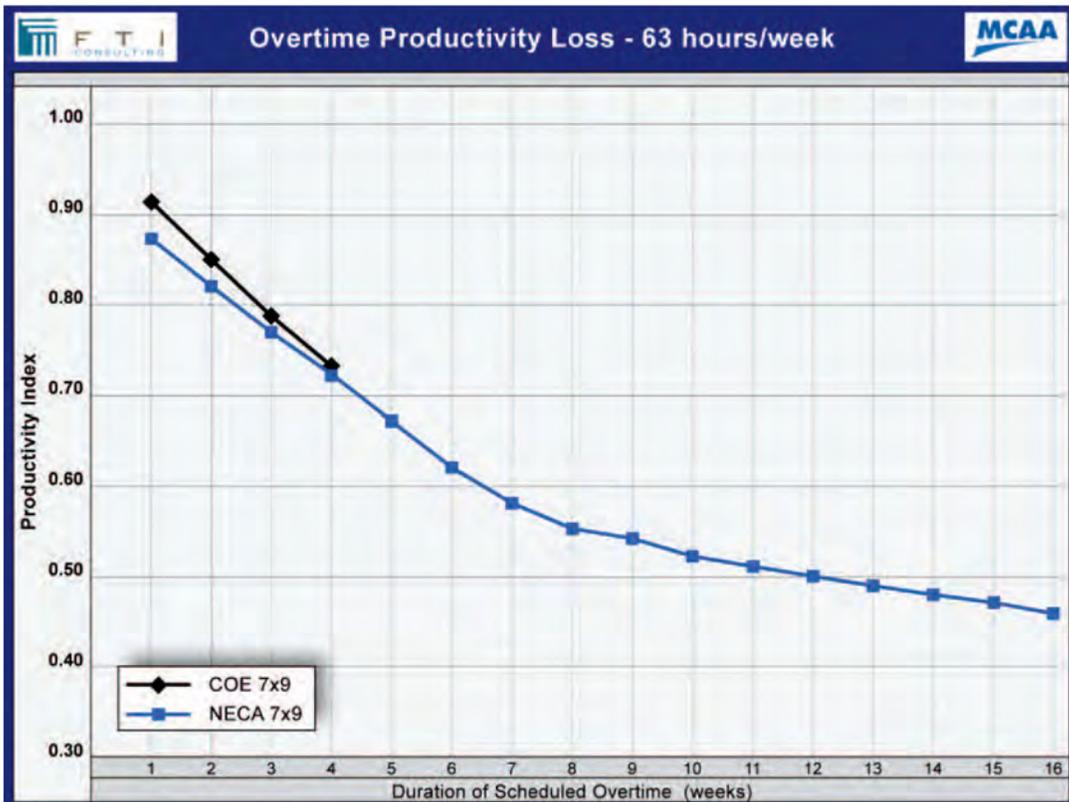
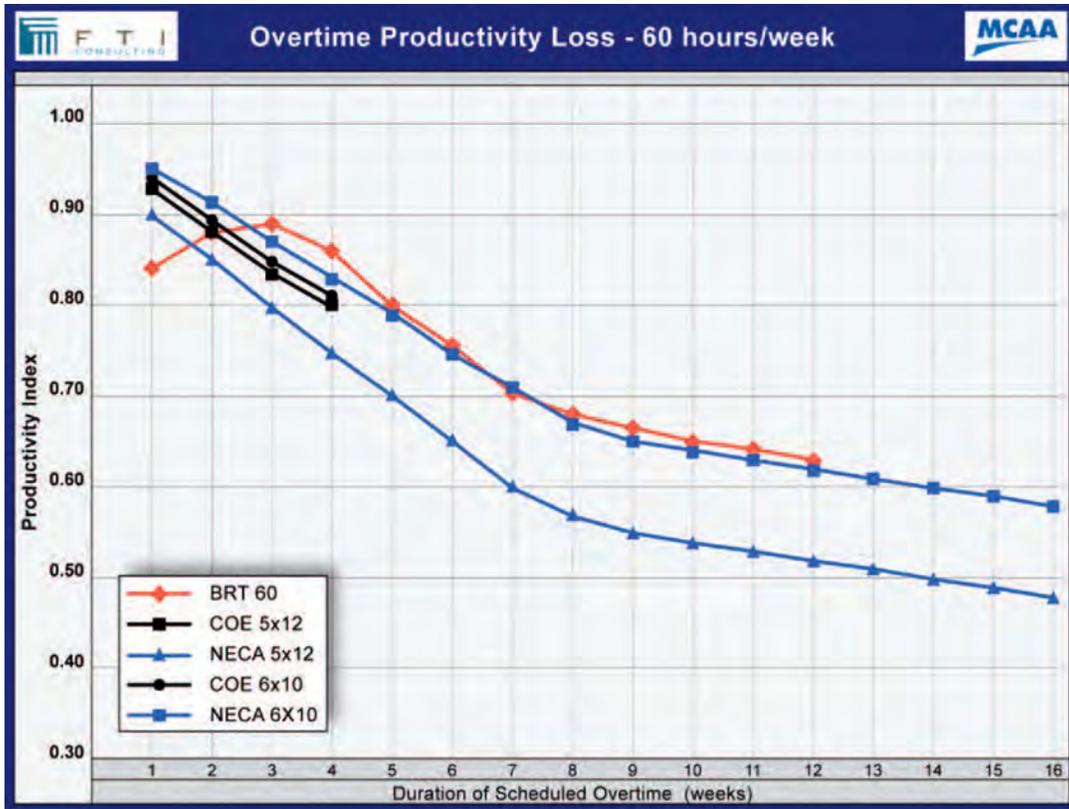
The U.S. Army Corps of Engineers (“the Corps”)

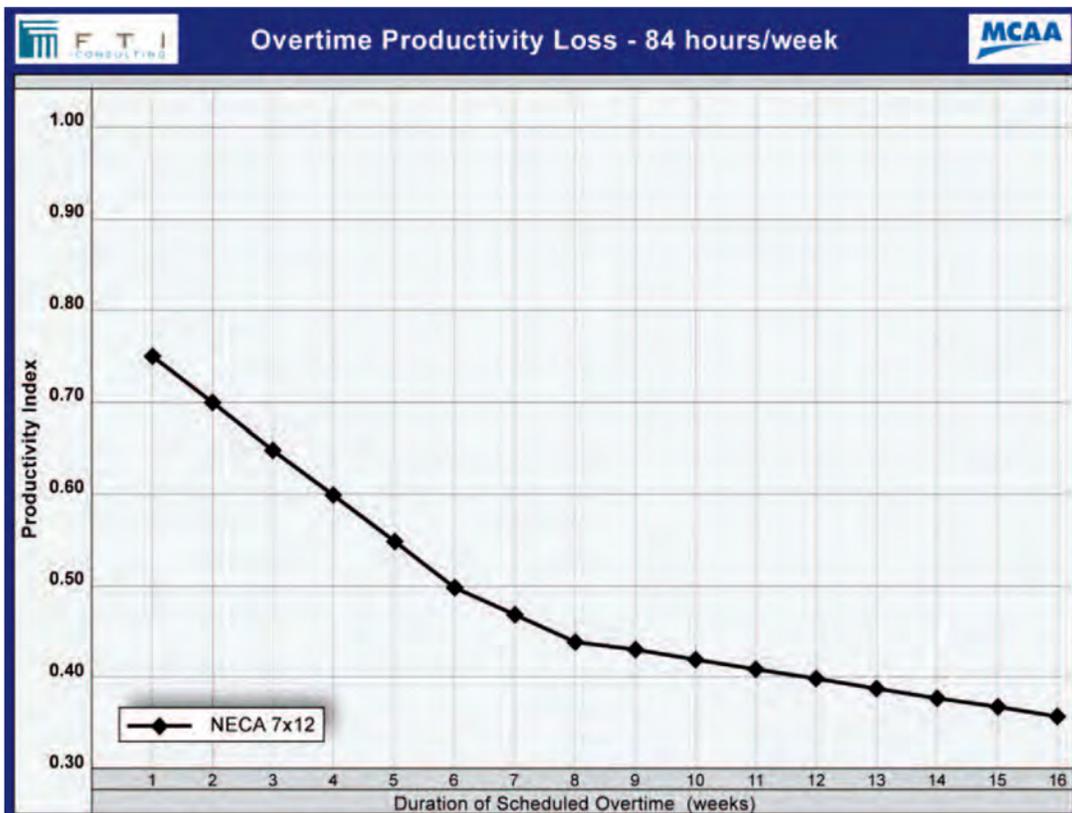
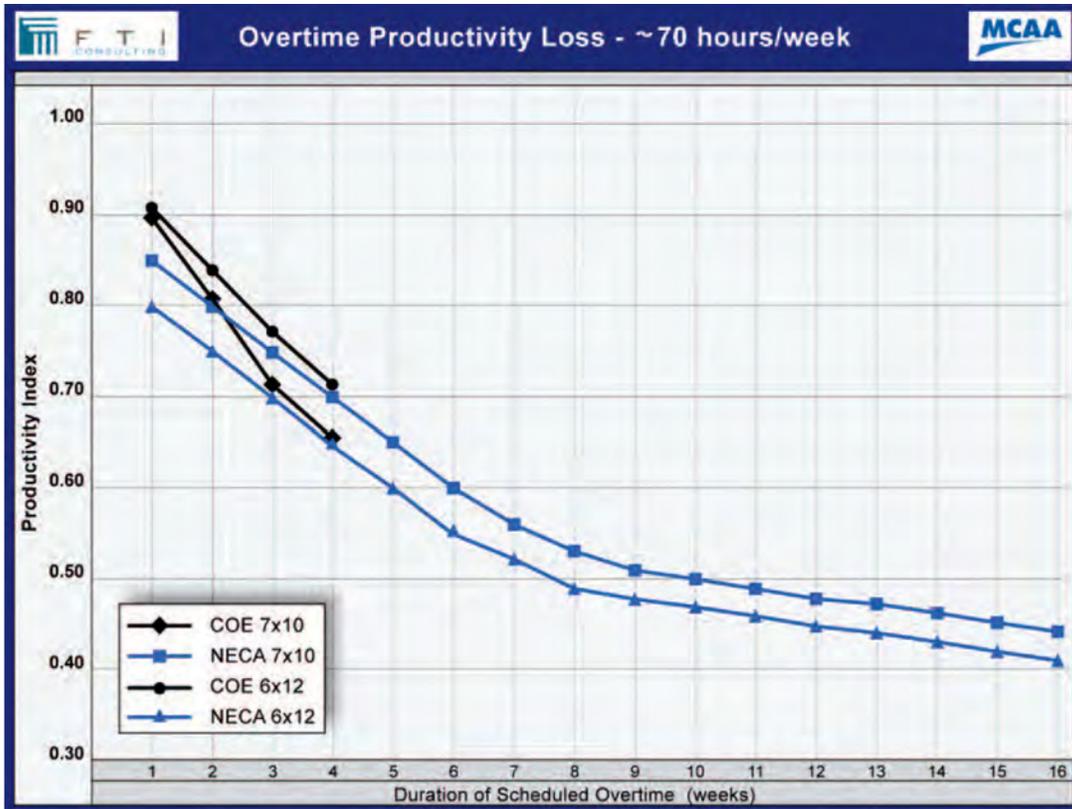
The United States Army Corps of Engineers (“the Corps”) study included an overtime loss of productivity graph showing predicted losses of labor productivity for various work schedules over a four-week period. Similar to the other reports cited herein, the Corps showed declining productivity as the overtime schedule was extended. The Corps’ overtime inefficiency graph was widely used to calculate impact and inefficiency claims until the Corps formally withdrew this publication several years ago for unspecified reasons. It is noteworthy that *Publication* indicates that the actual productivity was equal to the planned productivity; a PI > 1.0 indicates that the actual productivity exceeded (was better than) the planned productivity; and a PI < 1.0 indicates that the actual productivity was less than (worse than) the planned productivity.

In all cases, the PI during a normal 40-hour work week is assumed to be 1.0. The PI during a given overtime schedule is then indicated on the chart over a number of weeks of consecutive overtime. If a chart indicates a PI of 0.90 for a given week, that shows a 10% loss of productivity for that week (1.00 – 0.90 = 0.10, and 0.10 ÷ 1.00 = 10%).

As noted above, the curves were generally within the same relative order of magnitude. Using the average of the four studies, the table of PI at the bottom of this page was developed.







Application

The Prospective Application

When the period(s) of extended overtime have been determined, the mechanical contractor can find the chart for the applicable work schedule and determine a reasonable range of productivity loss by reading the PI for the given week of consecutive extended overtime and subtracting it from the “normal” value of 1.0. For instance, a PI of 0.60 equates to a inefficiency estimate of 40% ($1.00 - 0.60 = .40 \times 100\% = 40\%$). In a *prospective*, or forward priced analysis, the resulting percentage of productivity loss is multiplied against the estimated number of hours to be worked during that week

to identify the estimated impact of working extended overtime. In a *retrospective* analysis (i.e., an analysis prepared after the fact using actual labor hours), the formula for computing a conservative inefficiency estimate is discussed in a following subsection.

As described herein, the NECA tables list three impact intensity levels for each overtime schedule: “Low,” “Average,” and “High.” For the PI values shown in the following table, the “Average” values listed in the NECA tables were utilized. Where two different work weeks resulted in the same number of total hours (e.g., a 60-hour work week resulting from a 12-hour per day five-day schedule versus a 10-hour per day six-day schedule), the PI values derived from the source data were averaged between the two working schedules. Further, from weeks 13 through 16, only the NECA PI values were available.

When inefficiency factors are applied to estimated hours in a forward priced or prospective analysis, the user multiplies the factor percentage against the estimated hours for the overtime and for the straight time worked by the overtime crews. For instance, if a contractor expects to work a 50-hour work week with 25 mechanics for five weeks, the computation appears in the forward

Week of Extended OT	50 hrs/wk	54-56 hrs/wk	60 hrs/wk	63 hrs/wk	70-72 hrs/wk	84 hrs/wk
1	0.95	0.94	0.91	0.89	0.86	0.75
2	0.93	0.90	0.88	0.84	0.80	0.70
3	0.92	0.86	0.85	0.78	0.73	0.65
4	0.91	0.83	0.81	0.73	0.68	0.60
5	0.85	0.79	0.76	0.67	0.63	0.55
6	0.86	0.75	0.72	0.62	0.58	0.50
7	0.76	0.72	0.67	0.58	0.54	0.47
8	0.77	0.70	0.64	0.55	0.51	0.44
9	0.74	0.68	0.62	0.54	0.50	0.43
10	0.72	0.66	0.61	0.52	0.49	0.42
11	0.72	0.65	0.60	0.51	0.48	0.41
12	0.71	0.64	0.59	0.50	0.47	0.40
13	0.69	0.63	0.56	0.49	0.46	0.39
14	0.68	0.62	0.55	0.48	0.45	0.38
15	0.67	0.61	0.54	0.47	0.44	0.37
16	0.66	0.60	0.53	0.46	0.43	0.36

FORWARD PRICING TABLE

Week Ending	Act Hrs Worked	# Mechanics working over 40 hrs	Total Hours Subject to Loss Productivity	Loss (pct) from 5/10 Table	Inefficient Hours
6-Feb-10	50	25	1,250	5%	63
13-Feb-10	50	25	1,250	7%	88
20-Feb-10	50	25	1,250	8%	100
27-Feb-10	50	25	1,250	9%	113
6-Mar-10	50	25	1,250	15%	188
TOTAL					552

pricing table above.

Based on a forward priced, or prospective, estimate of overtime inefficiency, the contractor would request compensation for 552 labor hours of lost labor productivity.

The Retrospective Application

Retrospective analyses are performed after the overtime hours have been spent. For a retrospective example, let us assume that a contractor was directed to put its mechanical crews on overtime during construction of a

processing plant. The contractor's planned working hours were a 40-hour week, and in an effort to maintain schedule the contractor placed the mechanical crews on a five-day 10-hour shift over an 11-week period. In calculating the retrospective (performed after the fact) loss due to unplanned extended overtime, the contractor should apply the formula and procedures described below.

Most inefficiency tables, such as the

MCAA's labor inefficiency factors, were prepared with the anticipation that these factors would be applied to forward-priced change order requests.¹² Thus, the percent inefficiency factor would be utilized as a multiplier against the estimated hours to provide the forecast loss of productivity. However, when using tables and factors in a retrospective manner (i.e., applying these factor percentages to actual payroll hours), an adjustment must be made in order to eliminate overstating

the inefficient hours. The use of the retrospective formula adjusts for the fact that the inefficient hours are already embedded within the actual labor hours used in the retrospective computation. Multiplying the inefficiency factor against the actual hours that also include the inefficient hours results in an overstatement of the estimated inefficiency.

- 1) Identify the individual craft persons who worked unplanned extended overtime.**

The contractor's payroll records should identify those individual craft labor who worked at least 50 hours a week during the period of unplanned overtime. It

should not be assumed that every worker recorded on the daily craft report actually worked overtime during a given week. Note that the number of workers working over 40 hours declines with each successive week, indicating that some members of the crew did not work 50 hours. The result of such a calculation is shown in the table below.

Note that when the crew moved back to the normal 40-hour week, the "OT week clock" started over at Week 1 on March 27, 2010, and no hours were subject to any lost efficiency in the preceding two weeks. This was due to the fact that the crew was able to recover during the normal work weeks ending March 13 and 20. Thus, when overtime work resumed for the week ending March 27, 2010, the "Week 1" percentages were utilized.

2) Apply the applicable percentage tables above for the applicable overtime period (in this case 5/10s) to the craft hours subject to lost productivity due to unplanned extended overtime using the *retrospective* formula.

In this retrospective example using actual payroll data, the result is as shown in the table at the top of the following page.

In this example, the contractor lost 748 craft hours due to working unplanned extended overtime caused by the attendant overtime inefficiency over an 11-week period using a retrospective analysis approach. In order to produce a conservative inefficiency estimate, it is recommended that when actual labor payroll hours are used, as would be the case in a retrospective analysis, the retrospective formula should be utilized, as described below.

OT Week	Week Ending	Hrs Worked	Mechanics Working Over 40 hrs	Total Hrs Subject to Lost Productivity
Week 1	6-Feb-10	50	25	1,250
Week 2	13-Feb-10	50	24	1,200
Week 3	20-Feb-10	50	22	1,100
Week 4	27-Feb-10	50	22	1,100
Week 5	6-Mar-10	50	21	1,050
No OT	13-Mar-10	40	0	0
No OT	20-Mar-10	40	0	0
Week 1	27-Mar-10	50	25	1,250
Week 2	3-Apr-10	50	23	1,150
Week 3	10-Apr-10	50	23	1,150
Week 4	17-Apr-10	50	20	1,000

RETROSPECTIVE PRICING TABLE

Week Ending	Act Hrs Worked	# Mechanics working over 40 hrs	Total Hours Subject to Loss of Productivity	Loss (pct) from 5/10 Table	Inefficient Hours
6-Feb-10	50	25	1,250	5%	59
13-Feb-10	50	24	1,200	7%	78
20-Feb-10	50	22	1,100	8%	81
27-Feb-10	50	22	1,100	9%	91
6-Mar-10	50	21	1,050	15%	137
13-Mar-10	40	0	0	0%	0
20-Mar-10	40	0	0	0%	0
27-Mar-10	50	25	1,250	5%	59
3-Apr-10	50	23	1,150	7%	75
10-Apr-10	50	23	1,150	8%	85
17-Apr-10	50	20	1,000	9%	83
TOTAL					748

The retrospective formula appears as: actual labor hours - (actual labor hours ÷ (1 + the percent inefficiency factor)), or as an example from the table above: 1,250 - (1,250 ÷ 1.05) = the inefficient hours, or 1,250 - 1,191 [the *efficient* hours] = 59 inefficient hours in a retrospective analysis. This formula solves for the efficient hours [1,191] in the equation and then allows the user to subtract the efficient hours from the total, yielding the inefficient hours [59].

Preparation of the Request for Equitable Adjustment

It is not unusual for a general contractor or owner to request that a mechanical contractor provide a prospective cost proposal to accelerate a construction project. However, such requests are often limited to the added payroll costs attendant to the overtime schedule. When a mechanical contractor is asked to submit a proposal to engage in overtime on a prospective basis, the attendant estimated labor inefficiencies must be added to the direct payroll costs of the overtime schedule.

Thus, in cases where a mechanical contractor is asked to forward price an overtime change order request, both the direct payroll and the inefficiencies should be included. The content of this chapter provides the guidelines for forward pricing an overtime-inefficiency change order request. In cases where the extent of the overtime is unknown, the mechanical contractor, at a minimum, should include an express reservations clause in the change order proposal.

For example:

This change order proposal represents the direct additional payroll costs arising from the requested overtime schedule. No overtime inefficiencies are included in this proposal. Amalgamated Mechanical Contractors expressly reserves its rights to request compensation for labor efficiencies attendant to the requested overtime schedule. A revision to this change order proposal containing the costs for overtime labor inefficiencies will

be forwarded for processing as soon as these costs can be computed. We estimate that the labor inefficiencies arising from this overtime schedule will not be less than ____%.¹³

There may be occasions when the general contractor or owner denies the opportunity to supplement a change order request based on future events. Such prohibitions also may be a part of the contract or printed on the change order forms themselves as “full accord and satisfaction” clauses. If the mechanical contractor is prohibited from submitting supplemental change order requests, such as for labor inefficiencies arising from an overtime schedule, then forward pricing of the overtime inefficiencies may be the only option.

For example:

The overtime pricing contained herein includes the added payroll costs for the overtime schedule provided by your office. Furthermore, this change order proposal contains a loss of labor productivity estimate based on the overtime schedule that we have received from your firm. The proposed overtime schedule provided by your office is the basis of our estimate for direct and inefficiency costs associated with this change order request.

Amalgamated Mechanical Contractors expressly reserves the right to submit a separate change order proposal in the event the overtime schedule changes in any manner from that upon which we have relied in the pricing of this proposed change order.

It is recommended that the forward-priced (prospective) overtime change order request be treated, to the fullest extent possible, in the same manner as a “sticks and bricks” change would be priced. In a “sticks and bricks” change

order request, the contractor takes off pipe, fittings, and appurtenances based on a scope of added work provided by the general contractor or owner. The labor is derived there from and the final pricing is added to the change order proposal.

In like fashion to the fullest extent possible, overtime change order requests should be based on a fixed scope. A fixed scope means that the general contractor or owner will provide the mechanical contractor with the number of days of overtime and the number of hours per day that are to be worked in order to form a basis for the forward-priced change order. Once the fixed scope is known, then the mechanical contractor can estimate the added payroll costs and the expected loss of labor productivity using the tables included herein. The tables refer only to estimated overtime inefficiency and do not include inefficiencies arising from other categories of impacts, such as unanticipated trade stacking, reassignment of manpower (“disruption”), lack of site access, or other inefficiency factors. Refer to the chapter titled “How to Use the MCAA Labor Factors” for a more complete listing of potential inefficiency factors to consider when preparing a change order request or a claim.

In summary, it is essential that the mechanical contractor define, in its proposal, what costs are and are not included in its overtime change order request. Obviously, if the general contractor or owner direct an overtime acceleration effort without a requirement for a prospective change order proposal, and with only the requirement to provide the proof of overtime payroll costs for reimbursement, the mechanical contractor must make it clear that in addition to the actual payroll costs, a request for reimbursement of its overtime inefficiency costs will be

submitted for payment.

Conclusions

A sustained and unplanned overtime schedule can result in a substantial loss of labor productivity. The mechanical contractor may be entitled to recover the associated costs, in addition to the direct overtime premium payroll costs. The current available data on inefficiency resulting from unplanned extended overtime, when properly utilized, provide the mechanical contractor with a reasonable basis to estimate such losses in either the prospective or forward pricing of an original estimate or a scope change, or in a retrospective application. The inefficiency factor will vary depending on the amount of overtime to be performed, the number of mechanics required, and the duration of the unplanned extended overtime. Additionally, other inefficiency factors may occur simultaneously, such as stacking of trades, reassignment of manpower, or site access restrictions. Such additional impacts can be separately estimated using the MCAA inefficiency factors described in this manual.¹⁴

Crew considerations also can affect overtime inefficiency levels. Such considerations include whether or not to place the entire crew on over time even if only a definable portion of the work requires acceleration (i.e., the critical path activities), whether or not rest intervals can be interspersed into the overtime schedule to allow for one or more weeks of straight time work, or whether certain activities that would be subject to overtime acceleration can be scheduled for a second-shift crew. These sorts of considerations are made on a project-specific basis and can affect the amount of inefficiency sustained by a mechanical contractor resulting from performing the work on an overtime schedule.

Mechanical contractors should not accelerate to mitigate schedule slippage that was not caused by the mechanical contractor's fault or negligence on a *voluntary* basis. If a mechanical contractor is directed by a general contractor or owner to accelerate the work by commencing an extended overtime work schedule in order to overcome delays not caused by the mechanical contractor, a specific notice is necessary. While most construction contracts contain provisions that require the mechanical contractor to follow the direction of a general contractor or owner to accelerate the work,¹⁵ such direction and the ensuing acceleration must be accompanied by clear and timely notice that includes a statement that the mechanical contractor is proceeding under protest and that a claim will be filed for reimbursement of all costs as soon as those costs can be computed. If a mechanical contractor is placed in a position of *constructively accelerating*¹⁶ a project to overcome delay that has not been caused by the acts or omissions of the mechanical contractor, the review of these conditions by the contractor's upper management and counsel is highly advisable.

A schedule time impact analysis may be an essential factor in demonstrating that the mechanical contractor is not critically delaying a project. This is important in properly deflecting responsibility for the costs of acceleration in that the party controlling the critical path in a delayed schedule is usually the party that is found responsible for the costs to mitigate the delay. One primary means of delay mitigation is overtime. If the mechanical contractor is being charged with the acceleration costs, or the payment for the direct and indirect costs of acceleration are being withheld on the basis that the mechanical contractor was the responsible party, the contractor can employ a schedule time

impact analysis to identify the party causing the critical path delay.

A schedule analysis also may be helpful in demonstrating, to the extent that the mechanical contractor's activities are not controlling the critical path of the current project schedule, that overtime demanded by a general contractor or owner will have no mitigating effect on the forecast end date of the project. It is an accepted axiom of construction Critical Path Method (CPM) scheduling that reducing the duration (i.e., by way of overtime acceleration) of a path of logic that does not control the critical path has no effect whatsoever on the end date of the overall project. Put another way, the end date of a CPM schedule can only be foreshortened by accelerating work on the controlling critical path. If the mechanical contractor can demonstrate that its work is not on, or even near, the controlling critical path, accelerating those non-critical activities will have no mitigating effects on a project that is behind schedule and will represent potentially substantial economic waste.

The mechanical contractor should clearly note in its bid or change order proposal whether or not overtime has been included in its lump-sum pricing, and if so, to what extent it was included. If a contractor includes extended periods of overtime in a lump-sum bid or change proposal, the attendant loss of labor productivity should be evaluated and if deemed appropriate, the costs should be included in the lump-sum price for the work. At a minimum, the contractor's right to claim for such cost impacts should be preserved.

Preservation of the contractor's right to be reimbursed for its overtime inefficiency costs, on projects where the other party refuses to pay for such overtime inefficiency costs, is of paramount importance. As described in

greater detail in the chapter on "Time Impact Analysis—Measuring Project Delay," many general contractors and owners are including broad waiver language on change order forms and on the monthly payment applications. The contractor should take great care to limit this waiver language to matters that it deems have been settled and take express exception to each unsettled item, such as a pending inefficiency claim.

Overtime inefficiency costs for extended periods of unanticipated overtime may exceed the payroll costs of overtime premium. The mechanical contractor should employ every reasonable management tool including issuing proper and timely notice, keeping comprehensive records, performing schedule analyses, taking exception to broad waiver language, and timely submittal of change order requests to help ensure that the contractor's right to recover all of its overtime costs are preserved and that payment will be forthcoming.

¹ We are unaware of any data showing the difference in impact, if any, between "planned" and "unplanned" overtime. Generally, planned overtime has been included in the base contract estimate and was accounted for in the baseline CPM schedule. Unplanned overtime, which is the subject of this chapter, occurs when no overtime, or only very limited overtime for equipment setting or start-up tasks, was contemplated under the terms of the base contract and is implemented during the course of construction.

² See, e.g. *Appeal of J.A. Jones Constr. Co.*, 00-2 BCA ¶ 31000, ENGBCA Nos. 6386, 6387, 6390; 2000 WL 1044011 (Eng. BCA 2000) ("The study itself states that it was based upon prolonged overtime schedules in manufacturing plants and that it may not be applicable to construction projects.")

³ The well-accepted axiom is that the inefficiency effects of overtime affect the

worker while he or she works the straight-time schedule as well as the overtime schedule.

⁴ Similarly, on a non-overtime-based project estimate, the mechanical contractor should qualify in its bidding documents if the bid excludes overtime work.

⁵ The delay or event causing the mechanical contractor to engage in spot overtime may not arise from the fault or negligence of the mechanical contractor. For instance, the mechanical crews may be required to work spot overtime installing sleeves in slab pours because the concrete contractor was delayed and was required to accelerate, thus requiring the sleeving crew to work alongside on an overtime basis.

⁶ See, e.g., *Ace Constructors v. United States*, 70 Fed.Cl. 253, 281-283 (Cl.Ct. 2006), *aff'd*, 499 F.3d 1357 (Fed.Cir. 2007)(contractor entitled to recover lost productivity due to overtime based on BRT); *Appeal of Harbison & Mahony*, 68-1 BCA ¶ 6880, ENGBCA Nos. 2819, 2820, 1968 WL 436 (Eng. BCA 1968)(allowing claim for overtime inefficiency based on NECA); *Appeal of States Roofing Co.*, 10-1 BCA ¶ 34356, ASBCA No. 54860, 2010 WL 292732 (ASBCA 2010)(Thomas study recognized); *Appeal of Sante Fe Engineers, Inc.*, 86-3 BCA P 19092, ASBCA No. 29362, ASBCA No. 28058, 1986 WL 20062 (ASBCA 1986), *aff'd*, 818 F.2d 856 (Fed.Cir. 1986)(allowing inefficiency claim using the Corps study).

⁷ See, e.g., *Hensel Phelps Const. Co. v. General Services Admin*, 01 BCA ¶ 31249, GSBCA No. 14744, GSBCA No. 14877, 2001 WL 43961 (General Services BCA 2001)(“the Modification Impact Evaluation Guide of the Corps of Engineers is not recognized by GSA and, indeed, no longer used by the Corps.”) While the Corps has removed its *Modification Impact Evaluation Guide* EP 415-1-3 from publication, it has not repudiated any of the data contained in that publication.

⁸ See, e.g., B.Bramble, et al, *Construction Delay Claims*, §5.07, p. 5-53(3d ed. 2000) (“Where the damages are directly attributable to the breach, they are often recoverable even though they are uncertain

in amount. ‘Thus, courts have recognized that a plaintiff may recover even where it is apparent that the quantum of damage is unavoidably uncertain...or difficult to ascertain.’ The courts have recognized that ascertainment of damages, especially lost productivity, is not an exact science. When the responsibility for damages is proven, it is not essential that the amount of damages be ‘ascertainable with absolute exactness or mathematical precision.’” (and cases cited therein).

⁹ It is a generally accepted axiom in the construction industry that inefficiency impacts sustained by the mechanical trades are similar in nature to the inefficiency impacts sustained by the electrical trades given reasonably comparative adverse conditions.

¹⁰ Dr. H. Randolph Thomas, P.E. is a professor of civil engineering at Penn State University, author or co-author of a series of well recognized published papers on labor inefficiency, and frequent expert witness on the subjects of labor productivity and construction management.

¹¹ Thomas, et al, “Scheduled Overtime and Labor Productivity: Quantitative Analysis” *Journal of Construction Engineering and Management*, June 1997.

¹² As a conservative approach, it has been assumed that the NECA overtime tables, as well as other published tables designed for use as forward-pricing guides, require the use of the retrospective formula when applying such factors to actual labor hours.

¹³ The estimated inefficiency percent can be derived from the data and tables contained in this chapter.

¹⁴ The “Overtime” component (Item No. 15) listed on the MCAA inefficiency factors table in the chapter on “Factors Affecting Labor Productivity” herein was designed to give general guidance in forward-pricing overtime inefficiency. It is recommended that the more specific estimates of impacts contained in this chapter be applied to overtime inefficiency analyses due simply to the increased level of specificity offered by the studies and tables contained in this

chapter.

¹⁵ A subcontractor's refusal to comply with an acceleration directive provided by a general contractor or owner, in the presence of contractual authority to issue such a directive, may result in a termination for default. Before a direct, contractually proper acceleration order from a general contractor or owner is disregarded, the mechanical contractor should consult with construction counsel to evaluate the various courses of action.

¹⁶ *Constructive acceleration* is a condition wherein a contractor is directed to accelerate to mitigate a delay not caused by the contractor at no additional cost. In anticipation of a claim to recover the costs of the constructive acceleration, the contractor takes express exception to the acceleration directive, provides notice of a claim, and then executes the acceleration as directed. The submission of the claim for added costs occurs as soon as the contractor can compute the added costs either while the acceleration is taking place, or after the acceleration has concluded. The steps that should be taken to perfect a constructive acceleration claim are best set forth by the contractor's counsel.

Prepared by Paul Stynchcomb, CCM, PSP, CFCC of FTI Consulting, Dr. Mike Pappas, P.E., PhD of Pappas Consulting, Inc. and Jarad Kriz, CCM, LEED® AP (BD+C), PSP of FTI Consulting with peer review performed by: Robert Beck, Executive Vice President of John W. Danforth Company; Michael R. Cables, Executive Vice President of Kinetics Systems Inc.; James Durant, President and CEO of Trautman & Shreve; Richard Freeman, Executive Vice President of Stromberg Metal Works; Matthew Hahr, Senior Vice President of John J. Kirlin, LLC; Michael Loulakis, Esq., President/CEO of Capital Project Strategies; Michael Mack, Vice Chairman of John J. Kirlin, LLC; and Adam Snavelly, President and CEO of The Poole & Kent Corporation.



Bulletin

Shift Work and its Effects on Productivity

The following paragraphs list factors that may affect productivity when work is done on a shift work basis. Most apply to “extra” shifts, although you should note that paragraph B and C also affect costs on a regular shift. All factors may not apply to a particular job.

Factors Affecting Shift Work Productivity

1. Additional Needs—Night versus Day. Since the extra shift will be performing at night, natural lighting will not be available and good quality artificial lighting may have to be provided. Even if the work is done inside a building, additional lighting in yards, storage areas, etc. would be required. It would also be expected that the temperature and weather conditions at night would be more severe than during the daytime period and additional heating would, therefore, be needed.
2. Since both shifts will be working on the same installation, there will be a certain inefficiency in the transition from one shift to the other. The new shift must go through a learning period to become familiar with the work done by the previous shift.
3. Since both shifts use the same tools and equipment, they will not be at the same place and in the same condition as a man leaves them when he completes his shift. Extra time will be spent reorganizing tools and equipment.
4. Night work will result in work force fatigue to a greater extent than daytime work.
5. Supervision will be diluted, since the normal supervisory employees of the company must be spread out over several shifts. Supervisory problems also include transferring information between shifts as to work completed, ordering of materials, deliveries, field orders, etc.
6. Additional welders may have to be qualified for second shift operations, resulting in increased manhours for testing, together with the cost of qualification tests.
7. The men required for ancillary services, such as laborers and operating engineers, whose time is normally distributed over a broader base of total pipefitter manpower, will add disproportionately to the smaller work forces normally used on additional shifts.
8. When only one trade is working shifts, they probably will not be “pushed” to complete certain work, as they may be during the regular shift.

9. If the shift works 7 1/2 hours in lieu of 8 hours, the percentage of work hours spent in starting, stopping, and coffee breaks becomes a greater proportion of the work shift.
10. The social aspects of the tradesmen may have to be considered, such as the disruptions on family life by working nighttime hours, and the effects on a man of having to change his schedule, such as sleeping during regular daytime hours.

The following is an index of additional factors which should be considered as direct costs when pricing bids for shift work operations.

Additional Factors

Coordination Costs

1. **Overtime Supervisory Personnel.** It may be necessary to overlap supervisory personnel by 1–2 hours per shift.
2. **Engineering Costs.** Additional engineering costs may be required for all shifts, at least in the initial stages of the project.
3. **Project Support and Communication.** A jobsite business office containing business machines, such as faxes, computers, etc., may be necessary due to the need for intense coordination, communication and information disbursement among shifts. The lack of available personnel in the home office after regular shift hours may require supervisory personnel from all shifts to meet on a regular basis for coordinating, planning and establishing relationships among shifts.

Labor Costs

1. **Hiring for Shift Work.** If it is necessary to hire additional personnel to man the shift, be aware that the productivity of “new hires” may not be the same as for the established crew. This may also depend on the employment levels and labor availability within your local jurisdiction.
2. **Shift Premium Differential.** Shift premium differential should be a part of the labor contract.
3. **Absenteeism.** Absenteeism can run as high as 30 percent during summer vacation months, particularly on Fridays and Sundays, and when holidays occur during shift schedules.
4. **Bodily Adjustment Period.** An adjustment period can be from 30 to 60 days, with a productivity loss of 15 percent to 25 percent during this time.
5. **Accident Rate.** An accident rate increase of up to 15 percent may be experienced, which would mean additional workers' compensation costs.
6. **Efficiency Loss.** From 10:00 p.m. to midnight, there is up to a 25 percent loss of efficiency.
7. **Alcohol.** Often there is an increased consumption of alcohol before coming to work by shift workers.
8. **Attitudes.** Lack of productivity and quality workmanship can transfer from one shift to the next.

Job Costs

1. **Safety.** Safety requires more emphasis due to potential increase in the accident rate.

2. **Heat.** Heat in colder climates may be required to a greater extent on second and third shifts.
3. **Lighting.** Particularly when work is being performed outdoors, i.e., installation of rooftop units, additional lighting may be required.
4. **Rental of Equipment.** All shifts must have adequate tools and equipment available.
5. **Delivery Charges.** If they are required, delivery costs can be costly outside of regular hours.
6. **Material Availability.** A crucial scheduling consideration, depending on schedules and productivity, may be the requirement for accompanying shifts in the fabrication shop.
7. **Tool Availability.** Time required in searching for and/or replacing tools can be staggering. Most companies provide a set of tools for each work shift.

Additional Resources

When shift work is not the norm of the company, all of the items described above may apply. However, the company may also require additional resources to accommodate the shift project and other projects in progress could suffer drastically—a real hidden cost. Some of the added resources that should be considered for sporadic shift work:

1. Additional engineers for the other shifts and overlap with daytime engineers.
2. Additional project managers for other shifts for continuity and resolution of problems which surface on late shifts.

3. Additional supervisory personnel, foremen, etc.

Conclusions

After the contractor considers these items, he should then determine the effects on overall productivity and the cost of shift work based upon overall productivity. He may also want to consider that during the short-term, such as one through four weeks, the productivity of shift work will be different than during the long-term, such as three months or more.

In situations of a controlled environment, such as a fabrication shop, there may be some advantages (or perhaps less disadvantages) to shift work other than for those outlined above. These factors include using a plant twice, thus cutting the fixed overhead cost; fewer interruptions on the work force; and less supervisory problems. The latter is true since fabrication work tends to be production-type work and information is normally passed directly to the tradesman by fabrication drawings or fabrication tickets.

In some regions of the country, such as summertime in the Southwest, weather and temperature conditions may be such that it would be an advantage to work shifts. If so, this should be considered by the contractor. If the contractor is in the position of being able to make a decision as to whether to use shift work or overtime, he should determine a total productivity factor for shift work and compare this with the productivity factor for overtime work, as described in other Management Methods Bulletins. (See “Factors Affecting Labor Productivity” on page 77 and “How to Estimate the Impacts of Overtime on Labor Productivity” on page 105.) This information should be used in making the final decision.



Bulletin No. PD1 Revised
(Replaces 2005 version)
File: Productivity

Bulletin

Maintaining Control of Labor Productivity

Introduction

In the mechanical contracting sector of the construction industry, as with all labor intensive trades, once the project has been bought out and the material and equipment purchase orders have been entered into the job cost system, the largest single variable (and the most volatile component) that controls profit on the project is the expenditure of labor hours. Therefore, one of the keys to profitability on a project-by-project basis is maintaining control of labor productivity.

Surprisingly, many labor intensive contractors do not make any attempt to monitor and control labor hour expenditures during the life of a construction project. All labor charges are recorded to one or two general project codes, such as "field labor" or "shop labor." This method of labor control may be adequate for small and very simple projects with limited risks of labor overruns. However, on large and complex projects that offer a mechanical contractor the potential to lose thousands, or perhaps tens of thousands, of labor hours, a system of general and summary level labor tracking results in an unacceptable level of risk. It is not standard practice in our industry for the team that prepared the original estimate to also be the team that manages its installation. Generally, most large mechanical contractors

maintain an estimating department comprised of estimating professionals that will not, in the final analysis, be held responsible for the final labor expenditures on the project. Therefore, it is important to conduct in-house project initiation meetings wherein the estimators can explain, in detail, what was included and excluded in the estimate as well as defining any assumptions that were made in the preparation of the estimate. Furthermore, the basis of the labor estimate, along with any factors or special productivity rates that were used by the estimators, can be communicated to the project management team.

With so much profit or loss at stake, it is important that labor-intensive contractors make a management decision to track labor expenditures on a specific and identifiable basis on every major construction project. As set forth in this bulletin, the reasons offered for not tracking field labor are varied and generally lack substance. One excuse that is frequently put forth regarding the contemporaneous tracking of labor by element of work is the difficulty in the field with ensuring reasonably accurate reporting, such as disseminating to the labor managers the meaning of the various labor codes. Since the reporting may be unreliable, a contractor may elect not to maintain reasonably detailed labor records. Other labor managers simply aver that tracking labor by

multiple-labor codes on a regular basis is too much work and the investment of resources is not sufficiently rewarded by the value of the information gained in the process.

This bulletin will explore the arguments supporting more specific and defined labor tracking and some of the methods of achieving greater control over the expenditure of craft labor on construction projects.

Terms and Concepts Used in Project Planning and Labor Tracking

Original Estimate—the collection of bid forms, take off sheets, labor adjustment sheets,¹ material, equipment and labor pricing documents and other, similar material that comprise the bases for the final labor estimate included in the lump sum bid for the project. Obviously, an important historical set of documents regarding the original estimate are the bid set of drawings and specifications.

Job Planning (the Job Plan)—the process whereby the estimators and/or the construction managers divide the original estimate into identifiable units of work to which can be assigned the materials and equipment that must be installed and the labor and construction equipment that is required to complete each unit of work.

Activity—the basic unit of work in a construction job plan (and in the construction schedule). The activity is the unit of work into which the overall original estimate is divided for the purposes of tracking and managing craft labor during the construction process. The original estimate is divided into activities during the job planning phase. Each activity is defined by specific geographic or contract boundaries such as: phase, building, floor, sectors and by other designations such as by column

lines, systems, rooms, crew codes or other definitions that will allow specific identification of the work on the contract drawings. Each activity should be given a detailed and specific description of up to 48 characters in length² in order to comport with critical path method (“CPM”) schedules that are typically developed from the job plan activity listing.

The recommended size of the activity (i.e., the amount of work that is included in an activity), and the resulting duration for the activity, are based on the principle of optimized tracking.

Optimized tracking refers to the greatest reasonable degree of reporting accuracy that can be expected during the course of the project. The concept of optimized tracking dictates the size of the activity in the job plan, as well as in the project CPM schedule. In scheduling, the general guideline regarding the durations of erection activities³ for optimized tracking suggests a range of between three to 22 work days for the majority of the activities defined in the job plan. Obviously, some activities will be only one or two days in length by necessity. However the majority of the activities in the job plan and schedule should have durations that fall within the range of 3 to 22 work days. This range or duration for the activities used in the schedule also provides for optimized tracking when these activities are also used in the job plan reporting system.

The duration of an activity is calculated by estimating the number of labor hours that will be required to complete the activity and by estimating the crew size for the work. The duration is derived by dividing the total estimated labor hours by the hours required for the crew per day. For instance, if the activity will consume 640 labor hours and the contractor plans to utilize a crew of four mechanics (i.e., totaling 32 hours per day), the resulting duration for the

activity would be 20 work days.

Obviously and within reason, the more specific the activity data, the more valuable is the reporting information. Therefore, it is advisable to differentiate between the types of systems that may occur within the same geographic area, resulting in more than one activity in an area. For instance, if the mechanical contractor has HVAC piping, plumbing piping and duct work within the same area, each principal trade would have its work identified by separate activities. Similarly, if the mechanical contractor has large bore weld joint carbon steel pipe, socket weld small bore pipe and thin wall stainless steel pipe work, all in the same area or phase of the project, it is useful to divide this work into three discrete activities by type of piping system based on the crews that will perform the installation work.

Furthermore, the activity should be defined during the job planning phase such that the work can be commenced and not halted until the activity is completed. This is one of the characteristics of an efficiently planned construction project; namely that the activities express continuity of work such that there is no planned “start-stop-start” disruption contemplated in the baseline job plan or CPM schedule.

Once the mechanical contractor has developed its activities, this information should be shared with the prime contractor for integration into the project master schedule. If the prime contractor has already prepared the overall master schedule, the mechanical contractor must determine if the activities created in its job plan comport with the mechanical activities created by the prime contractor. If the activity durations of the prime contractor do not comport with those contained in the mechanical contractor’s job plan, then a written request should be submitted to the

prime contractor requesting the required modifications. If the prime contractor refuses the reasonable schedule modification requests of the mechanical contractor, the prime contractor should be placed on notice that the baseline master schedule is not reasonable. Specifics should be provided in the written notice as to the activities and/or logic that are incorrect or inconsistent with the mechanical contractor’s reasonable plan to prosecute its base contract work.

Activity Identification (“ID”) Code—the unique numeric, or alphanumeric, identifier that is given to each activity. The application of activity IDs may be dictated by the contractor’s job costing system, the labor performance software in use and by the scheduling software that may be employed on the project. In order to simplify the overall labor tracking operation on a construction project, it is important to utilize the same codes for all cost, labor and schedule tracking software systems. Having one single set of activity IDs for all control systems used on a project will increase the accuracy of the reporting and reduce the overhead costs to develop and update the systems.

Labor Performance Report (“LPR”)—the report format that provides the planned and the actual performance data for use by field and office management during the life of the project. There is not a single, “best” form of this report and many mechanical contractors have developed their own, highly effective, version of the LPR. The LPR can take on many different forms and is called by different names by various mechanical contractors, but for the purpose of this bulletin, the report that provides the labor tracking information will be known as the LPR. One example of an LPR is shown at the bottom of the following page. The code fields are identified from left to right as

follows:

Activity ID Code—the unique identifier for each activity

Activity Description—the definition of the work that is to be performed

Planned Hours—the originally estimated (or re-estimated hours)⁴ hours to perform the work

CO Hours—estimated change order, or scope change, hours

Revised Plan—the total of the original estimated hours and estimated change order hours

Last Percent Complete—the progress of the activity at the previous reporting period⁵

Current Percent Complete—the progress of the activity at the current reporting period

Earned Hours—the “should have spent” hours (Revised Plan x Current Percent Complete)

Previous Total Actual Hours—the actual hours charged as of the last reporting period

Current Actual Hours—the actual hours charged through the current

reporting period

Variance Week -2—the craft hour variance as of two weeks prior to the current period

Variance Week -1—the craft hour variance as of one week prior to the current period

Current Week—the current period craft hour variance (- over budget / + under budget)

By maintaining a current and accurate job plan, the productivity of each activity of work can be measured on a period-by-period basis (usually measured by pay period). Once the activity ID codes, activity descriptions and the planned hours have been input at the outset of the project, the regular input data consists of: (i) any revisions to the original job plan hours (i.e., changes in scope); (ii) the actual hours from payroll information; and (iii) the percent complete of the activity. In return for the input of the above-listed data, the project team has at its disposal a powerful tool that allows management to review with specificity the areas of labor expenditure that exceed the budgeted job plan labor hours. Most importantly, it permits the project management team to identify specific activities of work that are indicating unproductive progress before the activity is complete, thus

The Labor Performance Report (Example of Detailed Activities)

Activity ID Code	Activity Description	Planned Hours	CO Hrs	Rev Plan	Last % C	Current % C	Earned Hours	PT AH	C Act Hrs	Wk -2	Wk -1	Cw
7550	Inst CHWS&R Mains Area B	500		500	30	50	250	300	450	-75	-150	-200
7570	Inst CHWS&R Brnchs Area B	700	50	750	10	20	150	120	200	-40	-45	-50
7590	Connections @ Mech Equip	100		100	10	15	15	10	12	0	0	3

allowing the project management team to proactively address the forecast labor overrun before it becomes an historical loss.

The Purposes of, and Methodologies for, Tracking Labor

The single, best reason to maintain better control of field labor expenditures is to increase profit. There are other sound reasons for a higher degree of labor control on construction projects, which include:

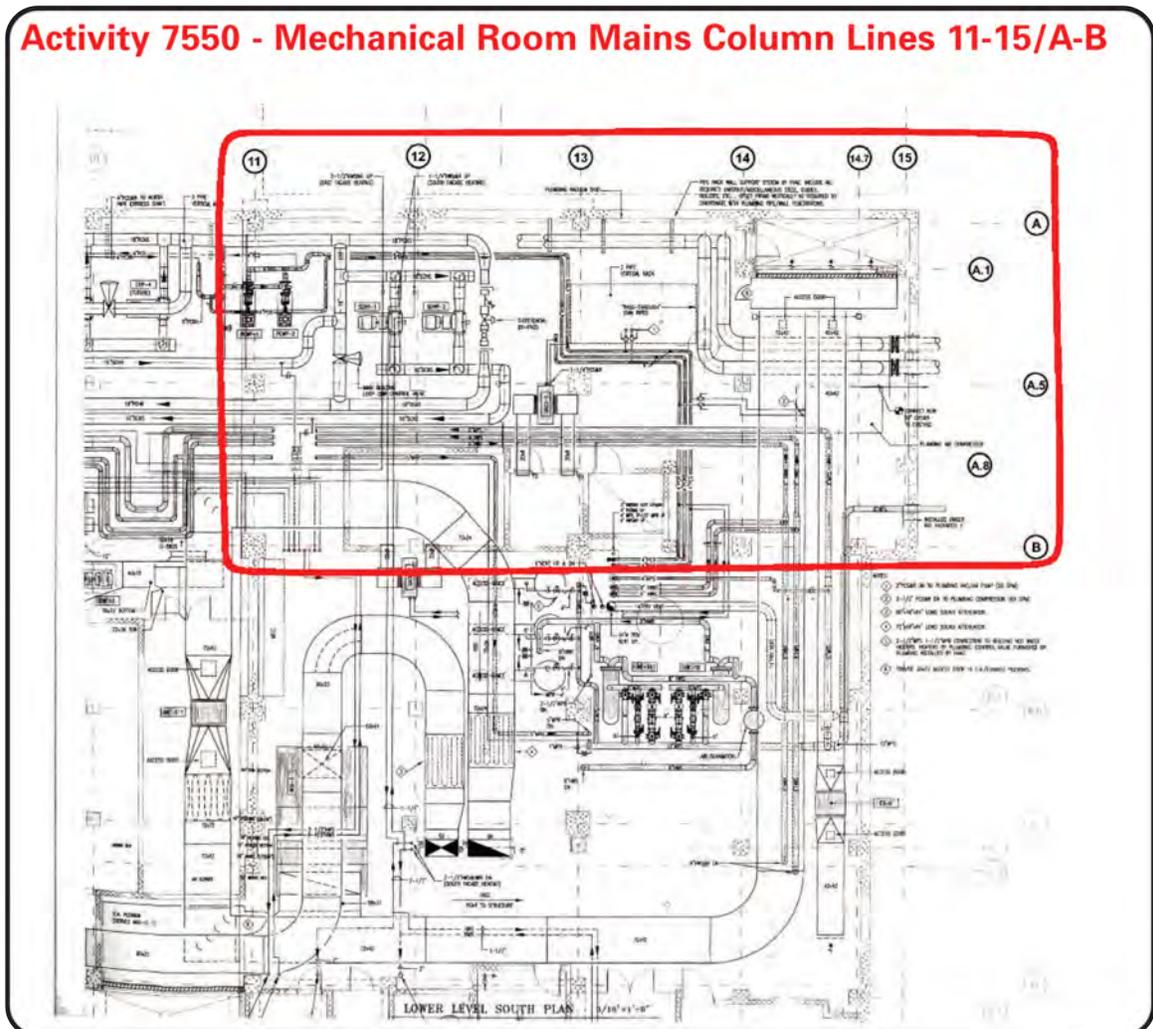
- Establishing, or verifying, the accuracy of the contractor's bidding units
- Developing an early warning system

that will allow proactive management intervention

- Mitigating, or documenting, the inefficiencies associated with non-contractor caused impacts as well as accurately quantifying the associated costs

In fact, these reasons to track labor expenditures contribute to the concept of maintaining, or increasing, profit on the project. The job plan should be developed with the input and direct assistance of the field labor supervisors (sometimes called the labor superintendent or general foreman). The inclusion of the principal labor managers will increase the opportunity for accurate labor reporting. An essential element of

Activity Boundaries Marked on the Contract Drawings



accurate labor reporting is the clear definition of the work included in an activity.

Documenting the elements of an activity is an essential ingredient in achieving accurate labor reporting. One means of meeting this goal is to mark the outlines or boundaries of each activity on a set of contract drawings. The graphic example below shows how depicting the extents of a specific job plan activity can provide relevant documentation that can be constantly referenced during the life of the project.

In addition, other forms can be utilized to capture the details of each activity that can be referenced during the project to ensure that the actual labor hour reporting is accurate. The form shown below has been used on large and complex projects to document the labor, equipment and material required to perform each activity. The form allows the contractor's planning team⁶ to record each set, or task, which will be required to complete the activity. Such records can substantially improve the quality and accuracy of actual labor hour reporting in the field.

Any project reporting system requires an investment in terms of management resources. If a contractor expects to derive valuable management information from any reporting system, whether cost or labor efficiency, attention to detail and accuracy are a necessity. A "corporate culture" that supports accurate cost and labor reporting is essential. Once the initial data has been input and collected, the contractor has the following data that must be accurately coded and input on a period-by-period basis:

- Actual field craft labor hours charged to each activity ID code
- Estimated scope change hours that

must be input to update the job plan

- Current period percent complete progress by activity ID code

The foregoing represents the ongoing data that must be collected and entered into the LPR to allow the report to provide a variety of output data that can be used by the project management team proactively to address productivity "events" that serve to reduce profits and/or cause delays to the construction schedule. The software cost for implementing and maintaining a labor tracking and trending system is not the limiting factor for the use of such systems. Reporting systems as described herein can now be accomplished using some of the more advanced features of Microsoft Excel[®]. Therefore, the actual costs of the software and computer platform to run such systems are no longer a bar to their implementation. It is simply reduced to the will of the mechanical contractor to track the expenditure of its most valuable and volatile resource—field labor.

With an accurate LPR, the project management team can readily and effectively evaluate the productivity of defined areas of the project including specific crews, labor managers or other defined features of the work. Often, inspection of the updated job plan activity ID codes will alert the project management team to inefficient labor trends that can be investigated by physically observing the work and interviewing the labor foremen to determine whether the deteriorating labor productivity has been caused by changed conditions, unanswered RFIs, other impact events beyond the control of the mechanical contractor or self-induced inefficiencies.

However, if the contractor does not institute quality control checks and

is to increase profit. The mechanism by which that goal is achieved is known as “proactive management.” Simply put, this sort of management occurs when a project team is able to identify negative trends within its labor budgets early enough to allow the manager to identify the discrete work activity in which the inefficiency is occurring and to take steps to totally remedy or mitigate, or at least identify the source and location of, the productivity loss. Assuming that the activity has been properly developed, it will have definable and specific geographical boundaries such that the labor manager can walk onto the project and “stand” in the area of the activity. The presence of such specific labor tracking and trending can allow the manager to evaluate the potential causes of the reported inefficiencies and take the appropriate action before the

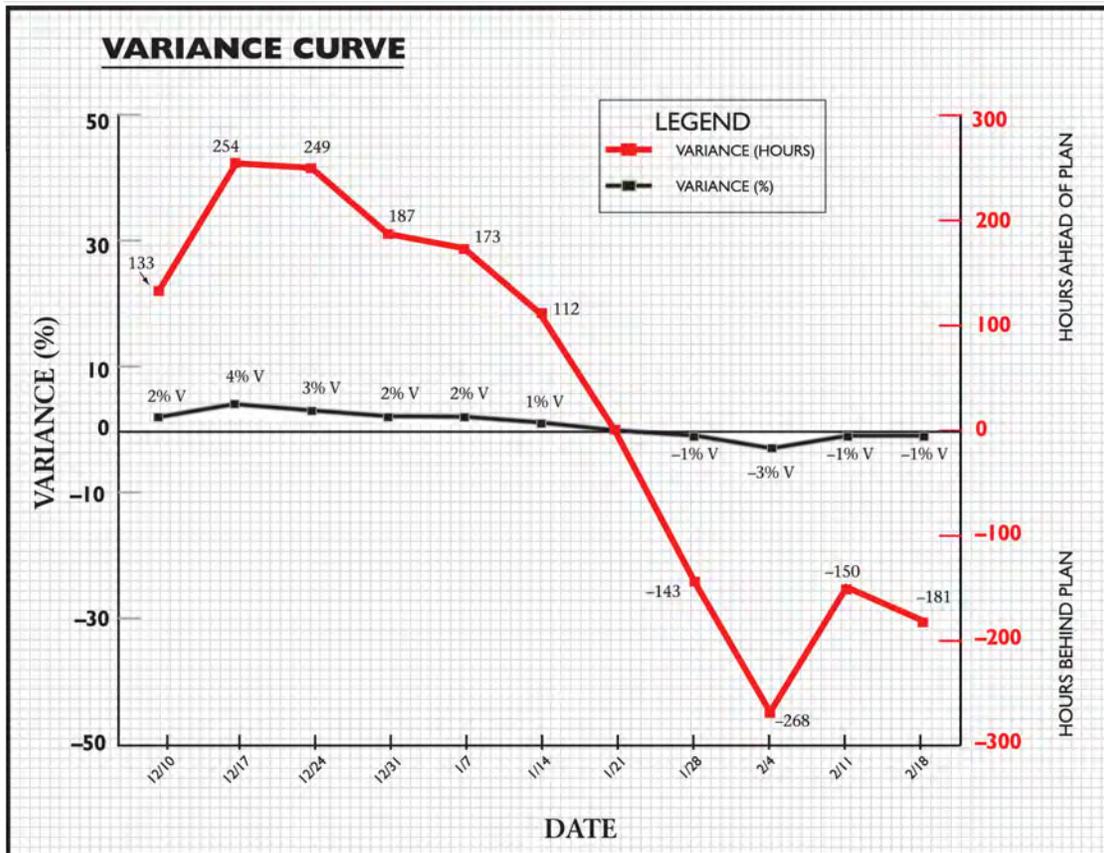
loss becomes project-wide.

Labor Productivity Trending

In order to grasp quickly the overall labor productivity on a construction project, it is essential that the data be presented in a format that can be readily acted upon by the management team. Various summary reports and trending curves can be produced from the LPR. For instance, from the summary of the LPR, the total project (or the mechanical portion thereof) can be computed on a period-by-period basis. This data, in combination with the variances computed within the LPR, can be combined to create a curve or trend of labor productivity, as can be seen in the example below:

From this sample curve, the trend of the labor expenditures can be plotted and

Labor Productivity Variance Tracking & Trending Curve



quickly evaluated by the project

management team. On this example, the total project percent complete, labor hours over/under budget and percent variance are shown on one chart. These types of easily assimilated graphic presentations can be augmented with other types of “roll up” trending reports that have their data derived from the LPR without any further input by the project team. Other sorts of “roll up,” summary level reporting that can be generated from the data described previously herein includes the following example:

Such summary level reports require no further input from that described herein and can provide valuable management information. From the above example, the following data can be derived:

- Total hours ahead or behind the job plan
- Total project percent complete in

terms of labor hours

- Progress gained by period in terms of labor hours
- The progress (by percent complete) that must be achieved by period
- Required crew size at the planned rate of performance
- Required crew size at the actual rate of performance
- Historical reporting on the activities that have been completed
- Trending of the active activities

These data can provide further insight into the typically non-linear expenditure of labor hours on a construction project and within each discrete activity. The object of any reporting methodology and output reporting is to increase profits and eliminate the end-of-project labor

Labor Performance Summary

Issue	12/10	12/17	12/24	12/31	1/7	1/14	1/21	1/28	2/4	2/11	2/18
Mechanical Work											
Planned Hours	17908	18208	18208	17848	17848	18526	18526	18526	18526	19882	19882
Completed Hours	5867	6510	7190	7596	8075	8718	9280	9919	10602	11554	12310
Actual Hours	5734	6256	6941	7409	7902	8606	9282	10062	10870	11704	12491
Hours This Week	585	522	685	468	493	699	676	780	808	722	787
Variance (Hours)	133	254	249	187	173	112	-2	-143	-268	-150	-181
Variance (%)	2%	4%	3%	2%	2%	1%	0%	-1%	-3%	-1%	-1%
Effective Crew Size	16	15	19	13	14	19	19	22	22	20	22
Current & Complete	33%	36%	39%	43%	45%	47%	50%	54%	57%	58%	62%
Progress This Week (%)	3%	3%	4%	3%	3%	2%	3%	3%	4%	1%	4%
Progress: 4 Week Average	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Required % Comp./Wk	4%	4%	4%	4%	4%	4%	4%	4%	4%	5%	4%
Weeks Available Left	18	17	16	15	14	13	12	11	10	9	10
Job End Date	4/14	4/14	4/14	4/14	4/14	4/14	4/14	4/14	4/14	4/14	4/28
Req. Crew @ Plan Rate	20	20	19	19	19	21	21	22	22	26	21
Req. Crew @ Actual Rate	19	19	18	19	19	21	21	22	23	26	21
95-100% Activities (Plan)	420	420	420	420	861	2478	3095	4582	5559	6067	6749
95-100% Activities (Actual)	434	434	434	434	830	2419	2933	4600	5864	6065	6810
100% Better/Worse (Hrs.)	14%	-14%	-14%	-14%	31%	59%	162%	-18%	-305%	2%	-61%
100% Better/Worse (%)	-3%	-3%	-3%	-3%	4%	2%	5%	0%	-5%	0%	-1%
5-95% (Plan)	11842	12142	13792	15272	15272	10078	9428	8014	8111	9073	9196
% of Mech. Plan Action	66%	67%	76%	86%	86%	54%	51%	43%	44%	46%	46%

loss “surprise” that afflicts a large number of otherwise sophisticated and successful mechanical contractors.

When Loss of Labor Productivity Claims Arise

On some projects, the mechanical contractor sustains a substantial loss of labor productivity for which the contractor seeks recovery from a prime contractor or owner. Each year, MCAA member firms incur hundreds of millions of dollars in unplanned labor expenditures due to loss of productivity impacts not caused by the mechanical contractor. To the extent that it can be demonstrated that the mechanical contractor was not the cause of such losses, it may be necessary to develop a loss of productivity claim. In some cases, the very survival of the contractor may depend on the success of such a request for equitable adjustment. Once the mechanical contractor’s estimate has been eliminated as the source of the loss, the mechanical contractor should determine what other events cause the loss of productivity. Some commonly overlooked items are the impacts of RFI’s, field change directives and “field fit-to-suit” conditions, which are seldom incorporated into the compensation for change orders. After careful evaluation of the events that adversely affected the labor productivity on a project, the mechanical contractor has the option of either absorbing the loss or preparing a loss of productivity claim. One of the acceptable methods of computing loss of productivity is the “measured mile” method. This method is described in the bulletin describing “*How to Use the MCAA Labor Factors.*” Simply put, this methodology computes inefficiencies by measuring a contractor’s actual productivity rate achieved in a time frame or area of lesser impact and compares the contractor’s actual productivity in a time frame or area of representative impact.

Among other information that is necessary in order to perform a measured mile analysis, the contractor must have available comparative data in order to compute the varying production rates. If the contractor maintained an LPR system similar to that described herein, then the data required to perform a measured mile analysis can usually be compiled.

By referencing its estimate, or by taking off systems by activity ID codes, the contractor can equate labor hours to the quantity of material installed. A measured mile analysis requires knowing the actual hours expended to install a unit of material; for instance, hours actually expended to install a linear foot of 14" ASTM A-53 schedule 40 butt weld pipe by area or time frame. The vast majority of mechanical contractors do not track materials installed on a period-by-period basis. However, the materials and conditions of installation can be readily analyzed by reviewing the historical data that supports the job plan and the LPR. Assuming the mechanical contractor has retained the records (such as contract drawings marked by activity ID code or the Activity Planning Form) that provide the basis of each activity, the materials installed in the activity can be estimated or, if the Activity Planning Form has been used, the material data are readily available without the need to reestimate the materials.⁷

Assuming that the contractor has accurately recorded the actual hours charged to each activity ID code, the hours required to install the material and equipment within an activity are identifiable. With that information in hand, a contractor can compare the labor required to install systems in less impacted time frames or areas with the labor required to install similar systems in the impacted time frame or area. The measured mile method is not dependent

upon the contractor's estimate because it uses actual installation rates achieved on that particular project site to form the basis of the productivity comparison. As noted in "How to Use the MCAA Labor Factors," on some projects it will be impossible to perform a measured mile analysis, even if proper labor productivity data is available. On many projects, there is no identifiable unimpacted, or less impacted, period thereby preventing the contractor from applying a measured mile analysis. In such cases, the MCAA factors described in "Factors Affecting Labor Productivity" and "How to Use the MCAA Labor Factors" can be useful in estimating the cause and effect of various sources of inefficiency such as "Reassignment of Manpower," "Crew Size Inefficiency," "Dilution of Supervision" and "Overtime Inefficiency." This data and an explanation of what a loss of productivity claim entails are addressed in the other MCAA bulletins as noted above.

Conclusion

Measuring labor productivity during the course of a construction project requires discipline, dedication of the labor management team and an earnest desire to understand the somewhat ethereal and amorphous concept of labor inefficiency. The pursuit of this understanding, however, can lead to more profitable construction projects and avoidance of substantial losses that are occasioned by impacts causing loss of labor productivity.

Author's Note

Obviously, the labor tracking and trending concepts described herein were not originated by the writer. I am compelled to credit many experienced and highly profitable mechanical contracting firms, well known within the MCAA membership, for developing, testing and proving the inestimable

value of the labor tracking and trending systems described in this bulletin. The writer had the privilege of having been employed by one such firm and had the opportunity, on a first-hand basis, of experiencing the hard work developing and maintaining an accurate LPR system and also of witnessing the material benefits that resulted from this proactive management concept.

Paul L. Stynchcomb, CCM, PSP, CFCC
FTI CONSULTING

¹ For the purpose of increasing the competitive nature of a bid, many mechanical contractors "discount" the detailed labor estimate by some factor or percentage. Any such adjustments should be carefully documented in the bid file.

² In today's construction environment, the most widely used CPM scheduling software system is Primavera[®]. This software system allows activity descriptions of up to 48 characters in length, however the software allows for many additional fields into which the planner may place area, floor, column line, crew identification, or other code information in order to track the activity with greater particularity.

³ "Erection Activity" as opposed to procurement activities, such as "Fabricate and Deliver Chiller," which may have a duration of many months and will not be assigned field erection labor in the job plan or in the schedule.

⁴ Some mechanical contractors require that the construction team "re-plan" the project once it has been transferred from the estimating department. The construction team may find differences in the construction estimate" as opposed to the original estimate. The job plan should reflect the planned hours determined by the team that will actually take responsibility for the profitability of the project.

⁵ The frequency of the reporting periods is generally governed by the frequency of the pay periods of the field craft labor, which is usually weekly or twice monthly. The longest

effective reporting period in terms of labor tracking and trending is approximately monthly.

⁶ Many mechanical contractors find it very valuable, and highly profitable, to have the construction team perform a re-estimate of the project before commencement of the work. While time-intensive, this operation provides an invaluable learning experience for the project team concerning the particulars of their specific project and will provide for a reasonably detailed job plan that relates to the manner in which the project team will actually prosecute the work. Another benefit of this process is the identification of long lead-time procurement items.

⁷ To the extent that change orders have been issued, the original estimate for materials must be adjusted for the material items added by the change orders to create the “adjusted estimated quantities.” This is true for field labor as well.

Prepared by Paul Stynchcomb, CCM, PSP, CFCC of FTI Consulting, with peer review performed by: Ronald Pearson, President/CEO of The NewMech Companies; Matthew Hahr, V.P. of John J. Kirlin, Inc.; Richard Freeman, Exec. V.P. of Stromberg Metal Works, Inc.; Robert Cox, Esq. of Watt, Tieder, Hoffar & Fitzgerald; and Robert Windus, Esq. and Stuart Sakwa, Esq. of Moore & Lee, LLP.



Bulletin

Factors Affecting Labor Productivity

Instructions on the use of MCAA’s Labor Factors are provided in the section of this bulletin titled “How to Use the MCAA Labor Factors.”

Factor	Percent of Loss per Factor		
	Minor	Average	Severe
1. STACKING OF TRADES: Operations take place within physically limited space with other contractors. Results in congestion of personnel, inability to locate tools conveniently, increased loss of tools, additional safety hazards and increased visitors. Optimum crew size cannot be utilized.	10%	20%	30%
2. MORALE AND ATTITUDE: Excessive hazard, competition for overtime, over-inspection, multiple contract changes and rework, disruption of labor rhythm and scheduling, poor site conditions, etc.	5%	15%	30%
3. REASSIGNMENT OF MANPOWER: Loss occurs with move-on, move-off men because of unexpected changes, excessive changes, or demand made to expedite or reschedule completion of certain work phases. Preparation not possible for orderly change.	5%	10%	15%
4. CREW SIZE INEFFICIENCY: Additional workers to existing crews “breaks up” original team effort, affects labor rhythm. Applies to basic contract hours also.	10%	20%	30%
5. CONCURRENT OPERATIONS: Stacking of this contractor’s own force. Effect of adding operation to already planned sequence of operations. Unless gradual and controlled implementation of additional operations made, factor will apply to all remaining and proposed contract hours.	5%	15%	25%
6. DILUTION OF SUPERVISION: Applies to both basic contract and proposed change. Supervision must be diverted to (a) analyze and plan change, (b) stop and replan affected work, (c) take-off, order and expedite material and equipment, (d) incorporate change into schedule, (e) instruct foreman and journeyman, (f) supervise work in progress, and (g) revise punch lists, testing and start-up requirements.	10%	15%	25%

Factor	Percent of Loss per Factor		
	Minor	Average	Severe
7. LEARNING CURVE: Period of orientation in order to become familiar with changed condition. If new men are added to project, effects more severe as they learn tool locations, work procedures, etc. Turnover of crew.	5%	15%	30%
8. ERRORS AND OMISSIONS: Increases in errors and omissions because changes usually performed on crash basis, out of sequence or cause dilution of supervision or any other negative factors.	1%	3%	6%
9. BENEFICIAL OCCUPANCY: Working over, around or in close proximity to owner's personnel or production equipment. Also badging, noise limitations, dust and special safety requirements and access restrictions because of owner. Using premises by owner prior to contract completion.	15%	25%	40%
10. JOINT OCCUPANCY: Change cause work to be performed while facility occupied by other trades and not anticipated under original bid.	5%	12%	20%
11. SITE ACCESS: Interferences with convenient access to work areas, poor man-lift management or large and congested worksites.	5%	12%	30%
12. LOGISTICS: Owner furnished materials and problems of dealing with his storehouse people, no control over material flow to work areas. Also contract changes causing problems of procurement and delivery of materials and rehandling of substituted materials at site.	10%	25%	50%
13. FATIGUE: Unusual physical exertion. If on change order work and men return to base contract work, effects also affect performance on base contract.	8%	10%	12%
14. RIPPLE: Changes in other trades' work affecting our work such as alteration of our schedule. A solution is to request, at first job meeting, that all change notices/bulletins be sent to our Contract Manager.	10%	15%	20%
15. OVERTIME: Lowers work output and efficiency through physical fatigue and poor mental attitude.	10%	15%	20%
16. SEASON AND WEATHER CHANGE: Either very hot or very cold weather.	10%	20%	30%

Connecting the “Cause” and “Effect” in Loss of Productivity Claims

By Gerson B. Kramer

Gerson B. Kramer began acquiring his vast experience in measuring differential productivity during his first post-college job at the Department of Labor’s Bureau of Labor Statistics. After graduating from George Washington University School of Law, Mr. Kramer joined the Justice Department’s Court of Claims Section and later the Commerce Department’s Appeals Board. For ten years prior to his retirement, Mr. Kramer served as chairman and chief administrative judge of the Department of Transportation’s Contract Appeals Board. In that capacity, Mr. Kramer heard cases involving contractors’ claims for loss of labor productivity and authored a reported decision on one of the government’s largest inefficiency cases in the history of any major board of contract appeals.

The construction industry is one of the leading capital industries that drive the U.S. economy. As an industry, it depends to a great extent upon labor productivity to remain profitable. Yet, many construction firms do not maintain the necessary records to supply the quantification of its labor productivity.

A contractor needs to maintain accurate contemporaneous productivity records to manage its labor forces and to serve as a foundation in the event of a productivity claim. While the courts and boards have established the principle that a contractor need not compute its loss of productivity with exactness, it would appear that accurate recording of a contractor’s productivity is simply a management necessity to ensure profitability, irrespective of the portent of an inefficiency claim.

One of the fundamental issues that a trier of fact considers in hearing a contractor’s inefficiency claim is “cause and effect.” Important in the consideration is the question of whether or not the contractor’s claims as to productivity impacts comport with the

quantum being sought. In my experience, “productivity” can be summed up as the efficiency that contractors achieve in converting inputs to outputs. In the construction industry, this usually means the conversion of labor hours to a quantity of installed materials, such as tons of steel erected, cubic yards of concrete poured or linear feet of pipe installed. However, where productivity is concerned, there is no general agreement and no “black letter” law as to how this is to be quantified. This is equally true of quantifying the loss of productivity. Furthermore, standard cost accounting categories and standard monetary categories do not readily yield the necessary quantifications of labor productivity or loss of productivity. Neither the IRS nor the vast majority of construction CFOs arrange for, or demand, the reporting of the necessary elements to calculate or quantify productivity or its loss.

This lack of quantification on productivity or its loss becomes problematical when disputes arise. The disputes process that is presented to tribunals calls for magistrates to make findings of fact on

very specific matters. Although there is currently no accepted empirical study that delineates a specific methodology or a particular means of record keeping to prove productivity or the loss of productivity, one method of labor productivity quantification that has achieved a relatively high level of acceptance is known as the “measured mile” analysis. This methodology is highly dependent upon the contractor’s books and records and also upon the presence of an unimpacted and impacted area or period by which a production ratio can be computed. While this methodology has been well received by the courts and boards, it is also true that this methodology cannot be applied on many construction projects for a host of reasons, two being the lack of detailed productivity record keeping and the lack of suitable or comparable unimpacted areas or time frames. The inability to prepare a measured mile analysis does not, in and of itself, bar a contractor’s loss of productivity claim. In such cases, the contractor must apply a different methodology to connect the cause and effect.

It is a fact that the MCAA factors have been in use for over 30 years in furnishing a means of estimating loss of productivity in construction matters. One of the most beneficial and advantageous facts is that the MCAA factors require users to consider carefully the narrative facts and project events or milestones with the trends shown by the numbers. “How to Use the MCAA Labor Factors” repeatedly instructs users to assess carefully each and every element of fact along with the use of the percentage factors provided by “Factors Affecting Labor Productivity.” Direct and indirect impacts need to be quantified carefully in conjunction with the specific events of the project.

This process of matching the facts with the claimed loss of productivity is designed to provide the deciding tribunals with a degree of confidence necessary to reach the ultimate decisions. It is well recognized that a contractor does not have to prove its loss of productivity with mathematical exactitude; however this does not relieve the contractor from making a compelling case as to the specific causes of the impacts and to connect them with a logical effect. In this regard, the MCAA factors have been found to be a reliable means of estimating a contractor’s loss of productivity caused by individual categories of causation. For this reason, “How to Use the MCAA Labor Factors,” which outlines how to use the MCAA factors to arrive at a reasonable estimate of productivity or loss of productivity, should furnish much needed and useful guidance to users who need to estimate productivity quantities and costs.

MCAA thanks Judge Kramer for providing this introduction.

How to Use the MCAA Labor Factors

Introduction

Since 1971 the MCAA has offered “Factors Affecting Labor Productivity” in its *Management Methods Manual*. Known as the “MCAA factors,” they have been used by contractors to forward price estimated losses of labor productivity in change order proposals, and to retroactively price estimated losses of labor productivity in the whole after the completion of a project. Since their introduction in 1971, the factor titles, descriptions and the percentage of estimated impacts have remained unchanged.

“How to Use the MCAA Labor Factors” has been developed to provide detailed explanations suggesting the proper use of the MCAA factors in estimating losses of labor productivity for both forward and retroactively priced change requests and for performing labor productivity analyses.

Also included are some points of consideration when assessing change order conditions and contract language that may affect the contractor’s ability to recover its damages. However, this chapter offers no legal opinions or conclusions and the contractor should review all project documents and conditions with counsel.

This chapter has been prepared to assist the contractor with the quantification of the loss of labor productivity caused by occurrences described by the various MCAA factors. Of all construction-related subjects, the proof and quantification of the loss of labor productivity are recognized as among the most difficult and complex to describe. An attempt has been made to

avoid the overly scientific and complex. It is understood that quantifying a loss of labor productivity is oftentimes based on an estimate of losses. However, by the very complex nature of the issue of the quantification of labor productivity loss, detailed explanations and qualifications of applications must be offered to the contractor.

The MCAA factors have proven to be a reliable means of estimating the loss of labor productivity on construction projects for over 30 years. The specific values shown in the factor tables must be applied with careful consideration and a review of the facts surrounding the events, which caused the loss of productivity. The applications of the various MCAA factor percentages will vary as project conditions dictate. This chapter will provide specific guidelines and examples of several methods of application for the proper use of the MCAA factors in calculating the loss of labor productivity on construction projects.

It is important to note that the MCAA factors have gained wide acceptance in the construction industry and before various courts, boards of contract appeals and tribunals of the American Arbitration Association. For example, reference the Appeal of Clark Concrete.¹ In this recent decision by the General Services Board of Contract Appeals, the board wrote, in part:

“To assess the impact of unanticipated conditions on productivity ... P&K used a manual published by the Mechanical Contractors Association of America (MCA). ... P&K has used it on other

projects to measure similar impacts, and the publication is generally accepted in the mechanical industry for this purpose. ... We have previously accepted the use of this manual for this purpose as well. Stroh Corp., 96-1 BCA at 141.132; also see Fire Securities Systems, Inc., VABCA 3086. 91-2 BCA 23,743 at 118.902. ... The manual lists various types of impacts, and for each, a percent of labor costs which represents loss of labor productivity under each of minor, average, and severe impacts."

Coupled with credible testimony, the MCAA factors can be useful to contractors, owners, boards of contract appeals and other courts and tribunals for the purpose of estimating a contractor's loss of labor productivity.

There are many definitions for the impact costs associated with a productivity loss on a construction project. The Department of Veterans Affairs Board of Contract Appeals in one decision offered the following cogent explanation:

"Impact costs are additional costs occurring as a result of the loss of productivity; loss of productivity is also termed inefficiency. Thus, impact costs are simply increased labor costs that stem from the disruption to labor productivity resulting from a change in working conditions caused by a contract change. Productivity is inversely proportional to the manhours necessary to produce a given unit of work. As is self-evident, if productivity declines, the number of manhours of labor to produce a given task will increase."

The board continued in its explanations of inefficiencies:

"Direct impact is generally characterized as the immediate and direct disruption resulting from a change that lowers productivity in the performance of the changed or unchanged work. Direct impact is considered foreseeable and the disrupting relationship to unchanged work can be related in time and space to a specific change. Cumulative impact is the unforeseeable disruption of productivity resulting from the "synergistic" effect of an undifferentiated group of changes. Cumulative impact is referred to as the "ripple effect" of changes on unchanged work that causes a decrease in productivity and is not analyzed in terms of spatial or temporal relationships. This phenomenon arises at the point the ripple caused by an indivisible body on two or more changes on the pond of a construction project sufficiently overlap and disturb the surface such that entitlement to recover additional costs resulting from the turbulence spontaneously erupts. This overlapping of the ripples is also described as the "synergistic effect" of accumulated changes. This effect is unforeseeable and indirect. Cumulative impact has also been described in terms of the fundamental alteration of the parties' bargain resulting from the change."²

The Armed Services Board of Contract Appeals has also found that two types of productivity impacts can arise from changes to the contract and the board wrote as follows:

"It is undisputed that the costs of performing changed work include both (a) those costs directly related to the accomplishment of the changed work, called 'hardcore costs,' and (b) those costs arising from the interaction between the changed work and unchanged work

or expended to offset inefficiencies experienced as a result of changes, called 'impact.' Viewed broadly, 'impact' embraces: the man hours, labor costs, and material costs that are expended to offset inefficiencies experienced as a result of Government-caused or contractor-caused changes or other departures from the plan. Included is the process by which the above inefficiencies in the performance of contract work are created.

Among other things, 'impact' includes: inefficiencies due to overcrowding, over or undermanning, skill dilution, extended overtime, shift work, and local and cumulative disruption.

'Local [or direct] disruption' refers to the direct impact that changed work has on other unchanged work going on around it. Conceptually, for purposes of this appeal, 'cumulative disruption': Is the disruption which occurs between two or more change orders and basic work and is exclusive of that local disruption that can be ascribed to a specific change. It is the synergistic effect . . . of changes on the unchanged work and on other changes."³

It is clear that a contractor must consider both the direct impacts of a loss of labor productivity caused by a change to the contract scope of work, as well as the cumulative impact of changes in scope to the unchanged work. In the past, many contractors have used the MCAA factors only when "forward pricing" a loss of productivity component of a change order proposal. In addition to providing updated general instruction on the uses of the MCAA factors, this chapter seeks to explain how the MCAA factors can also be applied equitably and reasonably when retroactively quantifying the cumulative

effects of changes on the productivity of a construction project.

General Discussion of Loss of Labor Productivity

To offer the lowest bid price or negotiated price for a construction project, labor intensive contractors such as mechanical and electrical contractors must plan to control labor productivity. Controlling the productivity of labor during construction is central to maintaining a fair and reasonable profit. When events occur which could not reasonably be foreseen by a contractor during the bidding or negotiating process, and which materially and negatively impact the contractor's labor productivity through no fault of the contractor, the contractor should consider seeking recovery of the costs of the loss of labor productivity.

For the purposes of this chapter, "owner" refers to the party with whom the contractor executed a "contract." If a subcontractor, it could be the general trade contractor; if a prime mechanical/electrical contractor, it could be the project "owner," whether public or private.

Contractors have long understood that adding new scopes of work to the original work plan can disrupt the flow and rhythm of the otherwise productive crews. The added work often comes at the peak of the planned effort on the project, when craft levels are already at their highest points on the labor curve. Also, added scope often affects the schedule, available work spaces, ability of labor supervisors to effectively manage base contract craft labor, material and equipment procurement and many other productivity-related factors. Sometimes the effects of a scope change/change order, or a series of such changes, on labor productivity can be of a higher dollar value than the

direct cost of the change itself. Assuming that the contractor did not cause the changed conditions, the contractor should seek to recover those losses in labor productivity either within the change order, or, if necessary, at the end of the project when all of the effects of project-wide changes on the total labor productivity can be measured. The courts have stated clearly that exact methods of loss of labor productivity quantification are not a condition precedent for recovery. Boards and courts have recognized the difficulty of measuring productivity loss and allow the contractor to use several methods, including the MCAA factors, to measure such losses.

Often, contract language known as “full accord and satisfaction” language, contained in some change order forms, may require the contractor to attempt to price all categories of productivity loss within the change itself, as estimated values. This is called a forward priced productivity loss and the cost of this estimated loss can be included as a line item in the change order proposal. While it can be highly beneficial to include all estimated impacts within a change order, thus “closing out” the change, many owners refuse to recognize labor productivity impacts caused by scope changes or other factors beyond the control of the contractor. This leaves the contractor in the unwanted position of either not executing change orders due to the risk of waiving its rights or placing a “reservations of rights” statement on each change, which can have the effect of holding open the option of making further requests for equitable adjustment should the contractor suffer productivity losses due to the cumulative impacts of changes in scope on the project.

Productivity loss recovery, which is sought at the end of a project phase or after the project is concluded, is called a retroactive productivity loss analysis.

Such retroactive productivity loss analyses take into account the total impacts of all unanticipated categories of potential loss, such as the quantity (in terms of added craft hours) of changes, resequencing, schedule delays and disruptions, overtime and shift work and increase in crew size over the optimum level.

Many experts in the field of productivity loss analysis believe that the only means of recovering a significant portion of productivity loss is to measure such losses in their totality, at the end of the project, particularly when such losses are a result of a large number of scope changes,⁴ which add a significant number of craft hours. This is believed to be true because it can be very difficult to evaluate fully the effects of productivity loss caused by one, single change in scope on the contractor’s entire labor force, when it may not be known how many changes will be forthcoming in a given time period and how the aggregate of those potential impacts will increase the contractor’s overall productivity losses. Such claims are typically called “cumulative impact” claims and are a recognized phenomenon by the major boards of contract appeals. It is understood that on projects pervasively and adversely affected by changes in scope, the only reasonable means of recovery may be through a cumulative impact claim rather than a forward priced, or individually priced, loss of productivity quantification.

Nevertheless, both methods of productivity loss—the forward priced and retroactively priced—are valid, and each project may demand the use of either, or both methods, described herein.

In terms of actually measuring a loss of labor productivity, several methods may be available to the contractor. A highly

regarded method of measuring productivity loss is known as the “measured mile.” This approach utilizes actual productivity measurements taken in unaffected and affected portions of a project and, from that data, a productivity ratio is established.

However, many contractors do not maintain labor hour tracking and material installation records needed to support this methodology and on some projects, there are no unimpacted labor hours. In such cases, the MCAA factors can be very useful and have been accepted by courts and boards as a reliable means of estimating a contractor’s loss of labor productivity.

It must be stressed that the contractor should carefully study the contract general and special conditions, the project schedule, change order forms and other, related documents to understand fully the rights, liabilities, obligations, limitations and remedies which are provided for by the documents that comprise the overall contract. These documents may dictate which method the contractor uses on a given project.

While the trend at the boards of contract appeals had been to define waiver language contained in change order forms as only waiving all impacts (direct and indirect costs) that were “knowable” at the time the change order was signed, the current trend points to much stricter and broader interpretations of waiver language on change order forms. An example of a generally “unknowable” impact is labor inefficiency caused by cumulative impacts: those impacts arising from a multitude of unanticipated labor-intensive changes in scope. Since cumulative impact labor inefficiency claims can only be quantified when all of the changes are known and the work is complete, in the recent past it was successfully argued that a contractor

was not understood to have waived its cumulative labor inefficiency impact claim on executed change order forms containing “full accord and satisfaction” language since such impacts are not fully known while the project is active.

In line with the earlier cases, the recent U.S. Court of Federal Claims case of *Bell BCI Company v. United States*, 81 Fed. Cl. 617 (2008) upheld the proposition that cumulative impact labor inefficiency claims were understood to be preserved even in the presence of waiver language on change order forms. However, on appeal, this decision was vacated in part by the U.S. Court of Appeals for the Federal Circuit. The Court of Appeals did not issue a finding as to whether or not the contractor sustained a loss of productivity caused by cumulative impact. Rather, the Court of Appeals found that the broad waiver language contained on the government’s change order form had released the government from any and all liability beyond the express relief provided for in the change order itself.

The Appeals Court wrote, “The language [on the change order form] plainly states that Bell released the government from any and all liability for equitable adjustments attributable to Mod 93.” The Court further wrote, “if parties intend to leave some things open and unsettled, their intent to do so should be made manifest.” As such, the contractor was barred from recovering its cumulative impact labor inefficiency costs for the contract modifications that contained the government’s waiver language.

Based on this appeal, it would be wise for a contractor to assume that if broad waiver language is present on the change order form, such language will be viewed as a waiver of the contractor’s right to later claim for any added compensation, even for those

costs attributable to a cumulative impact claim that cannot be quantified until the project has been completed. Thus, if a contractor believes that a cumulative impact claim may be forthcoming due to a large volume of labor-intensive changes in scope, change order forms containing broad waiver language should only be executed after careful weighting of the potential cost impact of a waiver (i.e., waiver of future cumulative impact claims) and with the advice of experienced construction counsel.

Use of the MCAA Factors for Forward Pricing Scope Changes

The MCAA factors can be applied to a pricing sheet for a scope change on an itemized basis. Once the direct costs of the change have been estimated—the labor, supervision, material, equipment and other such costs—the contractor can apply one or more of the MCAA factors to the change order breakdown sheet. In order to evaluate properly the estimated, potential impacts to labor productivity of changes in scope, the contractor must determine if the change requires a departure from the contractor's otherwise productive work flow. A change of very limited scope, which may affect only a small crew, and which may occur in a limited and distinct area of the overall project, may have little or no measurable negative impact on productivity. However, such changes in scope are rare. Generally, changes occur in the most active areas, and at times when crews are at or near their peak. These types of changes can have a significant, negative effect on crew productivity.

In order to estimate potential losses of productivity using the MCAA factors, questions can be posed to the contractor's labor supervisor(s) by management:

1.a) Will this change in scope cause us to add craft workers to our current work force, and if so, how many workers will need to be added, when will they be added and for how long?

1.b) Answers to 1.a could lead to adding the appropriate percentage for MCAA factors such as:

**Crew Size Inefficiency
Learning Curve
Dilution of Supervision**

2.a) Will this change move our crews into unanticipated, severe cold, hot, rainy or windy seasons?

2.b) The answer to this question could lead to a percentage for:

Severe Weather

3.a) Will this change cause us to shift existing crews to new areas, to stop work where we are, remobilize in another area, then return to finish the original work scope?

3.b) The answer to this question could result in the addition of multiple MCAA factors to the change order pricing:

**Reassignment of Manpower
Learning Curve
Dilution of Supervision
Stacking of Trades
Concurrent Operations**

4.a) Will this change in scope cause us to work in areas which were unanticipated, with other trades, which were not planned for in the same area, and for how long?

4.b) Answers to 4.a could lead to adding the appropriate percentages for MCAA factors such as:

**Stacking of Trades
Site Access
Concurrent Operations
Logistics
Ripple
Reassignment of Manpower
Learning Curve**

These are the types of conditions, for the purposes of examples, which can result from the issuance of changes in scope, and which can cause a loss of labor productivity. The contractor must apply the appropriate factor categories and percentages.

“Factors Affecting Labor Productivity” includes three levels of potential productivity impacts—“Minor,” “Average,” and “Severe.” Each level of impact intensity carries its own loss of productivity percentage. The three impact levels indicate the estimated effects of the changed condition on the labor hours being analyzed; i.e., specific hours within the total hours expended, or on the total hours expended on the project depending on the approach being used. Also, the three levels of intensity allow the user to more specifically assign an estimated impact for each of the MCAA factor categories being used, and like the categories themselves, should be applied with care and, if at all possible, with input by those who witnessed the conditions under evaluation.

While this chapter cannot provide for each and every condition under which contractors will choose a particular MCAA factor or factors, or the level of impact intensity, it is obvious that care must be taken to eliminate overlapping factors, to the fullest extent possible. The unrestrained and ill considered choice of multiple factors can lead to unreliable results.

For instance, the factor describing “Morale and Attitude” is a valid, but somewhat amorphous, category of inefficiency. The effects of a decline in workplace morale and attitude can be embodied in several other MCAA factors, such as stacking of trades, overtime fatigue and reassignment of manpower. It would be impossible to determine what portion the impact

percentage caused by stacking of trades, overtime fatigue and reassignment of manpower is attributable to the attendant decrease in worker morale and attitude. Thus, by way of the above example, when using other factors that may already include in the loss of productivity factor a consideration for decreased worker morale and attitude, it may be advisable to avoid applying a potentially duplicative factor such as “Morale and Attitude.” Another example to consider when striving to avoid factor duplication is the “Ripple Effect.” This term of art has been used in several board decisions and is a well recognized phenomenon in the construction industry. This MCAA factor describes the downstream effect on the mechanical contractor of impacts caused to predecessor trades. For example, the mechanical contractor’s schedule may be compressed because the building structure was erected late. In order to mitigate the structural delay, the general trade contractor may accelerate the follow on trades by stacking the crews of the various subcontractors, or forcing the subcontractors to work on an overtime basis. In such cases, the loss of productivity may be better classified by the events that result from the ripple effect, such as “Stacking of Trades” or “Overtime Fatigue.”

On some projects, a mechanical contractor may add labor supervision in order to mitigate a loss of productivity caused by an unplanned requirement to substantially increase its work force. In such cases, the contractor generally submits a request for equitable adjustment for its added supervisory costs. Such additions of supervision usually do not totally eliminate the contractor’s labor inefficiencies. The contractor may have suffered inefficiencies such as “Stacking of Trades,” “Logistics,” or “Reassignment

of Manpower,” which the added labor supervision could not mitigate or eliminate. However, where the contractor’s supervisory forces are effectively increased, it may be duplicative for the contractor also to assert productivity losses arising from the MCAA factor “Dilution of Supervision.”

Indiscriminate assignment of the MCAA factors can result in estimates that may be overstated and unreliable. Therefore, careful “testing” of each MCAA factor and its impact intensity must be carried out by the contractor. The description of each factor, which has remained unchanged for over 30 years, provides generally ample explanation of the type of impact described in each MCAA factor category.

It is important to understand that the MCAA factors provide a basis for developing reasonable estimates of loss of labor productivity and not for developing a loss with exactness. Thus, when the MCAA factors and their respective impact percentage are chosen, it must be with the intent to connect the cause or causes of the inefficiency with the reasonable effects. The MCAA factor descriptions represent the “cause” and the impact intensity percent represents the “effect” that can result from the conditions described by each MCAA factor. However, care must be taken to consider potential duplication and overlapping when the factor categories are chosen.

Likewise, the assignment of the impact intensity percentage must be chosen with care. For instance, if the change in scope is of a limited nature, on a project with a reasonably small crew size with little or no schedule impact (as opposed to productivity impact), then a “minor” category can be chosen. However, if the change is significant in its scope and requires major rescheduling and/or

resequencing, crew size increases, overtime, shifting of work areas, piecemealing of the work and general disruption of the rhythm of the crews, then “average” or “severe” impacts could be the result.

When the factor for “Crew Size Inefficiency” is used, it is most helpful to have on hand a planned craft level chart based on the estimate or the project plan. When attempting to demonstrate that conditions beyond the contractor’s control resulted in a loss of productivity, it is very helpful to show graphically what the contractor reasonably expected. Therefore, an estimated/ planned versus actual craft curve is often helpful in graphically depicting the effects of unplanned crew size growth.

The percent values for each category chosen are additive in the change order pricing. Once all of the factors have been carefully evaluated for each changed condition caused solely by the proposed change in scope, the percentages are added together. The total percent is then multiplied against the estimated craft labor hours for the change. For instance:

Change order estimated craft labor hours:	2,750 hours
MCAA factor:	
Crew Size Inefficiency	10%
Learning Curve	5%
Reassignment of Manpower	5%
Total	20%
Estimated Loss of Productivity (2,750 × 20%)	550 hours
Subtotal, Craft Labor Hours:	3,300 hours

As stated previously, this methodology prices the estimated loss of productivity caused by project conditions only on the estimated change order hours. But what about the impacts of change order work

on the unchanged hours? It is infrequent that a change in scope is so segregated from the base contract work that it has no effect on the crews performing unchanged, base contract work. How does the contractor recover the cost of a productivity loss caused by changes in scope to the unchanged work? There are several ways to estimate the impacts to labor productivity of changes to the unchanged work, two of which use the MCAA factors (i.e., the modified forward priced and retroactively priced methods). Another highly regarded method of measuring productivity loss is the “measured mile.” This approach utilizes actual productivity measurements taken in unaffected and affected portions of a project, and from that data, a productivity ratio is established. However, as previously noted herein, many contractors do not maintain labor hour tracking and material installation records needed to support this methodology and on some projects, there are no unimpacted labor hours. In such cases, the MCAA factors can be very useful in estimating the contractor’s loss of labor productivity.

Modified Forward Pricing for Estimating Labor Loss of Productivity on the Changed and Unchanged Work

It is a well understood principle that when significant changes in scope are issued to a contractor, a loss of labor productivity may affect the change order labor hours and the base contract labor hours. Previously herein, a method was described which only measured a loss of productivity on the estimated change order hours. This segment deals with estimating the effects of significant and pervasive changes in scope on the contractor’s entire labor forces, both those working on the changed work and those working on base contract labor; known as “the effects of changes in scope to the unchanged, or base

contract, work.”

The principle is the same as is often employed to describe the overarching effects of overtime fatigue as it impacts the overtime hours and the straight time hours worked by the overtime crews. Obviously, if a crew works for eight weeks of scheduled overtime, 10 hours per day for six days per week, the fatigue and its resulting effects impact both the straight time and the overtime hours worked by that crew. There is no way to segregate the impacts of this sort of loss of productivity factor between straight time activities and overtime activities.

Similarly, if the owner issues a major scope change, or issues many changes in scope in the same general time frame, it may be impossible for the contractor to segregate the loss of labor productivity to the change order work from the loss of productivity imposed on the base contract work by the changes in scope.

As an example, a crew of nine pipe fitters is working productively on base contract work. The owner issues a change, which requires four of this crew to move to scope change work. The craft supervisor for this crew must now divert his attention from the total crew performing base contract work to setting up the new “sub-crew” performing the scope change work. The remaining five workers’ productivity on the base contract work suffers because work is not being laid out as it was when the supervisor was focused only on the planned work of the single crew; answers to workers’ questions take longer to resolve and materials and tools are frequently “borrowed” from contract work to perform scope change work. These impacts are defined by “Dilution of Supervision,” “Reassignment of Manpower” and perhaps other MCAA factor categories. This is only one

example of how a change in scope can affect the productivity of both the change order hours and the base contract hours.

When attempting to estimate and recover such losses in labor productivity when changes of a significant magnitude affect the base contract work force, a modified approach can be employed. It is called a “time specific” MCAA factor method. The “time specific” method is used for both this modified forward pricing method and the retroactive pricing method (with slightly different rules), which will be described later in this chapter. The “time specific” method also requires significantly more information than does the standard forward pricing method, but it attempts to quantify loss of labor productivity to both the change order and base contract hours.

This method has some requirements, which may not be possible to meet because of problems inherent with the issuance of change orders. Some of the field conditions which can restrict or eliminate the effective use of this method include:

- 1) Unknown timing of owner’s approval of the change order “notice to proceed;”
- 2) Lack of foreknowledge on the part of the contractor regarding pending changes in scope which are to be

released by the owner for pricing;

- 3) Performance of the scope change work without change order execution; and
- 4) Not knowing what existing crews will be affected by the change order work.

Since these conditions are very prevalent on construction projects, the contractor may still be left with only three options: 1) use the method which limits loss of productivity estimates to the change order hours only; 2) wait until the project is over and perform an overall loss of productivity analysis; or 3) forego making any attempt to recover the loss of productivity costs from the party making the change.

However, if the project conditions allow the use of the modified approach, the general format is as follows:

- 1) The time frame of when the change order work will be performed must be known or estimated—in days, weeks, or at most, monthly increments.
- 2) The conditions of the change in scope must be known—what types and magnitudes of impacts are anticipated.
- 3) The planned craft hours for the affected period must be ascertained from estimates, labor plans or other

C.O. Impact Period	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Orig Planned Hours	400	400	600	600	720	800
Est C.O. Hours	80	160	320	400	400	160
Revised Planned Hrs	480	560	920	1,000	1,120	960
Learning Curve	5%	5%	5%	0%	0%	0%
Dil of Supervision	0%	10%	10%	10%	10%	10%
Crew Size Ineff	0%	0%	10%	10%	10%	0%
Total MCAA factor	5%	15%	25%	20%	20%	10%
Est Loss of Productivity	24	84	230	200	224	96
					Total	858

labor forecast reports.

- 4) The crews which could be affected by the change must be known (i.e., some changes may only affect certain physical areas of an overall project, and therefore, not the entire work force).
- 5) A table is prepared with planned hours per period (day, week or month) across the top, including the estimated change order hours. The appropriate MCAA factors are listed along the “y” axis of the table. Under each time period, the appropriate MCAA factor percentage is estimated. The percentages may change from period to period based on the estimated impacts. The percentages are then totaled and multiplied against the total, estimated/planned craft hours.
- 6) An example of a resulting table follows:

In this example, a specific time frame has been evaluated for estimated impacts. This more specific method permits the contractor to make MCAA factor applications, which can vary as estimated conditions vary. This is actually more realistic and compares well with what actually happens in the field when changes are issued, or when acceleration or other impacts occur. In reality, as time and conditions in the field change, the MCAA factors can change as well and the estimate should reflect this fact.

For instance, if the MCAA factor “Learning Curve” is applied to a change, which is estimated to have a long term effect, this factor may only be applicable for the first two to four weeks of the impact, as new workers become familiar with the work area. This methodology allows for a more precise estimation of loss of labor productivity impacts.

Similar to the concept of performing time specific analyses, it is also appropriate to determine if the contractor’s entire crew will be affected by the changes. If a change in scope only affects a separate and discrete area of the project, it may not be appropriate to impact the total crew hours by a loss of productivity factor. It is generally appropriate to use the MCAA factors on only those crews that will be affected by the changed condition.

Unfortunately, many owners simply do not recognize the effects of significant or numerous changes on the productivity of the base contract labor. However, virtually all contractors recognize this condition as a costly loss of labor productivity. Therefore, the contractor is frequently left with only one option, a post-project measurement of productivity loss caused by conditions that are not the fault or responsibility of the contractor.

Impacting the Project Schedule Using the MCAA Factors

This chapter does not deal with the development of the schedule time impact analysis (“TIA”) or “fragnet.” However, contractors should impact the current project schedule activities with the loss of productivity estimates derived from using the MCAA factors.

For instance, a contractor originally planned a series of activities as shown below. One of the activities was adversely affected due to a change, resulting in a 20% impact to productivity. Inefficiency can impact schedule durations and as such, the duration of the affected work must also be factored. Unless crews are added, the originally planned duration for “Piping Branches” would increase from 18 days to 22 days as a result of the 20 percent impact to productivity.

The loss of labor productivity will, in general, cause planned activities to take longer to perform, because the productivity ratio of 1:1, which was most likely used as the basis of the activity duration estimate, is no longer accurate. The contractor will no longer receive one hour's production for an hour planned, but rather some production rate less than the plan. Therefore, unless crews and supervision are added to the schedule in such numbers and with such care so as to accommodate the loss of productivity, the work activities will take longer than planned.

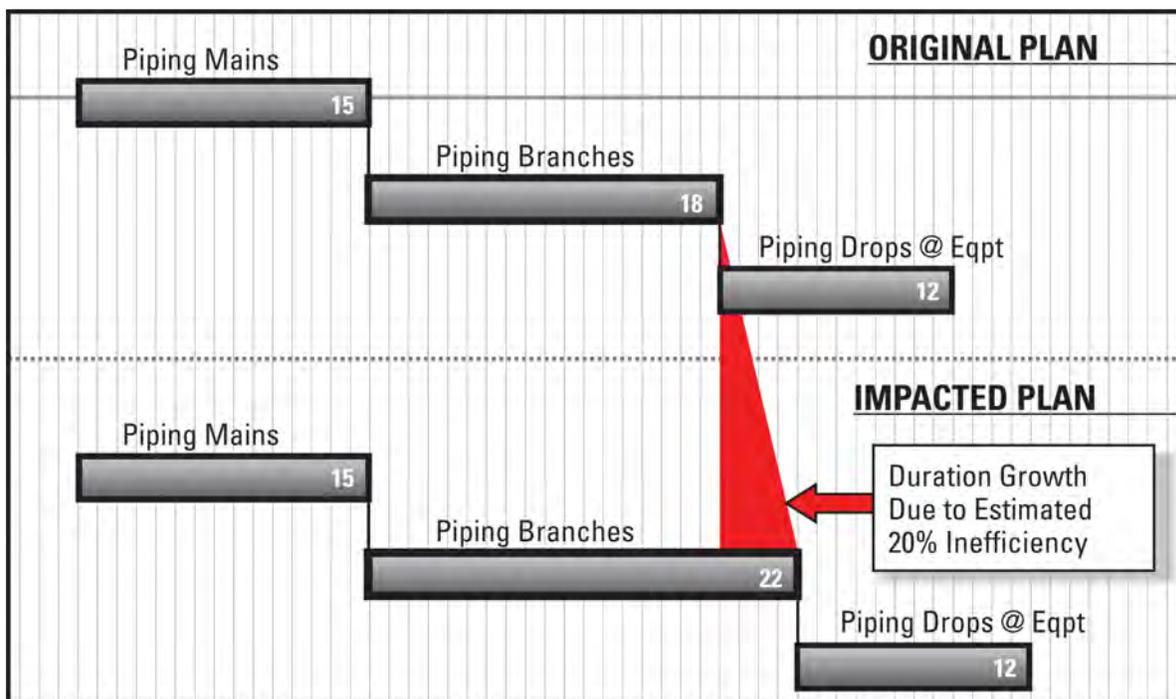
In this example, the 18-day planned activity in the series will take approximately 22 days each to perform, given an estimated loss of productivity of 20 percent. The adjustment of the project schedule for estimated losses in productivity can have a significant impact on the critical path, and on forecasted job costs. As can be seen in the graphic at the bottom of the page, the extension of a duration of a planned activity by adjusting the duration for an estimated loss in productivity using the

MCAA factors can materially affect the schedule.

Retroactively Pricing Losses of Labor Productivity Using the MCAA Factors

In many instances, the only option for a contractor attempting to recover a loss of labor productivity caused by changed conditions is to wait until the project is over and review the actual loss; planned versus actual. Such claims are sometimes known as "cumulative impact" claims. The "plan" can be the original estimate of craft hours or the preconstruction target plan. Before a contractor makes a claim for a loss of labor productivity at the conclusion of a project, several obvious considerations must be made, including:

1. Was the estimate/plan of craft hours accurate and reasonable?
2. Were the conditions, which caused the loss of productivity, reasonably foreseeable when the project was bid/negotiated?



3. Did the contractor cause this loss of productivity?
4. Were the principal causes for the loss of productivity the responsibility of identifiable parties?
5. Will the potential cost of recovery exceed the loss?

There are a series of important legal considerations which could be added to this list which can only be addressed between the contractor and his construction counsel, and which are not the subject of this chapter. Additionally, this chapter addresses several methods of calculating a loss of productivity using the MCAA factors; however it does not address the means and methods of proving the impacts, often known as the "triad of proof," which includes proving (a) liability; (b) causation; and (c) resultant injury. This is also known as the "cause-and-effect" connection, which is necessary in linking an owner's actions and/or inactions to the contractor's injury. This chapter assumes that the contractor has already determined liability and causation, and is attempting to quantify the "resultant injury" by the use of the MCAA factors.

Assuming that the contractor is satisfied that the loss of productivity is significant and is principally the fault of another identifiable party, and that party is legally accessible for redress, then the contractor must prepare the cause and effect analysis.

Frequently, contractors use the MCAA factors to retroactively price the cumulative effects of changes in scope. Often, the method used by contractors is to multiply the cumulative percentage of losses of productivity as derived from the MCAA factors against the total, actual hours expended, sometimes with, and sometimes without, change order hours included in the total.⁵

This methodology of multiplying the MCAA factor percent against the actual hours is incorrect. The actual hours against which the MCAA factors are frequently multiplied in a contractor's retroactively priced claim for loss of productivity already include the contractor's loss of productivity; therefore multiplying the MCAA factors against the actual hours overstates the loss of productivity. Only by removing the theoretically efficient hours from the contractor's actual hours can the MCAA factors be properly applied in a retroactively priced request for equitable adjustment.

The actual hours must be further adjusted to deduct:

1. Time and materials hours;
2. Hours spent to repair the contractor's defective work;
3. Change orders on which a loss of productivity has already been calculated; (If the contractor has included "forward priced" loss of productivity in individual, executed change orders, and then seeks to recover global losses at the end of the project, these incremental, per change order loss estimates must be factored out of the computations.)
4. Hours associated with executed change orders, where it has been determined that the contractor is barred from recovering the impact caused by the executed change orders;
5. Hours expended by crews that were not affected by a loss of productivity;
6. Other types of productivity losses for which the contractor is responsible (i.e., bid errors)

Also, some contractors simply apply the

total MCAA factor percentage to the total actual hours for the entire project duration. This can, in some instances, lead to inaccurate results because the effects of labor inefficiency can change during the life of the project.

The MCAA factor percentages sometimes change as actual project conditions change. Therefore, it can be useful to assign the MCAA factors to the specific impacted time frames within the overall project duration. In some cases, multiplying an MCAA factor against the total hours expended for the total duration of the project will result in a distortion (on the high side) of the forecasted loss of productivity.

The loss of productivity categories described by the MCAA factors can occur in a nonlinear fashion across the entire duration of a project. To more accurately demonstrate the retroactive loss of productivity on a project, it may be desirable to divide the project into months (or, if possible weeks) and to assign loss of productivity percentages by MCAA categories by time periods, based on the accounts of eye witnesses (field managers, labor supervisors and other fact witnesses) or on documents prepared contemporaneously. Consideration of the areas of the project and the crews working in those areas is very important in performing this analysis. Only the crew hours that have been impacted by the changed conditions should be included in the loss

of productivity computations. This is similar to the format for the modified forward pricing method, described previously.

When it is possible to apply this procedure, the types of losses described by the MCAA factors can be more accurately assigned to discrete time periods. The following table shows an example of this type of time-specific assignment of MCAA factors. Different MCAA factor categories can affect different periods of a project and at different percentages of impact intensity. As stated, it may be inaccurate to globally apply the cumulative MCAA factors against the total hours expended on a project. It may, depending on the specific circumstances, be more accurate for the contractor to evaluate the loss of productivity on a periodic, rather than on a total project, time scale.

The following table demonstrates the as-built, retroactive loss of productivity analysis using the MCAA factors, the rows indicate:

1. The actual work period being measured for impacts.
2. The actual, payroll craft labor hours (without supervision).
3. Craft hours deducted for time and material ticket work, the contractor's own deficient work (rework), any estimated, self-inflicted productivity

Contract Period	Week 40	Week 41	Week 42	Week 43	Week 44	Week 45
Actual Payroll Hours	1,600	1,600	1,800	2,400	2,400	3,200
Deducted Hours		-80	-120	0	-120	-120
Revised Actual Hours	1,600	1,520	1,680	2,400	2,280	3,080
Reassignment of Mpw	5%	5%	5%	10%	10%	10%
Dil of Supervision	0%	10%	10%	10%	10%	10%
Crew Size Ineff	0%	0%	10%	10%	10%	10%
Total MCAA factor	5%	15%	25%	30%	30%	30%
Est Loss of Productivity	76	198	336	554	526	711
					Total	2,401

losses, crew hours that the contractor believes were not affected by the changes in scope, such as crews working in areas of the project not proximate to the areas where the changed work was performed, and change order adjustments as described herein.

4. The resulting “revised actual hours.”
5. The list of the MCAA factor categories being applied.
6. The resulting estimated loss of productivity for each time period.

Note that the total MCAA factor percentage has *not* been multiplied against the revised craft hours. Instead, the percentages have been totaled, the adjusted hours divided by one plus the decimal percent (i.e., 1.05 for the first period in the table), and that result subtracted from the total, adjusted hours. One significant difference between forward estimated and retroactively estimated productivity loss is that the contractor’s actual labor hours already include the loss of productivity. Therefore, it is necessary to calculate the productive hours first to avoid overstating the loss of productivity,

For instance, referencing the preceding table, during week 42, the contractor actually expended 1,800 labor hours. However, 120 hours were spent on time and materials work or repairing deficient work and were subtracted from the total, leaving 1,680 as the adjusted labor hours. After removing the contractor’s self-inflicted inefficiencies, if any, hours not affected by the changes, or the hours for which the contractor was paid for the inefficiency (i.e., T&M), what remains are actual labor hours that already include the non-contractor caused losses of productivity.

After interviewing the site personnel, if it is determined that a 25 percent loss of productivity occurred, then the contractor must determine the number of hours that were efficient based on that estimated loss. Thus, taking the 1,680 craft hours and dividing that by 1.25 results in 1,344 efficient hours. Had the contractor not suffered any loss, 1,344 hours should have been spent on the work. The difference of 336 hours are those attributed to the identified loss of productivity described by the MCAA factors.

With the above analysis, the hours the contractor should have spent, if no loss of productivity had been encountered, have been calculated (1,344 hours). Since the contractor has estimated that the workers were impacted by a 25 percent loss, the resulting labor hours being claimed for recovery is 336. If the contractor simply multiplied the 25 percent times the adjusted actual hours (1,680 x 25%), the resulting loss would be estimated at 420 hours. The overstatement of loss would have been 84 craft hours (420 – 336) if the MCAA factor calculation had been misapplied.

The “Should Have Spent” Labor Hours in a Retroactive Loss of Productivity Calculation

One of the foundations of a loss of labor productivity claim is to determine how many hours the contractor *should have spent* to perform the work had the contractor not been affected by events caused by others.

The purpose of dividing the actual, adjusted⁶ labor hours by 1.n, where *n* is the decimal % of the total of the selected MCAA factors, is to derive the “should have spent” hours on the project. Once the “should have spent” hours have been calculated, then these hours can be subtracted from the total, adjusted actual hours to determine the

hours of lost productivity. In a hypothetical project, one without changes in scope, estimate errors and contractor-caused inefficiencies, the calculated “should have spent” hours should, theoretically, equal the original estimated hours. However, this hypothetical condition almost never exists.

The actual hours are affected by a series of inextricably intertwined events, such as impacts of changes to the unchanged work, impacts caused by the direct hours of change order work to the changes themselves, and other factors that affect the number of labor hours actually expended on a project. Therefore, it is highly unusual when the calculated “should have spent” hours equal the original estimate of labor hours. The frequent inability to match the original estimated hours with the “should have spent” hours only demonstrates that many factors can enter into the total hours expended on a construction project, some of which can be difficult, or impossible, to identify and to quantify on an individual basis.

An example of calculating the “*should have spent*” hours appears in the next column.

The 4,085 hours represent the hours of lost productivity caused by all types of noncontractor caused impacts as calculated using the MCAA factors. The 13,615 hours are the “should have spent” hours if 17,700 adjusted, actual hours were spent and the project suffered an overall productivity loss of 30 percent.

From the following example the obvious question arises—what comprises the difference of 3,615 labor hours between the original estimate and the calculated “should have spent” hours (i.e., 13,615 “should have spent” hours—10,000 originally estimated hours)? The

Example:

A contractor estimates a project to require 10,000 hours of field erection labor.

At the conclusion of the project, the contractor determines that 18,000 hours of field labor were actually expended to construct the project.

The contractor determines that approximately 3,000 hours were expended on out-of-scope work, which came in the form of change orders and/or scope changes. The contractor also determines that approximately 300 craft hours were spent removing and replacing work which was improperly installed by the contractor’s own forces.

The contractor then reviews the project documents, interviews the management team, and determines that owner-caused problems, such as scope changes, disruptions and acceleration, have caused a loss of productivity on the project. A review of the change orders themselves reveals no language which could bar the contractor from recovering losses of productivity caused by the change orders.

Using the MCAA factors, the contractor interviews the management team and determines that the combined impacts caused by the owner, as described in the applicable MCAA factors, is estimated to be 30 percent. In this simplified example:

10,000 estimated/planned hours

18,000 actual hours less the remedial work of 300 hours = 17,700 hours

17,700 adjusted, actual hours divided by 1.30 (1 + 30%, or 1.30) = 13,615 hours

17,700 adjusted, actual hours less 13,615 “should have spent” hours = 4,085 inefficient hours

difference will most likely be comprised of the hours expended on scope change/ change order work, the loss of labor productivity caused by the change order/ scope change work and all categories of contractor-caused issues other than the hours subtracted in the “adjustment” phase of the computation (in this example, the subtraction of 300 labor hours which were attributed to the contractor’s own forces).

When the estimated 3,000 hours in scope change/change order work are subtracted from the “should have spent” hours of 13,615, the result is 10,615 hours. The remaining 615 hours (i.e., 10,615—the estimate of 10,000 hours) are unidentified, non-productive hours for which the contractor is not making claim.

It is often alleged by owners that contractors do not account for their own inefficiencies when calculating a loss of productivity claim. The aforementioned calculation demonstrates that the contractor has not made claim for 615 labor hours, which can be characterized as non-productive labor hours for which the contractor has taken responsibility. By whatever means chosen by the contractor, any contractor-caused loss of productivity must be deducted from the total loss of productivity hours quantified in the contractor’s request for equitable adjustment.

In the above analysis, the performance of change order work, as well as the contractor’s base contract work, would be performed inefficiently. Consequently, it could be appropriate for the contractor to recover losses of productivity incurred in the performance of change order work as a part of the contractor’s overall retroactive loss of productivity analysis as described above. However, as is discussed herein, it may be determined by the contractor’s counsel that “full accord and satisfaction” language contained in executed change orders bars the contractor from the recovery of productivity losses on the direct change order hours. In such events, the contractor may deduct the executed change order hours from the total actual hours to arrive at the adjusted, actual labor hours, as described in the appropriate section of this chapter.

In some cases, the interpretation of the

“full accord and satisfaction” language is so broad that the contractor’s cumulative impact claim is barred in total or in part because such impacts are claimed to arise from the change orders containing such exculpatory language. Therefore, it is *absolutely essential* that the contractor review with counsel all proposed change order forms and other contract documents⁷ that seek to limit the contractor’s right of recovery—before the contractor executes such documents.

In the event that the contractor, or the contractor’s counsel, determines that change order hours will *not* be deducted from the total, actual labor hours, it is necessary for the contractor to remove from the contractor’s retroactively developed loss of productivity claim any forward priced loss of productivity hours which were included in the contractor’s executed change orders. This is true because the MCAA factor calculation should include all categories of productivity losses, including those caused to the direct hours of the change orders themselves. To leave the forward priced productivity loss estimates in place when using the MCAA factors in a retroactive computation would be “double dipping.” In performing a total project, retroactive loss of productivity calculation, it is necessary to deduct the individual forward priced productivity losses, which may have been included in the contractor’s individual change orders proposals submitted by the contractor to the owner. This deduction can be included when arriving at the adjusted, actual labor hour total.

The calculated “should have spent” hours may include, in addition to the originally estimated hours: (i) actual change order/scope change hours; (ii) inefficiencies caused to and by the out of scope work (subject to other possible limitations discussed herein); (iii) contractor-caused losses of productivity;

(iv) contractor’s remedial work hours; and (v) estimating errors. Consequently, the comparison of the “should have spent” hours to the original estimate is generally not appropriate. What is important is that the owner is not being charged with the “should have spent” hours or for contractor-caused impacts in the retrospective productivity loss calculation as described in the above example and elsewhere herein.

**Modified Total Cost Method
Check of the Productivity Loss
Calculations**

When using the retroactive productivity loss analysis, it is prudent for the contractor to check the estimated loss of productivity, which results from using the MCAA factors against the modified total cost method of calculating the loss of labor productivity. The modified total cost method consists of a very simple calculation:

Actual expenditure in hours	A
(Less) Estimated hours	(B)
(Less) All types of contractor-caused problems	(C)
(Less) Change/scope change labor hours	(D)
Claimed loss of productivity hours	E

This section will suggest a simple check on the results of the loss of productivity calculations using the MCAA factors. This very important calculation check is shown as an example at the top of the next column using numbers from the “should have spent” example on page 20:

The remaining 615 labor hours would be the contractor’s productivity loss not claimed in the contractor’s request for equitable adjustment. These hours would remain as a potentially undefined, but unclaimed, loss of productivity. Nevertheless, it could be concluded that

Total actual hours expended	18,000
(Less) Estimated hours	(10,000)
(Less) Contractor’s remedial work	(300)
(Less) Change/scope change hours	(3,000)
Subtotal (hours)	4,700
(Less) Calculated MCAA factor loss of productivity hours	(4,085)
Total of remaining hours	615

some portion of the 615 hours was attributable to a loss of productivity caused by the 300 hours of remedial work. Thus, with this example, the contractor has taken to its own account a loss of productivity caused by its own actions and/ or inactions.

It is possible, however, for the remaining hours to be a negative number. If the remaining hours are represented by a negative number, it would indicate that the contractor expected a savings in labor, as compared with the contractor’s original estimate. While it is not impossible to put forth labor savings in a loss of productivity claim, it does require an added level of confirmation that savings in labor, as compared with the original estimate, would be a reasonable expectation of the contractor.

The reasonable expectation could include a detailed analysis of the originally estimated labor hours, a presence of an historical pattern of proven labor savings by the contractor on past projects, and a verification that the subject project lent itself to a higher-than-anticipated productivity by such factors as the presence of a high degree of prefabrication or repetitive work which was not fully addressed in the original estimate. If the remaining hours indicate labor savings, the contractor will most likely have to demonstrate both the claimed losses and the reasonability of labor savings, as compared with the original estimate.

Special Considerations for “Full Accord and Satisfaction” Change Orders when Calculating the Loss of Labor Productivity

Many public and private owners are including in their change order forms language which attempts to bar the contractor from recovering, at a date after the execution of the change order, any added costs arising from the change, such as loss of productivity.

The referenced language—that which attempts to bar the contractor from recovering additional costs arising from the change order after the execution of the change order—is called “full accord and satisfaction” language. The actual wording varies from project to project, and such language is best reviewed by the contractor’s counsel before the execution of the project’s first change order.

Boards and courts have found that when such language is included on executed change orders, the contractor may be barred from the recovery of added costs arising directly from the change, after the execution of the change order document. In some cases, the application of exculpatory language is applied very broadly to bar the contractor from any further recovery arising from a change order containing such language. It is equally important to note that, in a Veterans Affairs Board of Contract Appeals case,⁸ the board found that while the “full accord and satisfaction” language contained on the executed change orders barred the contractor from recovering retroactive, direct losses in productivity on the change order work, it did not bar the contractor from the board’s consideration of the alleged losses in productivity caused by the change orders *to the unchanged work*.

In the above referenced Veterans Administration Board of Contract

Appeals case, the real party of interest was the electrical subcontractor. The electrical subcontractor did not include any loss of productivity “impact” costs in its change order pricing, and sought to recover loss of productivity in its claim. The VA’s change order forms contained “full accord and satisfaction” language. Complicating the matter, there was “reservation of rights” language on the part of the contractor also in evidence.

The board ruled that it was the intent of the parties to resolve all costs directly associated with the executed change orders during the negotiations for change order pricing. However, the decision further stated: “We find that Dynalectric’s claims for cumulative impact on unchanged work ... survive the accord and satisfaction agreement.” The board found that, whereas the electrical subcontractor was barred from recovery of productivity impact costs on the work directly covered by executed change orders, which contained the “full accord and satisfaction” language, it could attempt to recover the cumulative loss of productivity impacts *to the unchanged work*.⁹

Therefore, when the contractor’s counsel finds that the contractor has executed change orders which contain enforceable “full accord and satisfaction” language, the contractor may find it advisable to remove from productivity loss calculations the hours (either estimated or actual) associated with the executed change orders. This deduction would form a part of the adjusted, actual hour computation explained herein.

Many contractors do not maintain records which memorialize the actual hours expended on change orders, or which identify when the change order work was actually performed. In such cases, it is necessary to use the estimated change order hours, and to further estimate when the change order

work was performed. This is best accomplished by the onsite managers, as the fact witnesses who saw the work being performed. An analysis which deducts the hours for executed change orders may appear as shown below.

By using this example, the contractor's deficient work and the change order work covered by executed change orders which contained "full accord and satisfaction" language have been factored out of the calculation. However, the impacts of productivity loss caused by changed events on the unchanged work remain.

Court Acceptance of Loss of Productivity Calculations

There are several court and board cases with published decisions which describe the use of the MCAA factors. The recent *Appeal of Clark Concrete* case, cited previously herein, clearly stated the board's acceptance of the MCAA factors publication in presenting a mechanical contractor's claim for loss of productivity. In *S. Leo Harmonay, Inc. v. Binks Manufacturing Company*, tried in the U.S. District Court, Southern District of New York in 1984 (No. 82 Civ. 6868), Harmonay sued Binks to recover several categories of project costs, including a loss of labor productivity. In the case, Harmonay's fact witness testified to a productivity loss of 30 percent based on personal observations and the use of the MCAA

"manual." The court, in this portion of the case, decided for Harmonay, stating in part, that:

"... courts have often recognized that the extent of harm suffered as a result of delay, such as the loss of efficiency claim at issue, may be difficult to prove. Thus, courts have recognized that a plaintiff may recover even where it is apparent that the quantum of damage is unavoidably uncertain, beset by complexity, or difficult to ascertain, if the damage is caused by the wrong."

This is an important case which established that even though the loss of productivity cannot be computed with exactness, the impossibility of reaching an exact proof of loss does not bar recovery.¹⁰ Also, in the Stroh case, which was previously cited, the General Services Board of Contract Appeals restated two important principals of productivity loss claims; that exact measurement of productivity loss is not a condition precedent for recovery, and in loss of productivity claims, the claimant bears the burden to clearly demonstrate that the cause (for which the claimant was not responsible) resulted in the effect (loss of productivity).

It is fortunate that courts and boards have recognized the difficult nature of quantifying with exactness construction

Contract Period	Week 40	Week 41	Week 42	Week 43	Week 44	Week 45
Actual Payroll Hours	1,600	1,600	1,800	2,400	2,400	3,200
Change Order Hours & Other Deductions		-80	-120	0	-120	-120
Revised Actual Hours	1,600	1,520	1,680	2,400	2,280	3,080
Reassignment of Mpw	5%	5%	5%	10%	10%	10%
Dil of Supervision	0%	10%	10%	10%	10%	10%
Crew Size Ineff	0%	0%	10%	10%	10%	10%
Total MCAA factor	5%	15%	25%	30%	30%	30%
Est Loss of Productivity	76	198	336	554	526	711
					Total	2,401

productivity losses and have not found the absence of precise measurements as a bar to recovery. Furthermore, the MCAA factors publication has been recognized as a useful and reliable tool by which loss of productivity impacts can be estimated, particularly when their use is coupled with credible fact-witness testimony.

When a Contractor Must Litigate an Inefficiency Claim

It is usually in a contractor's best business interest to settle, or at least to mediate, a construction dispute rather than to litigate or to take the matter to arbitration. The decision to litigate, or to arbitrate, means handing over the destiny of your case to others. It is usually a better business decision to control your destiny and bring a contentious matter to an amicable settlement, if at all possible.

When a contractor has utilized the MCAA's labor inefficiency factors and then decides to take its loss of labor productivity claim forward for a hearing at arbitration, in a court or before a board of contract appeals, it is helpful to know how the courts and boards have viewed this method of calculating labor inefficiency. As noted previously in this chapter, the MCAA factors, if properly applied, have gained broad acceptance as a reasonable means of estimating a contractor's loss of productivity. However, that does not mean that boards of contract appeals automatically find persuasive contractors' inefficiency claims prepared using the MCAA factors. A contractor should expect probative questioning regarding the factual basis of such claims, how the claim was prepared, who prepared it, and the qualifications and independence of the person testifying on the issue of labor inefficiency.

From time to time, the source of the

MCAA factors may be questioned. This issue has been addressed by the MCAA in a Declaration filed in 1999. While the records of the polling and data collection process were not retained in MCAA's files, through historical research, the means of preparation of the factors have been memorialized. Pertinent excerpts from MCAA's Declaration follow:

The MCAA Factors apparently were developed by the MCAA Management Methods Committee beginning in the late 1960s and continuing into the early 1970s. It is (MCAA's) informed belief that the committee was comprised of MCAA Member representatives who were experienced mechanical contractors. MCAA records show that in April 1969 a "rough draft on the subject of Change Orders in the Construction Industry" was presented to MCAA's Board of Directors.... In May 1970, the Management Methods Committee reported to the MCAA's Board of Directors on a "complete 'in-depth' study of the whole Change Order concept as it affects the construction industry." It is (MCAA's) informed belief that this is the predecessor of the current MCAA Factors. It is also (MCAA's) understanding that the substance of this document has not changed since that time. It is now known as the "Factors Affecting Labor Productivity." ...the available documents indicate that the committee and its members were responsible for selecting the titles and descriptions for each of the factors and formulating the percentage values that are set forth in the document. To the best of MCAA's current knowledge, the information contained in the MCAA Factors was gathered anecdotally from a number of highly experienced members of the MCAA's Management Methods Committee. MCAA does not have in its possession any records

indicating that a statistical or other type of empirical study was undertaken in order to determine the specific factors or the percentages of loss associated with the individual factors.

The process of collecting data such as that which appears in the MCAA factors' table using a polling process is not unusual or proscribed. Such methods have been used to establish losses of labor productivity by many trade associations other than MCAA. The factor descriptions were prepared in advance by the Management Methods Committee. A form was created listing the factor descriptions and three levels of potential impact: "Minor," "Average," and "Severe." The form was then made available to the MCAA member firms for careful review. The intensity data, in the form of the expected impacts percents, were filled in by the MCAA member firms. From this broad polling process, the factor descriptions and the expected impact percentages were reviewed and finalized by the Management Methods Committee and then formalized in the MCAA's publication.

Not only were the factors prepared by experienced and knowledgeable leaders in the mechanical construction industry, the factors have constantly been vetted in the industry for the past 40 years and found to be reasonable and reliable. They have remained unchanged since their first publication and have been accepted by courts, various boards of contract appeals and arbitration panels as useful in estimating a contractor's loss of labor productivity. Moreover, the MCAA factors have been formally adopted by the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) and have been utilized by the National Electrical Contractors Association (NECA) and the Electrical Contracting Foundation in its publication entitled *Factors Affecting*

Labor Productivity for Electrical Contractors.

In terms of preparing to utilize the MCAA factors in a litigation or arbitration to establish a claim of lost labor productivity, it is vital that the contractor retain an experienced and independent expert to perform the inefficiency analysis, prepare the expert report, and testify as an independent expert if necessary. In several recent cases in which the MCAA factors were utilized, the Armed Services Board of Contract Appeals has indicated that the testimony regarding labor inefficiency quantification should not be performed by an employee or principal of the claimant, but rather by an *independent* labor productivity expert. That is not to say that credible fact witnesses, such as foremen, superintendents, and project managers should not testify as to the causes and effects of issues adversely affecting labor productivity. Credible fact-witness testimony is very important to establishing the cause and effect nexus. However, if various formulae are to be applied during testimony in litigation or arbitration, including utilization of the MCAA factors, then the use of an independent expert is highly recommended and may be mandatory if an analysis utilizing the MCAA factors is to be credible and reliable.

Even when an independent expert is utilized, it must be underscored that the MCAA factors should be applied in a reasoned manner, relying on the methodology set forth in this chapter. Outlandish and unsupported inefficiency analyses will draw deserved skepticism from courts and boards of contract appeals. If the MCAA factors are not applied in a proper manner as described in this users' manual, a contractor can expect to face a high bar in its attempts to recover its loss of labor productivity.

Conclusion

The loss of labor productivity is often difficult to quantify with exactness. The MCAA factors can be highly useful to contractors seeking to recover losses in labor productivity due to events not the fault of the contractor. The contractor facing a project that shows the symptoms of delays and inefficiencies should ensure that the contract terms and conditions for timely notice and impact quantification are followed with care. Many otherwise meritorious claims for which the contractor is entitled to recover its fair and reasonable costs are barred because the contractor failed to follow the contract terms as to notice and quantification, or failed to reserve the right to file a delay or inefficiency claim at a point in time after the execution of a change order.

The use of the MCAA factors in forward pricing change orders can result in an overall acceptable recovery of potential loss of productivity in addition to the direct costs of the change. Also, the use of the MCAA factors can result in a more accurate forecast of potential schedule impacts when durations of activities are factored for the estimated productivity loss.

It is essential that contractors weigh the value of recouping reasonable amounts for the indirect costs of change orders along with the direct costs against the potential of gaining a greater recovery by waiting until the end of a project to assess the cumulative effects of all changes issued during the life of the project.

As described herein, in some instances, the only option available to the mechanical contractor may be a retroactively quantified loss of productivity claim. In such cases, the MCAA factors can be applied to the adjusted, actual hours expended by the contractor.

Productivity loss caused by changes in scope, including defective design, unforeseen site conditions, delay and acceleration and change orders, can be real, provable and recoverable. Using the MCAA factors correctly can materially improve the contractor's ability to recover from such losses.

¹ *Appeal of Clark Concrete*, GSBKA 14340 99-1 BCA @ 630, 820 (1999).

² *Appeal of Centex Bateson Construction Co., Inc.*, VABCA-4613 and 5162-5165.

³ *Triple "A" South*, 94-3 BCA P 27, 194, ASBCA No. 46, 866.

⁴ "Scope changes" refers to any changed condition that is outside of the contractor's scope of work. These can include added items of work over which there is no dispute (i.e., approved and pending change orders), disputed scope items, differing site conditions, and acceleration proposals.

⁵ As noted herein, it is imperative that the contractor carefully read the contract, including all general and special conditions, as well as the change order forms offered for execution by the owner. The contract terms set forth in such documents will, in most cases, dictate the contractor's rights of recovery and obligations for timely notice of delay and inefficiency claims.

⁶ Adjusted (reduced) to account for such items as the contractor's remedial work, forward priced inefficiencies contained in change orders, contractor-caused inefficiencies and in some cases, the hours directly associated with executed change orders.

⁷ Other contract documents such as the monthly payment requisition lien waiver and release forms must be reviewed carefully for exculpatory language that may seek to limit or bar a contractor's claims.

⁸ See: *Appeal of Centex Bateson Construction Co., Inc.*, VABCA-4613 and 5162-5165.

⁹ This determination by the board was in

contrast to the appellate decision in the more recent *Bell BCI* matter described at page 9 herein.

¹⁰ *Luria Bros. & Co. Inc. v United States*, 369 F.2d 701, 712, 177 Cl.Ct 676 (1966).

Prepared by Paul Stynchcomb CCM, PSP, CFCC and Jarad Kriz, CCM, LEED® AP (BD+C), PSP of FTI Consulting, with peer review performed by: Wayne Day of John J. Kirilin, Inc.; Raymond Jung of The Poole & Kent Company; Robert Gawne and Richard Freeman of Stromberg Metal Works, Inc.; Herman Braude, Esq. of Braude & Margulies, P.C.; Robert Windus, Esq. of Moore & Lee, LLP; and Henry Danforth, Esq. of Watt, Tieder, Hoffar & Fitzgerald, LLC.



Bulletin

How to Apply the Measured Mile Method of Productivity Analysis

Introduction

When the labor on a project exceeds the estimate or job plan, the mechanical contractor often commences an analysis of the causes for, and quantification of, its labor loss. This sometimes leads the contractor to seek relief from a third party, such as a prime contractor or owner. Frequently, the third party's first line of defense will focus on assertions that the mechanical contractor's original labor estimate was flawed. When properly applied, the "measured mile" analysis is a very effective means of quantifying the loss of labor productivity. This method relies on a comparison of the contractor's actual unit rate ratios on the subject project, thus eliminating concerns over bid errors.

The measured mile method compares actual labor productivity in an impacted period or area with productivity in an unimpacted (or less impacted) labor period or area in order to establish what the labor production rates "should have been" in the impacted labor periods or areas. To be effective, the work performed in each area or period needs to be of a reasonably similar nature. The work performed in the unhindered or less impacted area or time frame is

frequently known as the "baseline" or "measured mile" labor. The process of calculating the difference between the "should have spent" labor hours and the actual labor expended in the impacted areas or time frames is referred to as the measured mile method of labor productivity analysis.

The more detailed and accurate the contractor's labor expenditure records, the more persuasive the measured mile analysis will be. Contractors are advised to evaluate their record keeping procedures to ensure that the information necessary for a measured mile analysis is being collected and maintained on a regular basis.

This bulletin offers a description of the measured mile method of productivity analysis, discusses record keeping and provides examples of the analysis process itself, along with ways in which the results can be presented. When used properly, the measured mile analysis can offer a compelling case for recovering a mechanical contractor's loss of labor productivity.

Applying the Measured Mile Method to Quantify a Loss of Labor Productivity

The measured mile method provides for a differential productivity comparison between actual production rates achieved on the same project.¹ Because this methodology relies on actual production rates, no reference or reliance upon the contractor's estimate or labor plan is required. This fact is one of the most important sources of credibility for this methodology.

Identifying the Measured Areas or Time Frames

In order to perform a measured mile analysis, different areas or time frames must be identified. These should be contrasted, one from another, by the inefficiency factors that have been alleged to be the root cause of the contractor's loss of labor productivity. The choice between utilizing physical areas of a project or time frames is at the discretion of the contractor based on the specific project conditions. The fact pattern may be such that similar sections of a building are definable with one or more definable areas having been less adversely affected by the productivity impact factors and with one or more definable areas having been more affected. These same conditions could be ascribed to discrete time frames.

For instance, a project could progress to the 50 percent complete point with reasonable productivity and then be subjected to a substantial acceleration effort resulting in overtime work, stacking of trades, crew size inefficiencies and reassignment of manpower for the duration of the project. The aforementioned case would suggest a time frame approach.

On another project, one or more discrete areas could be constructed with reasonable productivity while other, similar areas were affected by substantial changes in scope, trade stacking, lack of owner-supplied materials (logistics), site access limitations and other identifiable factors. The differential measurement between such areas can form the basis of a measured mile analysis.

One means of determining which method is best for a project under study is to interview the site management (i.e., project managers, superintendents, and foremen) and seek their input into what took place (or is taking place) and what areas or time frames were more productive and less productive. This interviewing process will also form the basis of the cause-and-effect connection that will be required when proving and explaining the production rate differential.

Once this interview process has taken place, the observations of the staff can be tested against the actual labor production records. At this time, it may become obvious as to which format will be most effective: an area measurement or a time frame measurement. After the contractor has decided on whether the measured mile analysis will be made on an area or time frame approach, the collection and analysis of the actual payroll labor hour and material/equipment installation data can commence, as described in greater detail below.

Reasonable Similarity between Materials and Work Environment

The measured mile method measures the difference in actual productivity rates between sets of productivity impact conditions, one having little or no impacts and one having representative² impacts. For this measure to be "exact"³

(which is **not** a condition precedent to use this methodology), the same material and/or equipment would have to be installed by the same crew, under the same management, in the same work environment, as measured between two areas or time frames that are similar in space and time; with the remaining difference being the influence(s) of inefficiency being claimed by the contractor. The aforementioned conditions virtually never exist on a construction jobsite. Only in an academic or laboratory setting would these precisely matched conditions be found.

The courts and boards of contract appeals only expect that the areas or time frames under measurement be **reasonably similar**. These reasonable similarities between the data being measured include: 1) material and equipment types; 2) installation equipment and/or means and methods; 3) experience, quality and quantity of supervision; 4) experience and quality of the work force; 5) inherent work environment including exposure to weather factors and height of the work being installed; and 6) any other factor that would inherently imbalance or skew the productivity study.

For instance, comparing the installation of 4", 6" and 8" standard weight A-53 carbon steel butt weld pipe to the installation of 8", 10" and 12" pipe of the same or similar material would be considered as reasonably similar. Comparing the production rate for 2" carbon steel threaded pipe to large bore mechanically welded stainless steel pipe, if utilized in the analysis, offers inherent dissimilarities that will require a carefully considered production adjustment and/or thorough explanation of why the comparison is reasonable.

Installing pipe under a roof slab 30' from the finished floor in a mechanical room

can be more challenging than installing the same type of pipe system in a room with a 15' ceiling. Installing straight lengths of pipe on pipe racks in an open area can be inherently more efficient than installing the same type of pipe in a crowded mechanical room where the pipe system has frequent changes in direction and may have valves and other appurtenances that could represent a lower production rate. Installing equipment during the winter in an area open to the elements with exposure to lower temperatures and wind will most likely be inherently less productive than installing similar equipment in a heated mechanical room (this assumes that the work was not delayed into an unanticipated adverse climatological period).

Installing material with a seasoned journeyman crew with proven competent supervision in an unobstructed area will most likely be inherently more productive than installing the same types of material in a congested area with a measurably higher ratio of inexperienced workers, less effective supervision or in more crowded or constrained conditions.

All of the potentially inherent differences must be identified and evaluated when performing a measured mile analysis. The goal of the analyst is to measure the differences in productivity rates caused by the productivity impact categories identified in the analysis (i.e., stacking of trades, overtime inefficiency, disruption and other such categories), and to be confident that the segment is reasonably free of differences that would have, on their own, caused a measurable variation in the contractor's labor performance.

The Project Records

An essential feature of the measured mile method is its absence of reliance

on the contractor's estimate or labor plan. This method relies on the contractor's actual unit rate ratio of production achieved on the project in different areas or time frames of the same project or, in some cases, highly similar projects. In order to establish the contractor's actual unit rate ratio, or productivity rate, records that set forth the actual labor hours expended to install a definable quantity of material and/or equipment is very helpful. They are not absolutely required, however, as explained herein.

A minority of contractors track, in a contemporaneous fashion, the amount of material and/or equipment installed by hour of labor. This sort of contemporaneous labor productivity tracking is very meaningful, however it usually requires a very substantial and costly effort to track the actual material installed by type and by labor hour. In some industries, such as the sheet metal industry, the difficulty of tracking actual material installed by labor hour is being overcome by electronic means of bar coding duct sections and tracking the duct from manufacture to pre-assembly to final installation in the field. Assuming the contractor's systems allow coding of actual labor to a section of duct, its actual manufacturing, preassembly and installation can be tracked with a reasonable degree of accuracy.

Such contemporaneous labor-tracking record keeping provides for valuable and timely productivity monitoring that

requires little or no further adjustment in order to apply this data to a measured mile analysis. However, most mechanical contractors do not contemporaneously track the actual labor hours required to install lengths of pipe, supports, fittings and appurtenances or pieces of equipment in discrete areas or time frames on a project. The absence of contemporaneously maintained actual labor installation records does not preclude the use of a measured mile method.

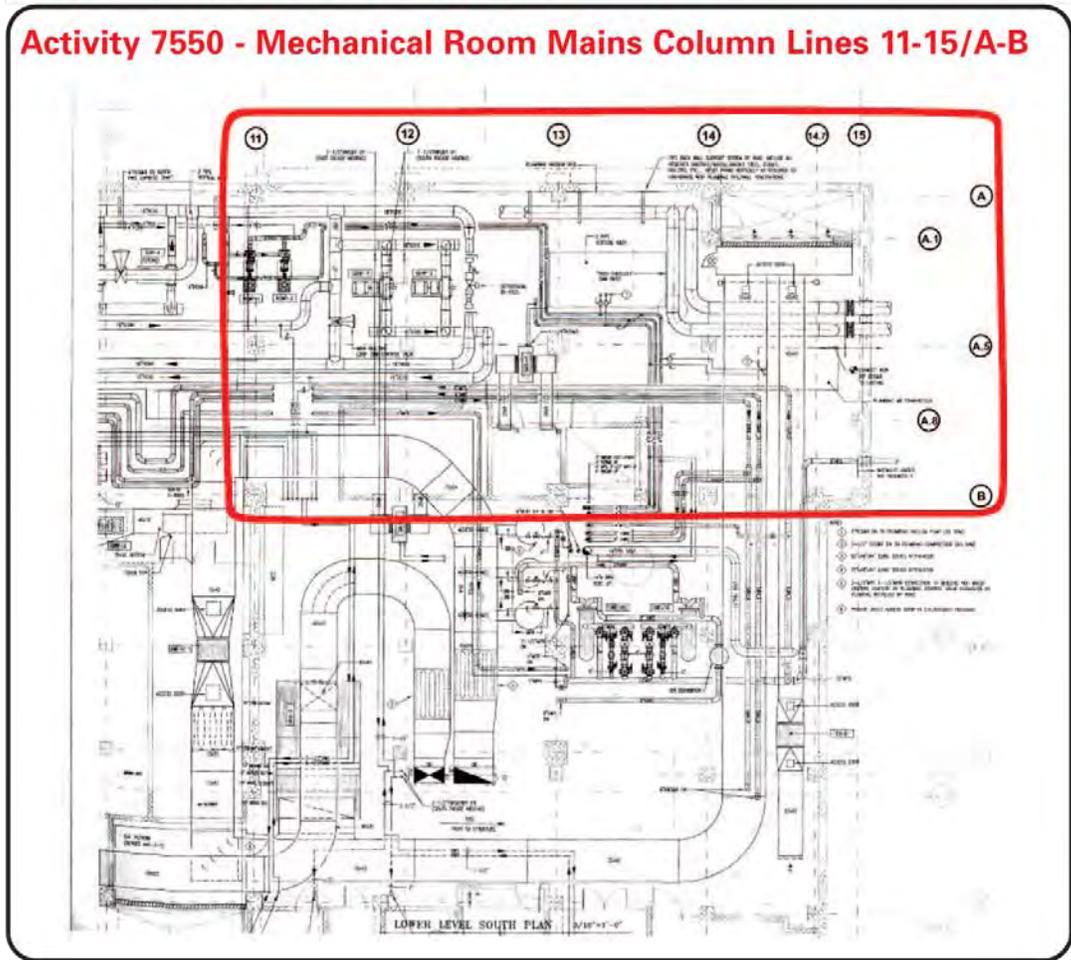
Many contractors maintain labor performance reports. These are an earned value type of reporting because the actual hours expended to install a known quantity of work are compared to a plan or estimate. These reports typically provide a variance between discrete activities of work comparing the planned and actual hours on a regular basis, such as each payroll period, or monthly. Such labor performance reporting is described in greater detail within the bulletin on "Maintaining Control of Labor Productivity," and a sample is at the bottom of this page.

In the sample labor performance report shown on this page,⁴ current actual payroll hours "C Act Hrs" are compared with an updated plan "Rev Plan"⁵ to provide for weekly variances. The "Earned Hours" are a function of earned or reported percent complete multiplied against the updated planned hours. Thus, the contractor's measure of performance using an earned value

The Labor Performance Report (Example of Detailed Activities)

Activity ID Code	Activity Description	Planned Hours	CO Hrs	Rev Plan	Last % C	Current % C	Earned Hours	PT AH	C Act Hrs	Wk -2	Wk -1	Cw
7550	Inst CHWS&R Mains Area B	500		500	30	50	250	300	450	-75	-150	-200
7570	Inst CHWS&R Brnchs Area B	700	50	750	10	20	150	120	200	-40	-45	-50
7590	Connections @ Mech Equip	100		100	10	15	15	10	12	0	0	3

Activity Boundaries Marked on the Contract Drawings



reporting system is based on reported progress and the contractor's estimate, adjusted to incorporate changes in scope in order to compute a current, revised plan. This system enables the contractor to divide the overall plan into identifiable units of work, called activities. These activities usually have work boundaries that are defined by the description of the activity, as shown in the example at the top of this page.

Assuming the contractor has a labor performance reporting system that sets forth definable features of the work (i.e., activities), the contractor can locate the activity boundaries on a set of contract drawings and from that information, take off the material contained in the activity. Provided the contractor has coded the

actual labor hours by discrete activity, the contractor can assign actual hours expended to a definable quantity of installed material and/or equipment.

Due to the differences in expected production rates between different piping and equipment systems, it is helpful if the contractor has defined its activities by pipe size (i.e., small bore versus large bore) and general material type (i.e., butt weld versus threaded, carbon steel versus cast iron, pipe installation versus equipment setting). Such differentiation will enable the contractor to assign the actual hours by general categories of pipe system, pipe type, equipment setting and other definable features of the work.

The goal of an exercise such as that described above is to assign actual labor hours expended to discrete elements of the construction process. This area-by-area comparison method is one manner of preparing a measured mile analysis. Once the actual labor hours have been defined and the material and/or equipment have been quantified, a production rate ratio can be computed.

Assuming the contractor has been able to identify a nonimpacted or less impacted area or time frame, then the actual labor hours and installed units can be measured. For example, a contractor measured 1,000 linear feet of 6" and 8" carbon steel butt weld pipe that required 575 labor hours to install⁶ in a definable area or time frame. From this data, the contractor can compute a labor rate of .575 hours per linear foot, or 1.74 linear feet of pipe per hour of labor actually expended. Although the contractor was unable to differentiate the labor required to install the 6" system from the 8" system, the pipe systems were sufficiently similar to arrive at a blended production rate.

The contractor must now identify a reasonably impacted area or time frame in which similar work was performed but was adversely affected by the conditions the contractor has identified during the interview process described herein. For example, it was found that 1,500 linear feet of 4" and 10" carbon steel butt weld pipe required 1,250 hours to install. Once again, the contractor could not differentiate between the 4" and 10" pipe as to actual labor hours required to install the pipe systems. The blended production rate equals .83 hours per linear foot or 1.2 linear feet of pipe per hour of labor actually expended.

The measured mile method comparison would be .575 hours per linear foot in the non/less impacted area or time

frame versus .83 hours per linear foot in the reasonably impacted area or time frame. Similarly, the methodology would compare an actual production rate of 1.74 linear feet per hour with an actual production rate of 1.2 linear feet per hour. The productivity factor would then be computed as 31 percent. Those calculations appear as:

$$0.575 \div .83 = .69; 1 - .69 = .31 \times 100 = 31\%$$

or

$$1.2 \div 1.74 = .69; 1 - .69 = .31 \times 100 = 31\%$$

The loss of productivity factor of 31 percent is then multiplied against the actual labor hours expended in the impacted area or time frame for the work being measured, or 1,250 actual hours x 31 percent = 388 labor hours lost due to the productivity factors that impacted the less productive area or time frame.

The results of this calculation also can be used to compute the "should have spent" labor hours between areas or time frames. From the example above, the contractor demonstrated that it actually installed butt weld carbon steel pipe at a rate of 1.74 linear feet per hour of labor in a less impacted area or time frame. There were 1,500 linear feet of pipe in the affected area. Absent the productivity factors being complained of in the affected areas, the contractor should have achieved approximately the same production rate in the impacted area or time frame as was achieved in the more productive area or time frame; 1,500 linear feet of pipe ÷ 1.74 linear feet per hour = 862 hours. The actual hours expended in the impacted area; 1,250 less the "should have spent" hours of 862 = 388 hours of lost productivity.

When more than one sampling segment of work is included in the measured mile

analysis, particularly when the amount of material (i.e., pipe lengths) varies significantly between the segments of work being compared, it may be advisable to use a weighted average, weighted on pipe lengths or other material considerations. This process weights the production averages based on the amount of material being evaluated. Examples that follow include a weighted average computation. Depending on the data, some samples using a simple arithmetic average will produce the same, or nearly the same, results as using a weighted average. However, in analyses with multiple and relatively large sample groups, and with significant variances in the quantities of materials, a weighted average approach based on material quantities or other measurement metrics can yield measurably different results as opposed to a simple arithmetic average.

Unusual Study Observations Caused by Inconsistent Project Conditions

One of the goals of a measured mile analysis study is to evaluate differential productivity rates by comparing similar work being performed under similar conditions, with the exception of identifiable categories of inefficiency that affect one set of labor hours but not the other set of labor hours, or at least to the same extent. Sometimes when performing a measured mile analysis, an area or time frame under study

shows a productivity rate that is either much greater or much lower than other unimpacted or less impacted areas or time frames. The contractor should carefully review these apparent anomalies and take appropriate action. One appropriate action could be to exclude these apparent outliers as shown in the example below:

Step 1. Identification of Areas and Production Rates

Assume all areas contain a mix of 4", 6" and 8" Std. Wt. B.W. pipe, 8-hour workday, 5 days per week, at approximately the same elevation and work environments, but production anomalies exist in one of the "better productivity" areas of the study (i.e., Area C).

Areas that are expected to be more productive and less productive can be calculated as shown in the example at the bottom of the page.

Step 2. Weighted Average Method

In the example at the top of the next page, Area C has been excluded from the weighted average because of its unusually high rate of productivity. This type of exclusion is known as an "outlier" due to its unusually high rate of productivity compared with the other less impacted areas and thus was not included in the weighted average. The second box on the following page provides sample calculations used in determining the weighted average of the less productive areas

Sample Calculations to Identify Expected More Productive Areas

Area A: 3,000 linear feet of pipe – crew of 4 for 38 days = 2.47 LF/MH
Area B: 4,300 linear feet of pipe – crew of 4 for 52 days = 2.58 LF/MH
Area C: 2,500 linear feet of pipe – crew of 2 for 30 days = 5.21 LF/MH

Example of Calculations Used to Identify Expected Less Productive Areas

Area D: 3,800 linear feet of pipe – crew of 4 for 68 days = 1.75 LF/MH
Area E: 2,000 linear feet of pipe – crew of 2 for 63 days = 1.98 LF/MH

As can be seen from the example, the contractor has removed the one study area that demonstrated an unusually high level of productivity. This may have been caused by having assigned a particularly experienced or hand selected crew to perform the work, or perhaps the physical work environment allowed the installation of the material to be performed much more efficiently than in other areas of the project. While there is no set guide as to how much variance in a particular study segment should disqualify it from a measured mile method analysis, findings that approach doubling or halving of productivity in particular segments suggest that such segments could be outliers in the study. However, there can be incidences where vastly different productivity rates have a reasonable explanation, thus these sorts of apparent anomalies must be analyzed on a project-by-project basis.

Additionally, if the contractor finds that its own management problems or crews caused portions of the inefficiencies in the impacted areas or time frames, such self-inflicted inefficiencies must be identified, quantified and removed from the contractor's request for equitable adjustment (REA). For example, a mechanical contractor may have experienced delay caused by its own forces and, to mitigate these impacts, embarked on unplanned overtime. This overtime schedule, depending on its intensity and duration, can on its own cause labor inefficiency. In its measured mile analysis, the contractor finds that it sustained a substantial loss of productivity caused by owner changes and disruptions in a particular time frame of the project schedule. The contractor also finds that this period of owner change and disruptions is concurrent with the time period of contractor-initiated overtime. Assuming the same crews involved in the contractor-initiated overtime were also

affected by the owner changes and disruptions in the same time period, the contractor must factor out of its claim the inefficiencies caused by the overtime it chose to undertake to mitigate its own delay.

Another adjustment that must be considered is the payment by an owner or prime contractor to the mechanical contractor for change orders that include a loss of productivity that occurred in the impacted segment of the project. To the extent that the contractor has been compensated for labor and/or equipment inefficiencies during the impacted segment, these labor and/or equipment hours must be identified and removed from the measured mile REA.

Area Measurement

Area-based measurements are often used in a measured mile analysis to quantify the loss of labor productivity on a construction project. Area-based analyses can usually be derived from earned value reports that divide the project into are spatially-based activities. Assuming that the productivity impacts can be segregated by building or project area, spatial dividing lines between impacted and less impacted areas make logical study segments. It is important that the work environments be similar from one area to the next, which includes the height of the work off the finished floor elevation, if applicable. There should not be any inherent features of any of the areas that make them more productive or less productive—only the inefficiency impact categories should form the significant differences between the areas, to the fullest extent possible.

As with a reasonable amount of time in a time frame-based measured mile quantification, there is debate within the construction industry and in academia regarding how large an area should be

in order to offer a credible measure of actual productivity. As of this writing, there does not appear to be any firm agreement on this question nor have the courts offered any judicial guidance. Generally, the area should be representative of the overall work, not an isolated segment of the work that would, by its nature, exhibit a much higher production rate than the balance of the project areas.

The space within the areas should be reasonable—that is, the area should be large enough for the crews to perform a sufficient amount of work to establish a measurable pattern of performance. Furthermore, the spaces between the areas used in the comparison should be similar or, if dissimilar, such differences should not have had an adverse effect on the underlying productivity.

Time Frame Measurement

In terms of utilizing time frames rather than physical areas, the application methodology is the same. Also, similar considerations have to be made when comparing the different time frames. Adverse weather may be a factor to consider; if the various measurement time frames fall into different climatological periods and weather impacts are not one of the categories of inefficiency being claimed, this may require adjustment of the study. In fact, any measurable inconsistencies between the time frames that could represent inherently more or less efficient performance need to be carefully evaluated. Reasonable care must be taken to eliminate from the study any effects that are materially different between the time frames being evaluated.

As with the proper amount of space when considering an area-based measured mile quantification, there is an unresolved debate within the

construction industry and in academia regarding how long a measured mile time frame should be in order to offer a credible measure of actual productivity. In the writer's opinion, the time frame should be long enough for the crews to perform a sufficient amount of work to establish a measurable pattern of performance. The less impacted or unimpacted time frames should not include periods that experienced unusual or isolated spikes of high productivity that are not representative of the work on the overall project.

For instance, the learning curve commences with lower productivity as workers arrive on the project at the outset of the contract, or begin work in very different surroundings. As workers become more accustomed to the project, or to an area, the productivity of the crews is expected to increase. If the time frame is limited to the opening days or weeks of a project, it may encompass this time of lowered productivity due to the effects of learning curve. Conversely, if the measurement period is at the height of the project such that workers have gained the benefit of the learning curve effect, this alone could increase productivity. The effects of the learning curve, both negative and positive, can in some instances be very slight and may not affect the measured mile comparison, however it should be taken into consideration when choosing the time frames to be measured. If necessary, explain in the written narrative that will accompany the measured mile quantification why the learning curve was, or was not, considered as a variable that could affect the outcome of the study.

What if the Contractor's Earned Value Records Are Not Available?

Most mechanical contractors do not track material and equipment installed

by labor hour on a contemporaneous basis. The reasons this sort of detailed tracking does not usually occur include the level of complexity of most mechanical piping systems, the mix of materials within areas or systems, and the cost of having a “clerk of the work” tracking the physical amount of material or equipment installed during each day of work, tied to the hours spent to install those materials or equipment.⁷ Where mechanical contractors do perform this sort of contemporaneous productivity measurement, the contractor has already gathered the information it needs to conduct a measured mile method analysis. There is little or no need to refer to earned value reports or to other data since the actual production data is being collected on a daily or weekly basis.

The absence of contemporaneous labor and material tracking is not an unusual condition in the construction industry. While many contractors maintain some form of earned value reporting, on some projects the contractor may not have maintained any reports that segregate the hours actually expended by physical areas or time frames within the project. There are other means of extracting the needed information, albeit means that are much more time consuming and that may be more subjective in nature. An alternate method of data segregation involves the use of the contractor’s payroll system, time cards, daily reports⁸ and/or field diaries. The CPM schedule also may be used to determine when work was performed.

In such cases, the interview process is very important in order to locate the areas and/or time frames of better and lower productivity. If the site management is available, a list of the categories of inefficiency impacts should be compiled. If necessary, refer to the list of inefficiency categories contained in the bulletin that addresses “Factors

Affecting Labor Productivity.” Discuss what areas or time frames were adversely affected by these impact categories and what areas or time frames were less impacted. Once the differential areas and/or time frames have been identified, have the knowledgeable individuals review the payroll time cards and other contemporaneous project data to see if the labor hours expended in those areas and/or time frames can be identified using the workers’ names or crew coding. Often, area foremen or superintendents know the workers by name and can identify which workers performed the various activities on the project. This is more subjective than using a well-maintained earned value report, however it may enable a measured mile method analysis to be performed.

If the labor hours can be extracted from the payroll system by identifying the workers by name and assigned to specific areas or time frames, then the materials installed in discrete areas can be taken off and quantified in that manner. As to time frame measurements, it may be necessary to review progress records such as daily reports, progress photographs, project schedules or site diaries for descriptions of the work being installed. Some daily reports allow very specific entries of such progress information and can be useful references to allow for the identification of workers and the material being installed by time and area. The payment applications or CPM schedule updates also may reveal vital information regarding when and where work was performed, and to what extent it was complete on a weekly or monthly basis. While this sort of investigative analysis is very time consuming, it may be the only way to extract the labor hour and material quantity information that is necessary to perform a measured mile method analysis.

What if the Less Impacted Area or Time Frame was Adversely Impacted?

On some projects, there is no reasonably “unimpacted” area or time frame. This is not unusual. Projects with pervasive defective design impacts can experience labor inefficiencies from the outset of the work, and in virtually all areas of the project. Projects that are the subject of enormous scope growth by way of scope changes (i.e., cumulative impact) can be similarly affected such that no area or time frame can be found that was immune from measurable productivity impacts.

One method of removing labor inefficiencies from the less impacted area or time frame is to perform an MCAA labor inefficiency factor analysis on those labor hours (reference the bulletin entitled, “How to Use the MCAA Labor Factors”). If the less impacted area or time frame has been impacted by others as a result of unplanned trade stacking, disruption, overtime or other recognized categories of labor impacts, appropriate MCAA factors can be applied to the less impacted area or time frame to set a revised baseline to be used in the measured mile comparison. All adjustments to the less impacted baseline labor hours should be fully explained and justified. If the contractor was responsible for its own inefficiencies in the baseline segment of the project, those have to be quantified and explained as well to demonstrate that the contractor has not claimed inefficiencies arising from its own mistakes and corrections.

Can Similar Projects Serve as Surrogates for Areas/Time Frames on the Project Under Study?

The farther a contractor moves from comparative measurements on the

same project, the less likely the analysis will be considered a valid measured mile analysis. That does not necessarily disqualify the use of very similar projects to produce the comparative areas or time frames. The two-project measured mile approach is used when the baseline, or less impacted area or time frame on the project under study simply does not exist, or would have to be significantly adjusted to explain the inefficiencies in the less impacted area or time frame.

In some cases, it may make sense to offer two measured mile analyses: one utilizing a modified baseline comparison as explained above and one utilizing two very similar projects. However, there will be a need to demonstrate that the crews, supervision, work environments, types of productivity impacts and other factors on the two projects were indeed highly similar, one to the other. While a two project method is not proscribed, it is worth the extra effort on the part of the contractor to find similar areas or time frames on the single project under study.

Productivity Impacts to BIM/ Coordination and Pre-Fabrication/ Sub-Assembly Operations and Equipment Inefficiencies

On projects that suffer from the effects of multiple and significant changes in scope (i.e., cumulative impact), defective designs, overall disrupted “start-stop-start” operations and/or delays to the schedule, the BIM/ coordination and pre-fabrication/ subassembly operations can sustain significant labor inefficiencies. The measured mile method can be used to quantify inefficiencies in these areas of a project.

When a mechanical contractor bids a project, labor hours are usually included

for traditional coordinated drawings or, on larger projects, computerized Building Information Modeling (BIM) drawings. The production of these drawings or computer models usually leads to some amount of prefabrication or sub-assembly of systems. A mechanical contractor can expect substantial labor savings if this process is reasonably free of impacts from large quantities of requests for information (RFI), changes, disruptions and delays.

Many mechanical contractors include coordination/BIM hours performed on change work within the change proposal itself by way of percentages or direct hours required to address the changes. However, many of the issues that affect coordination/BIM labor and the downstream prefabrication and subassembly operations never become a part of the contract as a change order. It is not unusual to find that a large percentage of RFIs issued by a mechanical contractor during the coordination/BIM stage never become change orders, thus the added time and disruption to the coordination/BIM process are not equitably compensated to the mechanical contractor. The result is an undefined overrun in the coordination/BIM efforts. The disruption and inefficiency of the coordination/BIM operation then trickles down to the prefabrication and subassembly operations, which can be additionally impacted by having to start, stop and then restart operations due to the flow of the drawings, or due to "holds" placed on prefabrication or sub-assembly work caused by delays, RFIs and changes to the work.

In order to capture measured mile information for use in the coordination/BIM, prefabrication and sub-assembly

operations, the mechanical contractor should ensure that the workers are coding time to individual projects and, if possible, to discrete segments of the erection work or drawing. To the extent that there are areas of a project or discrete time periods which represent reasonably productive work, actual hours required to produce a representative drawing or set of drawings, or to prefabrication or sub-assembly a known quantity of material should be maintained. This becomes the baseline set of hours. As with the erection work, the baseline productivity should be based upon a representative sample and not on unusually simple drawings or assemblies.

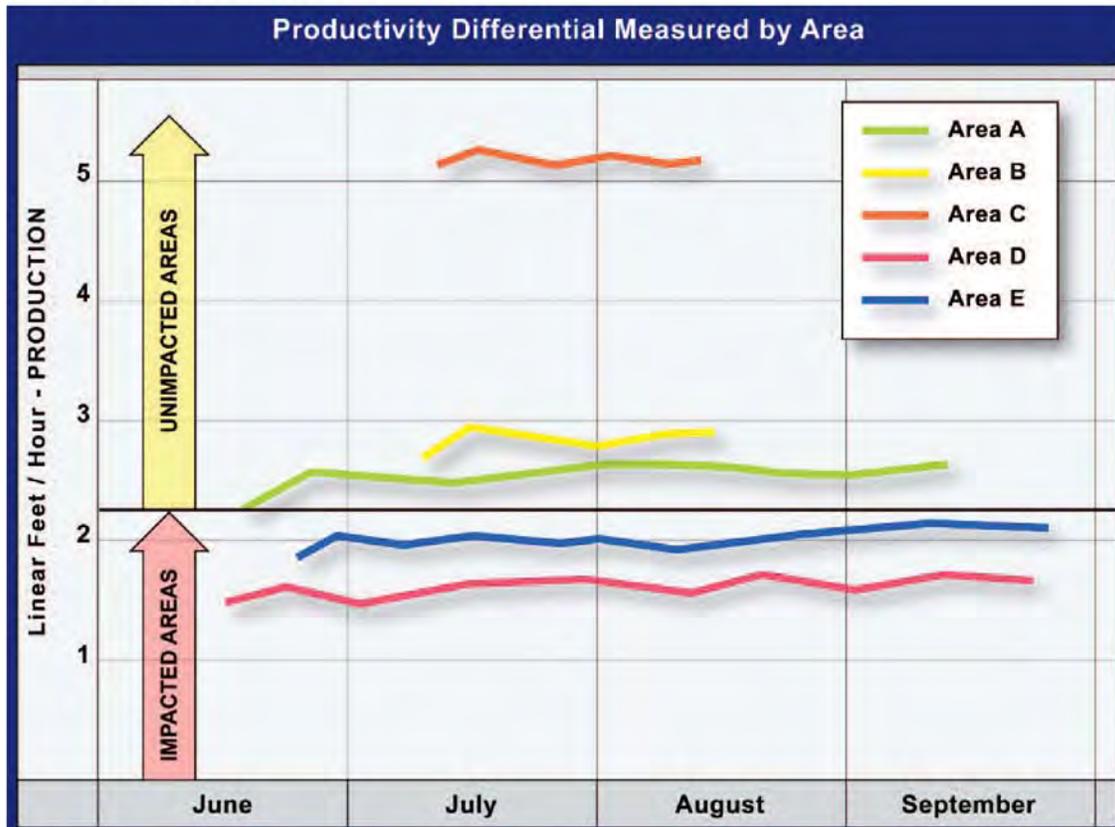
Similarly, actual hours should be coded and collected on drawings by area or systems, or during time periods which represent the effects of the disruptions, RFIs and changes. The goal is to establish a differentiation between the labor hours required to produce coordinated or BIM computerized drawings without the adverse effects of inefficiencies not caused by the mechanical contractor and the labor required to produce the drawings given impacts on the project.

Actual prefabrication and sub-assembly operations can be measured for inefficiencies in the same fashion as field erection activities. In order to perform the comparative analysis, the contractor should have records of the time required to perform prefabrication and subassembly work by definable segment, comparing the production rates between more efficient and less efficient areas or time periods.

Construction equipment can also be subject to a loss of productivity. Depending on how equipment has been estimated, the inability to utilize equipment in an efficient fashion can add to the cost of construction. If the inefficiency of construction equipment is the result of delays, disruptions, stop work orders or other adverse conditions outside of the control of the mechanical contractor, this component of added cost can be the subject of an REA.

To the extent that usage records can be maintained for any mechanized or motorized equipment, such as gas welding rigs, bulldozers, track hoes, electrical welding packs and similar items, these records can be coordinated with the contractor's measured mile labor analysis to demonstrate the less efficient and/or delayed nature of the equipment usage on the project. A measured mile analysis can be performed on the equipment itself, by

Sample Productivity Chart by Area



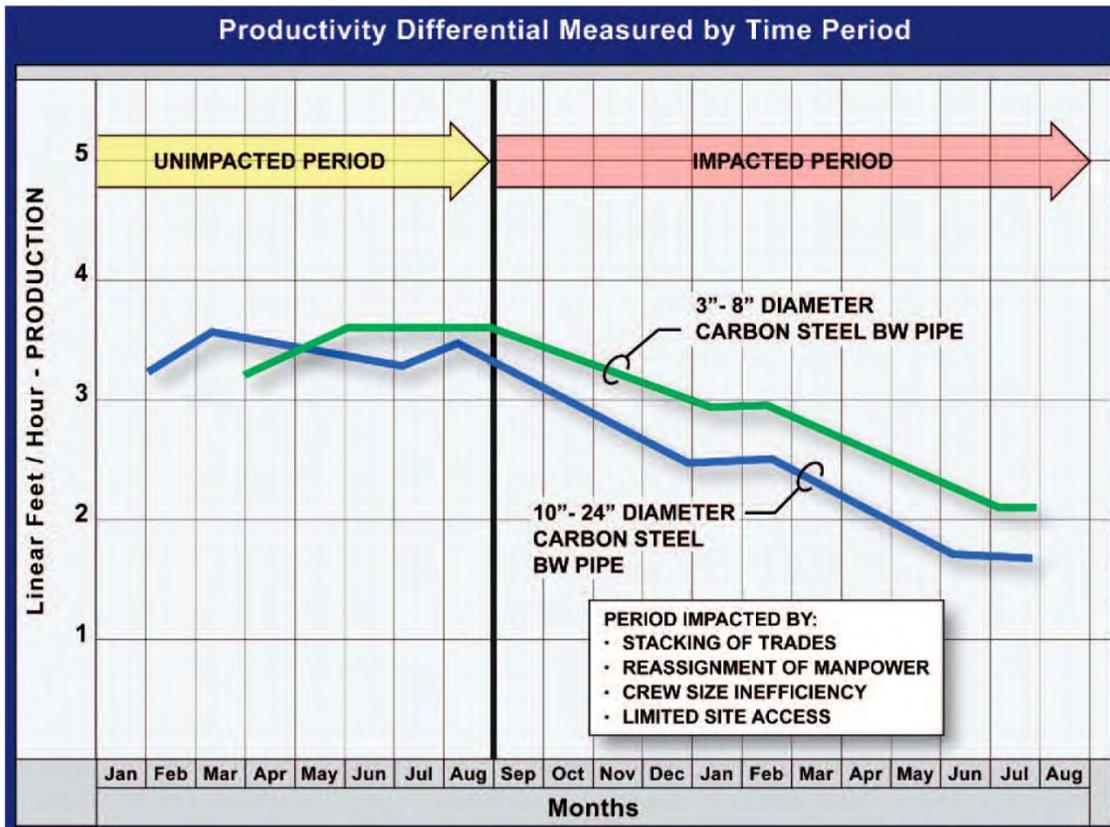
way of example contrasting the amount cubic yards of excavated materials that were moved in unimpacted and impacted segments of the project.

As with the erection activities, any appreciable inherent differences between segments being measured, other than the inefficiency categories themselves, must be identified and factored during the preparation of the measured mile method analysis. Also, any contractor caused inefficiencies occurring in the impacted areas or time periods must be identified, quantified and removed from the contractor's REA along with any inefficient hours paid for in change orders or by time and materials tickets.

Presentation of the Analysis and Graphic Charts

When presenting a change order proposal, or REA, for loss of labor

Sample Productivity Graphic by Time Period



productivity, the claimant has the burden of proof regarding the cause-and-effect nexus and the damages resulting from the causative events. Therefore, it is helpful to prepare a comprehensive written narrative report describing the conditions that the mechanical contractor is asserting caused the harm and how the resulting damages were quantified.

One effective means of communicating the comparative variances that are at the center of a measured mile analysis are graphic charts depicting various productivity curves. These curves can convey the time lines and differences between the productivity that was measured in the analysis. Two examples are provided, one on the previous page, and one above.

Oftentimes, the acceptance or rejection of a mechanical contractor’s REA for loss of labor productivity can be affected by the quality of the narrative describing the cause-and-effect nexus, the supporting schedule analysis (if appropriate), payroll and other project reporting, and the form and content of the measured mile quantification. Presentation graphics, supported by well-prepared documentation, also can be persuasive in depicting the differential productivity unit rate ratios derived by the measured mile investigation.

Conclusions

The measured mile method is, without question, a very effective means of quantifying a contractor’s loss of labor productivity in the construction industry. In order for the measured mile method

to be reliable and successful, however, it must be applied in an appropriate manner. The inappropriate application of the measured mile method may result in a significantly reduced recovery or, in the worst case, no recovery at all. However, many contractors have properly applied sound and reasoned logic to prepare measured mile method analyses that contain comparisons of similar materials, equipment, environments, and crews and also contain any required adjustments between the segments as described herein.

Contractors who consistently pre-plan their work and create a mechanical schedule in close coordination with the general contractor's schedule can significantly improve tracking of the measured mile data. The mechanical contractor, in coordination with its developed schedule, can create an area-specific labor-coded schedule of activities that follows the logical construction sequence of the project. Whenever possible, this area-specific data should be divided and identified by individual system or piping material.

The general guideline for the duration of activities is from between 3 and 22 working days in order to allow for optimal tracking. Mechanical activities should be created that can usually be accomplished by a single crew in the time period noted above. Collection of the payroll input then gives the contractor timely data as to how each area performs in comparison to the original project plan, and in comparison with other similar areas on the project.

Since the contractor's estimated/planned hours are used to populate the area-specific labor-coded activity schedule and labor performance report, the contractor has a record of performance compared to its estimate/plan and to other similar work on the

same project. Such record keeping can allow a mechanical contractor to perform a measured mile analysis while the project is still ongoing, and with that information, to work proactively to mitigate productivity losses, if at all possible.

When mitigation is not feasible or achievable, the mechanical contractor may be placed in a position of recovering its productivity losses by way of an REA. In its REA, the contractor will have to identify, justify and quantify its loss of productivity component.⁹ A contractor has several choices in the selection of a method to quantify labor inefficiencies. Where possible, the contractor should consider the measured mile method as the one that will, if properly applied, produce the most compelling and acceptable results.

Additionally, when a mechanical contractor anticipates that it will sustain a loss of labor productivity on a project and such labor productivity losses will, more than likely, not be equitably compensated in change orders, the contractor must preserve its rights to collect its damages by other means, such as an omnibus REA. Many change order forms issued by public and private sector owners contain "full accord and satisfaction" restrictive language. On many projects, the prime contractor may include waiver language on the monthly payment application release forms that attempt to bar a mechanical subcontractor from recovery of any impacts that are not expressly excluded from the waiver provisions. These "full accord" and waiver provisions are explained in greater detail in other bulletins within this manual, however the mechanical contractor is reminded to avoid executing any document that seeks to limit the mechanical contractor's rights to recover its delay and labor productivity impact costs, unless such terms have been reviewed

and accepted by the mechanical contractor's senior management or construction counsel.

Finally, the more credible the measured mile analysis, the greater the contractor's REA recovery will be. To be credible, the contractor must carefully apply the test of reasonability—reasonably similar comparison areas or time frame, reasonably similar types of material and/or equipment being installed, reasonable record keeping or source data, reasonable adjustments that may be required to the unimpacted and/or impacted segments, such as the removal of the contractor's own inefficiencies and inefficient hours compensated in change order in the impacted segments, and reasonable conclusions drawn from the analysis. The analysis should be accompanied by a cogently written narrative that connects the causes with the effects of the analysis and discusses why such impact causations were not the fault or responsibility of the mechanical contractor. A well-prepared and well-documented measured mile REA can be an important factor in averting costly litigation and can offer the potential for a positive recovery of a mechanical contractor's loss of labor (or equipment) productivity.

Appendix

Support at the Courts and Boards of Contract Appeals for the Measured Mile Method

Reported decisions from the boards of contract appeals and other tribunals can be instructive in the preparation of a measured mile quantification of labor productivity loss. One of the frequently cited cases in favor of the use of the measured mile method is the *Appeal of P.J. Dick*¹ at the Veterans Administration Board of Contract Appeals. This

decision stated the following, in part:

...the efficiency factor calculated from the feeder work was used to adjust the budget for the branch work. ...the VA's labor productivity expert, took exception to use of the measured mile analysis using the feeder-branch circuit comparison because it violated a fundamental precept of a measured mile analysis in that [the electrical subcontractor's expert's] analysis does not measure the productivity for an activity in an unaffected period against the productivity for the same activity in the affected period. ... [the electrical subcontractor's expert] indicated, there was no period of branch conduit installation that was not impacted by either the design problems or acceleration. [The VA's expert's] principle objection to comparing feeder work to branch work was the difference in crews and crew continuity.

Note that the government's expert criticized the electrical subcontractor's alleged improper use of feeder conduit installation as compared with branch conduit installation to form the measured mile as being too dissimilar to support a reasonable comparison. The Board rejected this criticism and the electrical subcontractor was awarded inefficiency damages based on its measured mile analysis comparing feeder conduit production with that of branch conduit.

Moreover, in the *Appeal of P.J. Dick* the Board underscored the favored standing of the measured mile method to quantify a contractor's loss of labor productivity and also recognized that measured mile quantification was not required to be exact in order to be acceptable as a basis of recovery. This decision mirrors the oft-cited *Wunderlich Contracting Co.*² decision wherein the Court decided that a "claimant need not prove his damages with absolute certainty or mathematical exactitude... it is sufficient

if he furnishes the court with a reasonable basis for computation, even though the result is only approximate”

However, the *Wunderlich Contracting Co.* decision cannot be taken to extremes and the requirement for establishing “a **reasonable** basis for computation” [emphasis supplied] cannot be ignored with impunity. Other cases underscore the need for the claimant to adjust its measured mile analysis to take into account inherent dissimilarities between the segments under study. *Danac, Inc.*³ and *W.G. Yates & Sons*⁴ confirm the necessity for the claimant to make productivity adjustments for differences in materials and joint types in the segments being compared.

The decision in *W.G. Yates & Sons* underscoring the acceptance of the measured mile method stated, in part:

Yates, using the measured mile methodology, computed its alleged additional labor inefficiency costs by comparing performance costs incurred prior to the defective specification disruption with performance costs after the defective specification disruption. ...In *DANAC, Inc.*, ASBCA No. 33394, 92-2 BCA ¶ 29,184 **this Board endorsed the use of the measured mile methodology** to measure the cost for labor inefficiency caused by Government delay and disruption holding:

For labor inefficiency claims, “good period vs. bad period” analysis, comparing the cost of performing work during periods both affected and unaffected by disrupted events “**is a well established method of proving damages.**” *U.S. Industries, Inc. v Blake Construction Co. Inc.* 671 F.2d 539, 547 (D.C. Cir. 1982) [emphasis supplied]

The contractor’s measured mile analysis may be significantly reduced or even

rejected by a court or board of contract appeals if the contractor does not adjust the underlying productivity rates for differences in the installation of the materials or other conditions not associated with the inefficiency categories upon which the claim is based. Such inherent differences can include material types, joint types, elevation of the work, spatial limitations or other physical conditions that would make the comparisons imbalanced. The goal of the measured mile method is to measure labor productivity between two segments of reasonably similar work with the variable being the labor inefficiency factors identified by the contractor.

The principal of “reasonably similar” comparisons in a measured mile analysis was clearly defined in *Clark Concrete Contractors, Inc.* wherein a concrete contractor offered a measured mile analysis. The aforementioned decision was cited, in part, in the *P.J. Dick* decision:

We find no basis to conclude that either the productivity of the same crew or that exactly the same work is a prerequisite for a valid measured mile analysis to establish the amount loss of productivity. We agree with the GSA Board of Contract Appeals when it held in *Clark Concrete, Inc.*, 99-1 BCA ¶ 30,280:

[The Government] is correct in asserting that the work performed during the periods compared by [the Contractor] was not identical in each period. We would be surprised to learn that work performed in periods being compared is ever identical on a construction project, however. And it need not be; the ascertainment of damages for labor inefficiencies is not susceptible to absolute exactness [citation omitted]. **We will accept a comparison if it is between kinds of work which are reasonably alike, such that the approximations it**

involves will be meaningful.
[emphasis supplied]

However, in *P.W. Construction, Inc.*⁵ the contractor's measured mile productivity analysis was rejected because the contractor failed to take into account very different pipe joining methods between the segments being measured. While different materials and installation methods do not necessarily prohibit the use of a measured mile comparison, the claimant must make suitable adjustment in the computations to account for inherent differences in the segments being compared. This decision stated, in part:

The record shows that welding in the impaired period was butt-welding on polyethylene pipes, which takes only 15 seconds to 2 minutes per weld, whereas the welding done in the pre-disruption period was steel welding, which may take up to 2.69 hours per weld. ...this evidence suggests that a comparison of the pre- and post-disruption periods must take into account the difference in welding ...

Because the impaired rate accurately reflects productivity during the impaired period, but does not accurately reflect productivity during the ideal period, the court vacates the damage award on lost productivity. The rates must account for the differences in welding and trenching costs for the different pipes.

What can be taken away from the aforementioned cases and the other measured mile cases in the industry is that the concept of *reasonable similarities* is crucial in prevailing when utilizing a measured mile analysis. Also, these cases affirm the fact that the measured mile method is the most widely accepted form of productivity measurement in the construction industry.

Endnotes

Bulletin

¹ While this bulletin focuses on the use of labor hours in quantifying labor inefficiencies, some contractors have chosen to use unit costs. The measured mile method does not proscribe the use of costs as a surrogate for labor hours, however if costs are utilized, the claimant must be careful to remove all factors, such as wage increases, that would inherently unbalance the measured mile comparison.

² The term "representative" is used herein to mean impacts representing a reasonable and consistent level of productivity loss arising from the alleged causes as opposed to choosing a limited, particular area or time frame that exhibited the most drastic impacts without averaging or weighing the resulting inefficiencies with other impacted areas or time frames.

³ *Luria Bros. & Co. Inc. v United States*, 369 F.2nd 701, 712, 177 Cl. Ct. 676 (1966)

⁴ For an explanation of the data columns shown in this sample report, refer to the bulletin entitled "Maintaining Control of Labor Productivity" herein.

⁵ Many mechanical contractors do not track actual change order hours by activity code. Some mechanical contractors do not update the plan on an activity-by-activity basis for estimated change order hours. There is no established standard in the industry in this regard. However, at some level, the contractor must know if the production rates estimated to perform the work are being met on the project, either at the activity level or at the bottom line.

⁶ "Installation" needs to be uniformly defined within the analysis such that categories of work such as material

handling and pipe support erection are consistently included or excluded.

⁷ We note that the trend among many of the larger sheet metal contractors is to track the labor required to manufacture, pre-assemble and erect duct work on a contemporaneous basis. This trend has been facilitated by computerized sheet metal detailing and cutting systems and bar coding on the duct segments that allow for efficient tracking of the material and correlation of the material installed with the labor required to perform the work. This mechanization has resulted in many sheet metal contractors being able to perform measured mile analyses while the project is on-going and with little additional effort in data collection and labor hour correlation.

⁸ From the outset of a project, the contractor's management should review the superintendent's or foreman's daily field reports and/or progress diaries to ensure that the contemporaneous entries contain sufficient detail, are accurate and are in the proper format. At a minimum, daily reports or diaries should specify what work is being performed, where the installation activities are taking place by physical area of the project and by which crews.

⁹ The contractor should also endeavor to measure the potential time impacts to the project schedule arising from labor inefficiencies and, if applicable, include those time impacts in its REA. The subject of potential time impacts arising from labor inefficiencies is covered elsewhere in this manual.

Appendix

¹ *Appeal of P.J. Dick* VABCA Nos. 5597, 5836-37, 5839-50, 5951-65, 6017-24, 6483, 01-2 BCA ¶¶ 31,647

² *Wunderlich Contracting Co. v U.S.* 173 Ct. Cl. 180, 351F.2d 956 (1965)

³ *Danac, Inc.*, ASBCA No. 33394, 97-2 BCA ¶¶ 29,184 (1977)

⁴ *W.G. Yates & Sons Construction Co.*, ASBCA No. 49398, 01-2 BCA ¶¶ 31,428 at 29 (2001)

⁵ *P.W. Construction, Inc. v. The United States* 2002 WL 31780958 (Fed. Cir. 2002)

Prepared by Paul Stynchcomb, CCM, PSP, CFCC of FTI Consulting, Inc. with peer review performed by: Robert Beck, Exec Vice President of John W Danforth Company; Michael R. Cables, Executive Vice President of Kinetics Systems, Inc.; Stephen R. Dawson, President, Harrell-Fish, Inc.; Richard Freeman, Executive Vice President of Stromberg Metal Works; Michael A. Mack, Executive Vice President, John J. Kirlin, Inc.; Charles F. Mitchell, General Counsel of The Kirlin Group; Adam Snavely, President and CEO of The Poole & Kent Corporation, An EMCOR Company; and Thomas Williams, President of Sustainable Builders.



Bulletin

How to Estimate the Effects of Cumulative Impacts

EXECUTIVE SUMMARY

This bulletin has been written as a resource for the subcontracting industry with the purpose of helping the reader identify when cumulative impact has affected labor productivity and how to quantify the adverse effect in terms of inefficient labor hours. To the extent that questions arise, contractors are encouraged to seek the expertise of their legal and claims consulting resources.

Definition

Cumulative impact of changes to a construction contract is the unforeseeable disruption of labor productivity resulting from the effect of multiple changes to the contractor's pool of labor. Cumulative impact is referred to as the "ripple effect" of changes on unchanged work, and on the change work itself, and causes a decrease in labor productivity. This loss of productivity is usually not subject to analysis in terms of spatial or temporal relationships because its source is not a single event, but arises from the multiple changes issued on the project.¹

Contractors have long understood that when a project is subjected to a large number of changes in terms of labor hours, not necessarily dollar amounts, the productivity of the contractor's labor force can decrease substantially, even

more so than the contractor may foresee at the time any single change is priced. It is not the effect of a single change, but the *cumulative effect* of numerous labor-related changes in scope that disrupts the rhythm of the project and frequently results in stacking of trades, unplanned crew size increases, piece-meal performance, and other types of inefficient operations.

The resulting loss of labor productivity may be recoverable as an added cost of the multiple changes affecting the contractor's labor pool. This loss is not attributable to a single change and cannot be tied to a specific change by a traditional cause and effect analysis. Rather, the contractor's loss of labor productivity is the result of the myriad changes radiating disruption and other adverse effects outward, resulting in a decrease in the contractor's overall labor productivity on the project.

The contractor may quantify the effects of cumulative impacts in several ways. The simplest means of quantification is the total cost method. This entails subtracting from the contractor's total labor hours its estimate and change order labor hours. A variation on this, called the modified total cost method, subtracts from the total actual hours any of the contractor's bid errors or field retrofit caused by the contractor. These are the least accepted methods of

quantifying the contractor's losses. The contractor may employ the MCAA labor inefficiency factors to quantify the labor inefficiencies caused by cumulative impact. The most widely accepted method of recovering loss of labor productivity is the measured mile method, where the portion of the project impacted by others (i.e., change) is compared with an undisrupted or less disrupted portion. The measured mile is the favored methodology because it is an empirical, project-specific method of quantifying all types of labor productivity impacts. However, the conditions permitting the use of a measured mile analysis may limit the projects on which it can be applied.

Only recently have methods been made available for a contractor to quantify the adverse productivity effects of cumulative impacts utilizing statistical analyses performed on other construction projects. William Ibbs, PhD, Professor of Civil and Environmental Engineering at the University of California, Berkeley, has performed studies of over 170 individual construction projects covering a wide variety of project types. Those data have been assembled into forecasting curves that predict, with reasonable accuracy, a contractor's loss of labor productivity given the labor intensity and timing of the implementation of the labor changes.

Professor Ibbs' studies have confirmed the critical role of the timing of the performance of changes as correlating to the degree of impact caused by change to a construction contract. The Ibbs studies show that when change is implemented early in a construction schedule, the effects of these early changes can be less than the effects of changes introduced during the "heat of battle"—at a time when crew sizes and the number of activities being worked are at their maximum, and when much

of the physical base contract work may have been installed and may require modification or removal and replacement as a result of changes in scope. The resulting studies and the statistical analyses have now been published by the MCAA in a form that allows contractors to utilize the data to quantify the effects of cumulative impact.

In the following bulletin, contractors will learn what constitutes cumulative impact, how to explain the phenomenon, and, using the Ibbs curves, how to quantify the resulting loss of labor productivity. Examples are provided that guide the contractor in selecting the appropriate timing curve, computing the necessary categories of labor hours and percent of change, and reaching a reasonable result in terms of the loss of labor productivity, expressed in labor hours. The graphic curves presented in this bulletin allow the contractor to plot percent change against the resulting loss of labor productivity percentage. That correlation, derived from the graphic curves, is then utilized by the contractor to compute an estimated number of inefficient labor hours resulting from the effects of cumulative impact. The Ibbs methodology has been accepted by triers-of-fact and thus, can be helpful in resolving disputes arising from cumulative impact.

INTRODUCTION TO CHANGE AND CUMULATIVE IMPACT

There are few subjects in the construction industry as widely discussed in the context of identifying and quantifying losses in labor productivity as the subject of cumulative impact. A principal reason for this discussion regarding cumulative impact stems from the fact that cumulative impacts are, in most instances, virtually impossible to identify while they are taking place.² In many cases, the effects

of cumulative impact only become evident at, or near, the conclusion of a project, when the effects of the individual changes have been recorded in the contractor's labor and cost reports. Reasons for this may arise from a lack of detail in contemporaneous labor tracking and trending reports, the manner in which labor reporting was maintained, or the late issuance of scope changes such that negative trends do not appear in the labor reporting until the project is at, or near, completion.

Another cause can be attributed to the notion that a significant number of small to medium-sized changes are difficult, if not impossible, to connect as causes to quantifiable and specific effects on an individual, change by change basis. It is not until these almost invisible and individual impacts of changes mount into a tidal wave that the effects begin to become evident in the project records.

Because today's construction projects are complex, expensive, and sometimes risky investments for project owners, many owners seek to impose strict bidding or proposal conditions and tight controls on their projects. Projects sometimes have to go to market by way of competitive bidding early in the development process, with plans and specifications that are latently incomplete or have errors, such as lack of a coordinated design among the trades. Often the additional costs associated with incomplete design and/or design errors do not become apparent until the project is under construction. At the same time, there is fierce competition in the marketplace as evidenced by the large number of contractors pursuing the projects released for bidding. The result is an industry that is competitive and which creates tight profit margins for the builders. Moreover, some projects are "economically fragile" and susceptible,

so when even modest change occurs, contractor profit margins and owner value propositions can be jeopardized, or even evaporate.

Thus, in a challenging marketplace, it is important for the contractor to monitor the status of contract changes on a construction project. An important step in this process is for the contractor to attempt to fully understand the scope of work in the contract. Only by being aware of the base contract scope can a contractor know that an owner is requiring out-of-scope work to be performed. Unfortunately, at times contractors perform out-of-scope work without realizing that the labor hours they are expending are actually for work that is out of scope. They incorrectly assume that the labor hour overruns recorded on the labor reporting system must be caused by their own issues in the labor plan or by inherently inefficient workers.³

A second step in monitoring the change process is for the contractor to track the magnitude and timing of change. Many contractors do not record actual labor hours expended on change orders or scope changes (i.e., by charging actual hours to separate change work codes on labor reports) nor are actual start and finish dates for changed work tracked in the contractor's contemporaneous records. When changes are performed, the contractor should create some form of documentation (e.g., RFIs, daily field reports, or superintendent's diaries) that will denote when and where change work is being performed and by what crew size. In the absence of this contemporaneous data, change work files should be maintained that document the estimated labor hours required to perform the work, and, at a minimum, when the change work was estimated to have commenced and when it was completed.

However, even with identification and monitoring of the work scope accompanied by reasonable efforts to segregate and account for job costs, the cumulative impact of multiple changes often cannot be accurately captured within the contractor's cost reporting system. As noted by legal and accounting experts:

The advisable practice for capturing and reporting claimable costs is to segregate the costs that are a direct result of the events that impacted the project....This argument has merit in theory but in practice may be difficult to achieve. If the claimed event relates to additional activities or expanded scope of work that is readily identifiable and segregated from the original scope of work, then discrete cost accounts can be established to capture the additional costs of direct labor, purchase orders, or subcontractor change orders. Conversely, if the basis of the claim is...acceleration within the same activity, or changes affecting multiple work packages, then the associated extra costs may not be captured from the originally established cost accounts. Because separating the additional costs may be difficult or impossible, the basis for substantiating these costs must be accomplished by other means.

...Even with optimal planning and cost control systems, contractors can still experience difficulty in capturing all of their discrete cost damages....Hidden costs may occur with a significant number of changes to a project...and such delay and disruption costs can snowball and not be discretely captured....The quantification of each change order will fail to identify the cumulative impact or "ripple effect" associated with multiple changes. These...will have a negative compounding effect on construction productivity and are usually difficult to quantify discretely in the cost report.⁴

This bulletin will describe methods for establishing a reasonable recovery of

costs arising from the adverse effects of cumulative impact. As a starting point, *change* is defined by the Construction Industry Institute (CII) as "any variation in a project's scope, whether physical, administrative, commercial, or schedule."⁵ For the purposes of this bulletin, change will refer to changes in the contract scope, whether existing as formally approved change orders or unapproved scope changes submitted by the contractor to the appropriate contractual party (e.g., owner or prime contractor). As will be discussed more fully herein, unapproved scope changes used in the computations contained in this bulletin must have a reasonable likelihood of being approved as a change order, or have a reasonable chance of being recognized as valid changes by a neutral or trier of fact.

When many changes occur, the situation is further complicated and may result in what is known as a cumulative impact condition. This term has, perhaps, been best defined by recent decisions issued by the major boards of contract appeals and which are cited elsewhere in this publication (reference "How to Use the MCAA Labor Factors" herein). Two such definitions bear repeating here:

Direct impact is generally characterized as the immediate and direct disruption resulting from a change that lowers productivity in the performance of the changed or unchanged work. Direct impact is considered foreseeable and the disrupting relationship to unchanged work can be related in time and space to a specific change.

Cumulative impact is the unforeseeable disruption of productivity resulting from the "synergistic" effect of an undifferentiated group of changes. Cumulative impact is referred to as the "ripple effect" of changes on unchanged work that causes a decrease in

productivity and is not analyzed in terms of spatial or temporal relationships.

This phenomenon arises at the point the ripple caused by an indivisible body on two or more changes on the pond of a construction project sufficiently overlap and disturb the surface such that entitlement to recover additional costs resulting from the turbulence spontaneously erupts. This overlapping of the ripples is also described as the “synergistic effect” of accumulated changes. This effect is unforeseeable and indirect. Cumulative impact has also been described in terms of the fundamental alteration of the parties’ bargain resulting from the change.

The second paragraph of this board of contract appeals decision defines several key elements of cumulative impact: 1) changes in scope that can result in decreased labor productivity can be “undifferentiated” (i.e., the loss of productivity cannot be attributed to a specific change); 2) the effects of such changes can “ripple” outward adversely affecting the base contract, or unchanged work, as well as other change work; and 3) changes in scope that affect labor productivity need not be related spatially or temporally—they need not occur in the same time frame and/or in the same physical area of a project. As a result of the inability to tie the features of cumulative impact to a specific event, time frame, or area of the project, it is difficult, if not impossible, to capture the additional costs associated with a specific impacting event even with standard project control and accounting systems being utilized by the management team.

Finally, in the third paragraph, the board found that these “ripples” of inefficiency flow from the changed work onto the pond of the base contract, or unchanged work, as an indirect effect of the changes. Since these “ripples” are an indirect result, they may not be

foreseeable at the time the change events are taking place.

It follows that cumulative impacts—the destructive effects of multiple changes in scope on a construction project—cannot be measured as the work moves forward, nor can such adverse effects be measured in individual changes in scope. An estimator attempting to forward price changes may not be able to foresee, let alone quantify, with reasonable accuracy the productivity impacts to the overall project arising from individual changes.⁶ Indeed, such impacts may not be identifiable or quantifiable until the end of a construction project, when measured within the entire universe of change that was encountered during the construction process.

Another definition of cumulative impact offered by a major board of contract appeals is also instructive:

Among other things, ‘impact’ includes: inefficiencies due to overcrowding, over or under manning, skill dilution, extended overtime, shift work, and local and cumulative disruption. Local [or direct] disruption’ refers to the direct impact that changed work has on other unchanged work going on around it. Conceptually, for purposes of this appeal, ‘cumulative disruption’: Is the disruption which occurs between two or more change orders and base work and is exclusive of that local disruption that can be ascribed to a specific change. It is the synergistic effect....of changes on the unchanged work and on other changes.

While this bulletin is not intended to serve as a legal treatise on the subject of cumulative impact, it is frequently the published decisions from the Boards of Contract Appeals and the U.S. Court of Federal Claims that can provide some understanding regarding critical issues in the construction industry. It is apparent from these and other Board of

Contract Appeals decisions that there is general agreement as to the existence and effects of cumulative impact. However, there is less agreement regarding how to actually measure the effects of cumulative impact. Addressing this challenging issue in the construction industry is the primary purpose of this bulletin.

UNDERLYING CAUSES AND NATURE OF CUMULATIVE IMPACT

Cumulative impact occurs when multiple changes in scope unforeseeably ripple out to cause disruption and a loss of productivity to changed work and, potentially, to the base contract work itself. However, it is understood in the construction industry that some change is inevitable on larger construction projects—the question is how much change to expect. It is generally agreed in the construction industry—and substantiated by research—that projects with multiple, unanticipated labor hour changes often suffer a considerable loss of labor productivity.

Thus it is important to establish what general magnitude of change an experienced contractor should expect when bidding a construction project of any size or complexity. Studies conducted in the construction industry by governmental agencies have resulted in the data shown in Figures 1-A and 1-B regarding expected changes in scope on construction projects.

From the data shown in Figures 1-A, 1-B, and 1-C,⁷ it is clear that contractors should expect some amount of change on a sizable construction project. Obviously, the exact percentage of contract growth is not foreseeable at the time of bidding each individual project. However, ranges of potential change

Figures 1-A & 1-B

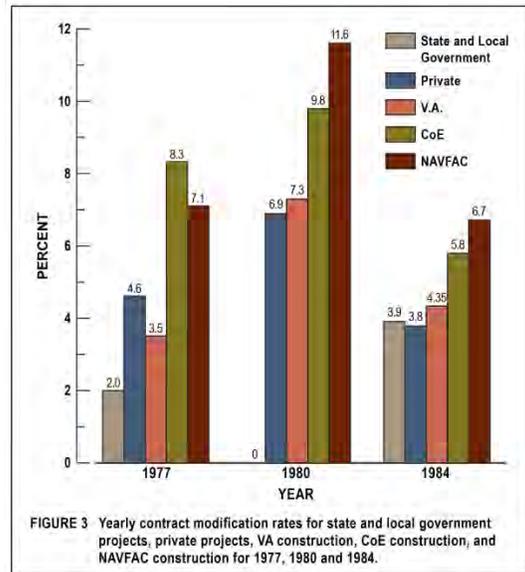


TABLE 7 Statistics on Modifications to Veterans Administration Construction Contracts, 1974 to 1985

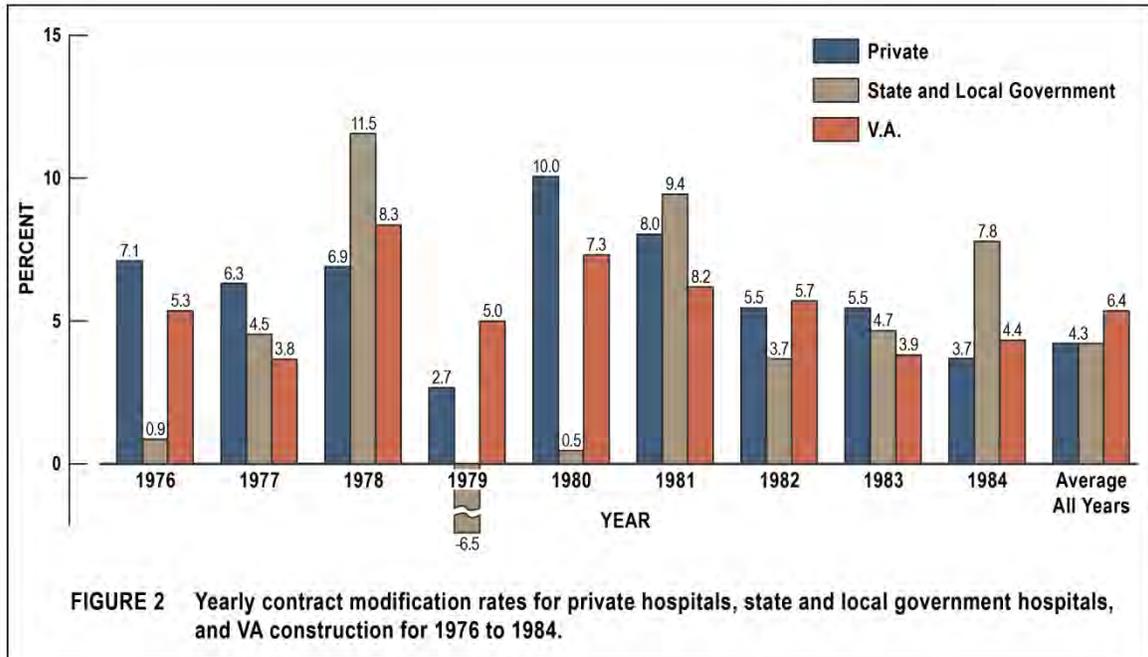
Calendar Year	Number of Projects Physically Completed per Year	Original Amount of Completed Contracts, Yearly Totals (\$, thousands)	Net Amount of Changes to Complete Contract, Yearly Totals (\$, thousands)	Rate of Cost Growth (percent)
1974	56	16,470	803	4.87
1975	128	91,928	8,162	8.88
1976	159	163,046	8,672	5.32
1977	202	132,717	4,706	3.55
1978	197	149,068	12,394	8.31
1979	204	183,267	9,091	4.96
1980	224	210,962	15,445	7.32
1981	259	245,654	15,297	6.23
1982	211	209,513	11,901	5.68
1983	214	495,199	19,322	3.90
1984	257	281,896	12,256	4.35
1985 (thru June)	89	96,517	4,411	4.57
Total	2,200	2,276,237	122,460	5.38

SOURCE: Veterans Administration.

growth can be evaluated based on historical data available in the industry.

Cumulative impact arises from multiple labor-related changes (whether directed or constructive) being issued on a construction project. The more labor intensive the project, the greater the impact that can be expected. This impact may result from design changes, differing site conditions, third party actions or inactions, weather, or other

Figure 1-C



causes that are not the responsibility of the labor-intensive contractor.

Regardless of the source of the change, it is generally not the dollar value of the change, or the number of executed change orders, that are the critical factors in determining whether change may cause or contribute to cumulative impact. Rather, it is the number of labor hours that will be required to perform the changed work. A change order presented to a mechanical contractor could have significant dollar impact to the overall contract value, but could be “all material” and have little or no meaningful impact on labor productivity. Thus, it is usually the labor hours that really matter when attempting to identify and quantify cumulative impact.

Another characteristic of change, not just of cumulative change, is that it can be either additive or deductive. That is, a given change may enlarge a project’s scope or reduce it. Many owners find it difficult to accept, but research clearly indicates that there are many instances

where a deductive change can be so disruptive that the number of labor hours and costs actually increase despite the fact that the physical quantity of work may be reduced by the change. This situation must be evaluated on a case-by-case basis.

Cumulative impact cannot be measured on individual, discrete changes as each change by itself may not have a significant impact. Usually, cumulative impact is best measured near, or at, the conclusion of a project because its adverse impacts do not dissipate until the project is completed, or is nearly completed.

WAIVER LANGUAGE IN CONTRACT DOCUMENTS

This bulletin does not offer a comprehensive review of the potential legal obstacles associated with recovery of damages arising from cumulative impact. However, it is important to note that owners such as the federal government (e.g., GSA, VA) and many

local agencies and private developers are including waiver language in the various contract forms (e.g., change orders, payment releases, or in the contract itself) that seeks to limit a contractor's right to recover any costs of change that are not expressly included in the executed change order. Recent trends at the federal level suggest that a contractor must use extreme caution when executing any contract document, including the contract itself, if the contractor expects to preserve its rights to recover the cost of change (i.e., cumulative impact) that was not included in the executed change order.⁸

Since cumulative impact is usually quantified near, or at, the conclusion of a project, by that point in time the contractor may have executed a host of monthly payment application forms and change orders containing some form of waiver language. In many cases, these forms contain "full accord and satisfaction" language or other waiver provisions that may seriously limit, or even bar, the contractor from a cumulative impact claim arising from the adverse effects of changes that have been previously negotiated and bilaterally executed.

Before executing the original contract or any of the various contract forms, such as monthly payment applications and change orders, the project management team should review these documents with its executive management team and seek legal advice if deemed appropriate. Executing such forms containing the aforementioned waiver provisions, without an assessment of long term risk to the contractor, is not prudent project management. In general, the contractor should assume such waiver clauses are enforceable unless advised to the contrary by competent construction counsel.

In the alternative to executing payment applications and change order forms that have comprehensive waiver provisions, the contractor may seek to bilaterally negotiate with the prime contractor or project owner alternative language that will appear on the forms themselves. Such alternative language often seeks to preserve a portion of the contractor's rights to recover, at some future date, "unknowable" (i.e., "unknowable" at the time individual, "stand alone" changes are priced and executed as change orders) impact costs such as those arising from cumulative impact.

In the alternative, on projects where cumulative impacts are expected to be substantial, and where the owner refuses to alter the waiver provisions on the various contract forms, the contractor may decide to accept unilateral change orders that pay for a portion of the change but do not require the contractor to execute documents that may waive the right to later claim for unforeseeable or unknowable impact costs such as those arising from cumulative impact. Another option is for the contractor to proceed with the changed work without payment (most contracts give the owner the right to direct the contractor to proceed without a settled change order) while the parties address the change through the contractor's dispute clause.

The waiver of a contractor's right to claim for cumulative impact costs after the execution of changes bearing full accord and satisfaction language is a very serious financial and legal issue. It is strongly recommended that mechanical contractors review all contract documents with competent legal counsel prior to mobilizing on the project and certainly prior to executing any document that could potentially bar the contractor from receiving full equitable adjustment to its contract for

all forms of impacts, including the cumulative impacts of change.

THE MEASURED MILE ANALYSIS METHODOLOGY

The measured mile method of quantifying a loss of labor productivity on a construction project is considered a project-specific, empirical analysis methodology. Productivity data is collected on the project under study comparing the production rates of similarly skilled workers installing similar materials but under different conditions; productive (or partially productive) and impacted. The role of the analyst is to identify the causes of the reduction in productivity between a less impacted and a representatively impacted area or time frame on the project. The comparative production rate data produces the productivity loss quantification.

Since the measured mile methodology is a project-specific means to quantify a loss of labor productivity, it is highly favored by courts and arbitration tribunals. The cumulative impact data provided in this bulletin are not studies of the productivity rates actually achieved on your company's project. The graphic models presented herein were prepared under statistical controls to offer accurate predictions of productivity loss given a set of circumstances that existed on over 170 individual construction projects.

As will be described herein, the data lines shown on the graphs have a "good fit" as to their ability to statistically predict with reasonable accuracy outcomes given certain input (i.e., the project data described in the examples contained herein). However, the data collected to produce the curves shown in this bulletin were not prepared from the specific project to which the reader

will apply the methodologies described herein. Thus, before a statistical approach is attempted, the claimant should attempt to prepare a measured mile analysis that derives its data directly from the affected project under study. The description of the measured mile methodology is provided in detail within this publication in the bulletin on "How to Apply the Measured Mile Method of Productivity Analysis."

There may be a host of valid reasons why a measured mile analysis cannot be applied on a construction project that is beset with multiple changes in scope. In order to prepare a measured mile analysis, there must be a nonimpacted or less impacted area or time frame in which, or during which, the contractor's actual productivity can be compared with the contractor's actual production in an impacted area or time frame. On many projects, change begins at the outset of the project and continues almost to the time of commissioning or demobilization, thus yielding no unimpacted or less impacted area or time frame for the comparison. On other projects, the labor tracking records may not exist to perform a measured mile analysis. However, there are ways to modify the measured mile approach to accommodate some of the obstacles often encountered with the lack of a less impacted area or time frame, or with the lack of robust recordkeeping.

Before any other type of productivity quantification methodology is applied, the claimant should first seek to utilize the measured mile method to quantify the loss of labor productivity. A successful measured mile analysis will capture the vast majority of the types of labor inefficiencies that occur on construction projects. If a measured mile analysis cannot be performed and the project has been adversely affected by change, the methodology described in this bulletin may assist the contractor

with the preparation of a loss of productivity analysis that is derived from statistically reasonable project studies as will be described herein.

DEFINING “SCOPE CHANGE” AND “CHANGE ORDER”

When reviewing the available literature on the subject of cumulative impact, the terms “scope change” and “change order” are frequently used interchangeably when discussing the hours attributable to contract changes in scope.⁹ “Change” includes unapproved scope change labor hours and approved change order hours, presuming these unapproved changes will stand the test of scrutiny regarding their validity. Including labor hours arising from questionable scope changes will reduce the contractor’s credibility and potentially affect the inefficiency computations and estimates.

If scope change hours (which by definition have not been formally approved as contract change orders) are included in the contractor’s cumulative impact loss of productivity computations, some special considerations have to be made. If, during the process of vetting scope changes, the contractor withdraws a scope change and performs the work under its base contract, or the scope change is determined by an authoritative tribunal or board to have been within the contractor’s base contract scope, the total “change” hours must be adjusted accordingly in any of the cumulative impact models that are presented in this bulletin.

As will be discussed herein, the actual number of change orders issued on a project may not be relevant to the issue of labor inefficiency. On some projects, an owner may bundle many, perhaps 10, 20 or more, individual scope

changes into one omnibus change order. Thus, it is not the number of executed change orders, or necessarily the timing of the issuance of the formal change order documents, that most adversely affect field labor productivity. It is the number of change labor hours and their timing (in terms of when the work is actually performed) that most profoundly affects a contractor’s labor productivity.

IDENTIFYING LABOR OVERRUNS IN THE CONSTRUCTION INDUSTRY

Labor overruns can have a variety of causes as their origins. One cause of labor overruns could be an inaccurate estimate. However, on projects fraught with a multitude of labor intensive changes, labor overruns are frequently the result of cumulative impact. As noted, a simple labor overrun shown in a labor production report is not necessarily an indicium of an inefficient project. Similarly, labor overruns on construction projects do not necessarily arise from inaccurate labor estimates. A project which was based on an accurate, reasonable and carefully reviewed labor estimate can have substantial labor overruns. Therefore, it is necessary to investigate such labor overruns carefully to ensure that the root cause is not an inaccurate labor estimate and is, in fact, the result of labor inefficiencies caused by identifiable events on the project.

Labor overruns that result from an inaccurate estimate usually arise from missed work scopes, such as material and equipment items, not being identified during the estimating process. As such, when it comes time to assign labor hours to material and equipment items, the labor hours required to install items that were missed in the estimate are not included in the total of labor

hours required to construct the project. Another possible source of an improper labor estimate is the labor factor(s) utilized by the contractor as the achievable productivity on a particular project and that will result in the expenditure of the planned labor hours.

For instance, if an estimator applies a 0.65 MCAA estimating labor factor for the installation of pipe, valves, and fittings on a project because the field forces are known to the estimator as productive, and these forces become unavailable when the project actually commences, the actual labor forces may only achieve a 0.75 or higher MCAA estimating labor factor. While this represents a form of labor inefficiency (i.e., the actual labor force was inherently less productive than the estimated labor force), such misassumptions in the estimating process may not constitute a claim for labor inefficiency under most construction contracts.¹⁰

When a project has been properly estimated in terms of quantities and the original labor factors applied at the time of the bid, and the project sustains a measurable labor overrun, then a condition resulting in a potentially recoverable loss of labor productivity may have occurred. Such conditions should initiate a careful analysis of the project by the contractor's management personnel.

A potentially recoverable¹¹ loss of labor productivity condition is one that was not caused by the contractor in its estimating, management of the project, or other factors ascribable to the contractor. Put another way, but for the conditions that caused the inefficiencies—conditions not caused by the acts or omissions of the mechanical contractor—the mechanical contractor's labor would have at least met the planned production rates.

Loss of productivity cannot be defined simply as actual labor hours for a specific scope of work, minus change hours, minus estimated hours, equals inefficient labor hours for a particular scope of work. Consider that a contractor planned to install 40 linear feet of 10" diameter ASTM A53 schedule 40 carbon steel butt weld pipe and fittings in 8 labor hours. However, it actually took 12 labor hours. The labor overrun cannot be ascribed to a loss of labor productivity without the benefit of a productivity cause and effect analysis. The overrun of 4 labor hours could have been caused by a bid error, an inherently less efficient labor force, or the introduction of the ripple effect of change to the project.

When cumulative impact occurs, it is the effect of multiple changes to the work that causes the majority of the loss of labor productivity, not each independent change itself. In such cases, it is usually impossible to connect an individual, single cause to a specific effect—on a change by change basis. However, the contractor still must prepare a cogent narrative that provides the respondent with a logical and factual basis for the contractor's productivity losses.¹² If the cause can be identified as arising from the impacts of multiple changes on the project and not from the contractor's self-inflicted acts and omissions, then the contractor should consider the application of the studies and examples contained in this bulletin to quantify the loss of labor productivity.

If the contractor is tracking its field erection labor by use of activity tracking or cost account codes that divide the project into identifiable segments, such as by buildings, floors, rooms, or site facilities, management can determine if the losses are project-wide or limited to certain specific areas or time frames. This sort of labor performance reporting is discussed in much greater detail in

the “Maintaining Control of Labor Productivity” bulletin of this publication. Such contemporaneous labor tracking is an important tool in forecasting inefficient labor trends on a construction project and can assist the management team in their efforts to connect causes with the effects in terms of lost labor productivity.

Once a contractor determines that its crews have sustained a measurable loss of labor productivity, and that such losses are not solely the result of the contractor’s own acts or omissions, the contractor should seek to identify the source(s) of the productivity loss, mitigate where practical, quantify the losses, and, if appropriate, seek recovery for those losses.¹³

EVALUATING THE POTENTIAL PRODUCTIVITY IMPACTS OF CHANGES IN SCOPE

What are the potential constituents of cumulative impact as we presently understand them in the construction industry? In terms commonly used in the construction industry, cumulative impacts arising from a multitude of changes can include, without limitation, the following components:

- **Stacking of Trades**—congestion of unplanned trades simultaneously working in limited spaces;
- **Reassignment of Manpower**—also known as labor disruption—the startstop-restart condition frequently resulting from the introduction of new scopes of work into the existing labor plan, or the resequencing of activities to accommodate the introduction of other trades in an unplanned fashion, or new activities (i.e., the scope change activities);
- **Crew Size Inefficiency and Learning Curve**—resulting from the

addition of unplanned resources brought on site to address the magnitude of the changed work and their need to “learn” the project and assimilate into existing crews;

- **Concurrent Operations**—congestion caused by the stacking of the contractor’s own forces to address the added change activities;
- **Dilution of Supervision**—redirection of field labor supervision’s attention from managing base contract work to solving change scope issues—such as preparing RFIs, directing crews performing changed work and ordering of materials arising from the changes; and
- **Overtime**—inefficiencies arising from an unplanned overtime schedule required to mitigate the delaying factors arising from changes to the work.¹⁴

The aforementioned categories, taken from the widely accepted MCAA table entitled “Factors Affecting Labor Productivity” herein, are among the list of possible components of cumulative impact. On a project with multiple changes, it can be difficult, or in some cases impossible, to segregate the individual impact categories that caused the loss of productivity arising from cumulative impact. Thus, the data provided in this bulletin is presented to allow a contractor to estimate labor inefficiencies arising from cumulative impact in a more holistic fashion based on the manner in which the underlying data was collected and analyzed.

In addition to reviewing the labor tracking records and interviewing the field supervision in its investigation, the contractor should carefully assess the size, quantity in terms of labor hours, and timing of changes in scope that

have been issued. As will be described below, the timing of changes in scope is important in the evaluation of the impacts of those scope changes to the base contract labor. Changes in scope that are issued early in a project and sufficiently prior to the planning, coordination, fabrication, and installation of the affected work can be expected to have less impact than changes that are issued in the heat of battle and while the affected work is about to commence or is already in progress. The importance of the timing of changes has been borne out by the research performed by the researchers at the University of California at Berkeley and is demonstrated by the data contained in this bulletin.

It is helpful for contractors to record when scope change work commences and is performed. While the majority of contractors do not code their actual field labor to scope change or change order account codes, in some cases it is possible to track generally when changes are directed or otherwise authorized to commence and when the changed work is performed.¹⁵ By tracking when scope change work is performed, a bar chart can be compiled demonstrating the timing of the scope change work. Such charts can temporally depict the concurrent nature of multiple changes on a construction project and aid in the preparation of a cumulative impact request for equitable adjustment.

It is a generally accepted axiom in the construction industry that the timing of changes is important when considering the potential effect of changes on labor productivity. Changes that occur early in the project and which affect downstream activities may not adversely affect the overall labor productivity. For example, if a scope change/change order is issued near the outset of a two year project to modify piping on a vessel that is not

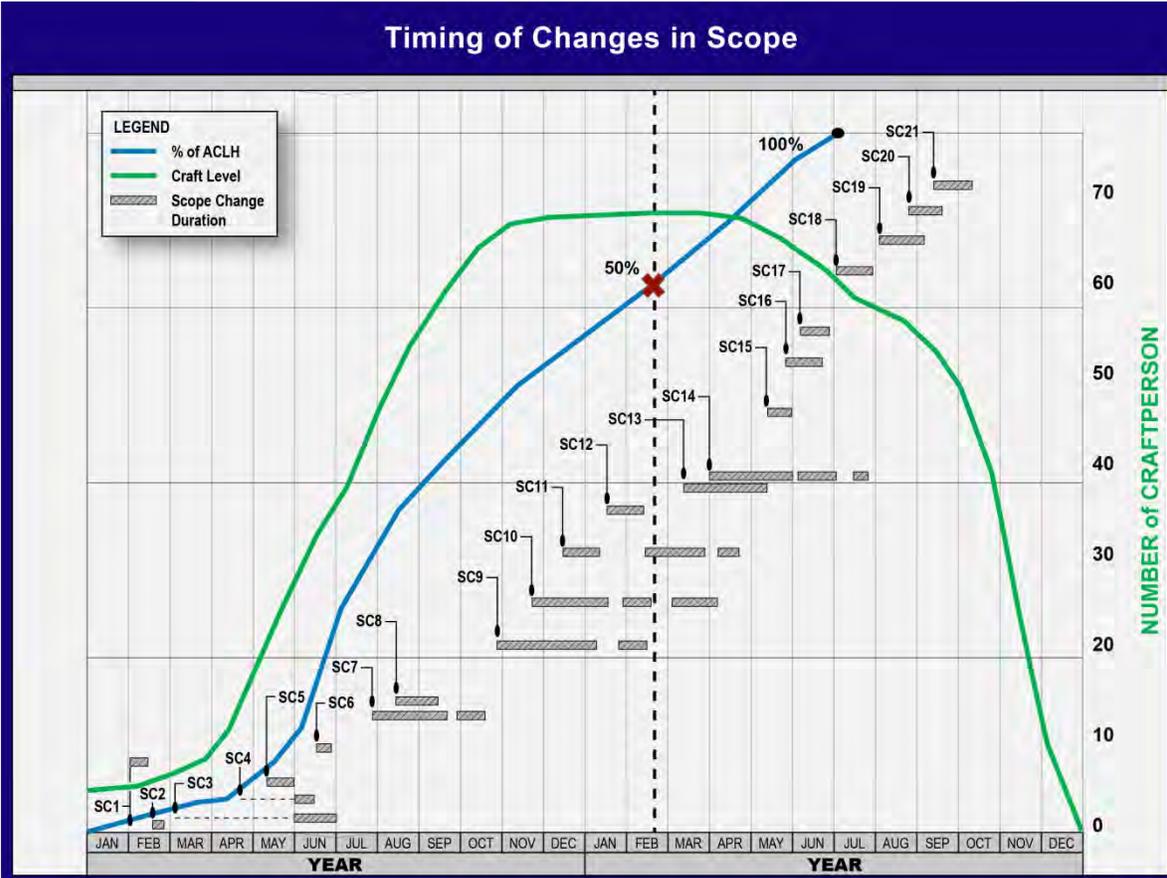
planned to be fabricated, installed, and piped until the middle of the second year of construction, such changes may have a negligible effect on productivity because the influence of such changes can be assimilated into the normal flow and rhythm of the work more easily.

However, most changes in scope are not issued far enough in advance of the planning, coordination, prefabrication, and installation of the work to allow the influences of the change to be managed into an efficient work flow. Most often, contractors are deluged with changes in scope as the work affected by those changes is being installed. When changes in scope are identified and are required to be performed during the "heat of battle," when the crews are ramping up or are at or near their peak, the effects of such changes in scope on labor productivity can be devastating.

Figure 2 on the next page depicts the temporal relationship between change, resource usage and a value known as the Actual Contract Labor Hours (ACLH). The ACLH calculation and consumption curve will be explained in the next section of this bulletin. The actual crew size is shown on the z axis and, if desired, the planned labor curve can be superimposed to show a contrast between planned and actual. This is optional, but potentially very helpful information to show how the craft levels responded to the addition of change work. On the line graph, the contractor has plotted the dates on which scope change work actually commenced and was performed¹⁶ and the rate of consumption of the ACLH.

Figure 2¹⁷ shows that certain scope changes (SC), or interchangeably, change orders, were directed to commence when the project was in its early stages and when the crews were at minimal levels. Assuming these early changes allowed the contractor to easily

Figure 2: Example of Scope Change Timing Chart with Craft Level Curve



incorporate the new or changed work into its planning, coordination, fabrication and installation steps, an attenuated impact would be anticipated as compared with changes issued during the peak crew periods. However, as the contractor increases its crews and prosecutes multiple work activities on several work fronts, changes could be expected to have a substantial and increased adverse impact on the contractor's labor productivity. It is the labor-hour intensity of the change in scope, and its timing, that are the important considerations regarding the effects of the change on labor productivity. The actual dollar value of the change is not the determining factor as to its potential impact on labor productivity.

An important feature of the inefficiency study that underlies this bulletin is its measurement of inefficiencies arising from the *timing* of the changes in scope.

The studies and resulting data that underlie this bulletin (i.e., the *University of California at Berkeley Ibs Study*) were evaluated to determine the effects of timing of the changed work, as well as the effects of the magnitude of the ratio of changes to the base contract labor hours. In a following section of this bulletin describing the use of the Ibs cumulative impact curves, the manner by which the user can categorize a change as "early," "median," or "late" will be defined in detail.

CHANGE AND ITS QUANTITATIVE EFFECTS ON PRODUCTIVITY

Despite the fact that change clearly has measurable and oftentimes adverse impacts on a construction project's labor productivity, until recently there was little authoritative and reliable research into the quantitative relationship between change and loss of labor productivity.¹⁸ This dearth of information led CII to fund an extensive, two-year study led by Professor William Ibbs, PhD, a co-author of this bulletin, and his University of California at Berkeley research team.

The study was funded by large, sophisticated owners and contractors and was reviewed and overseen by a balanced audience. The published results were endorsed by representatives of a majority of the stakeholders in a typical construction project. The Berkeley researchers collected extensive amounts of data from 172 projects and tested various research hypotheses by sophisticated statistical methods. Follow-up interviews were conducted with the project participants to provide quality control on the data and to understand the contexts of the projects.

The projects ranged in size from \$3.2 million to \$15 billion, with a median value of \$62 million, and included both domestic and foreign worksites. Ninety-two percent of the sample projects were constructed in the United States. Sixty-two percent of the sample projects consisted of private sector projects and the remaining 38 percent were public sector projects. Of the public sector projects, 31 percent were highway and bridge, 20 percent rail systems,¹⁹ 19 percent commercial and school buildings and 15 percent hospitals, with the balance consisting of airports and canals.

Forty-one percent of the sample projects were design-build and the balance of the projects utilized a design-bid-build contract delivery system. Fifty-two percent were fixed price (either lump sum or unit price) and 48 percent were cost reimbursable projects. Eighty three percent of the public projects were design-bid-build with a general contractor or construction manager at risk and 17 percent utilized a design-build delivery system. Seventy six percent of the private projects were design-build, with 20 percent using a design-bid-build delivery system and 4 percent utilizing a hybrid contract delivery system. Of the public projects, 65 percent were lump sum, 31 percent were unit price and 4 percent cost plus. Of the private projects, 53 percent were lump sum and 40 percent were cost plus. Eleven percent of the public projects were multi-prime as were 8 percent of the private sector projects. Fifty-seven percent were new, greenfield projects and the balance renovation or expansion projects.

The private projects in this database contained the following types of construction:

- Petrochemical27%
- Power generation19%
- Heavy manufacturing16%
- Light manufacturing12%
- Commercial buildings and other types26%

Labor hour and labor, material, subcontractor, and overhead cost data were collected for the projects at the 25 percent, 50 percent, 75 percent, 80 percent, 85 percent, 90 percent, 95 percent and 100 percent completion points in the design and construction phases.

The data points representing each of the 172 total projects were analyzed and

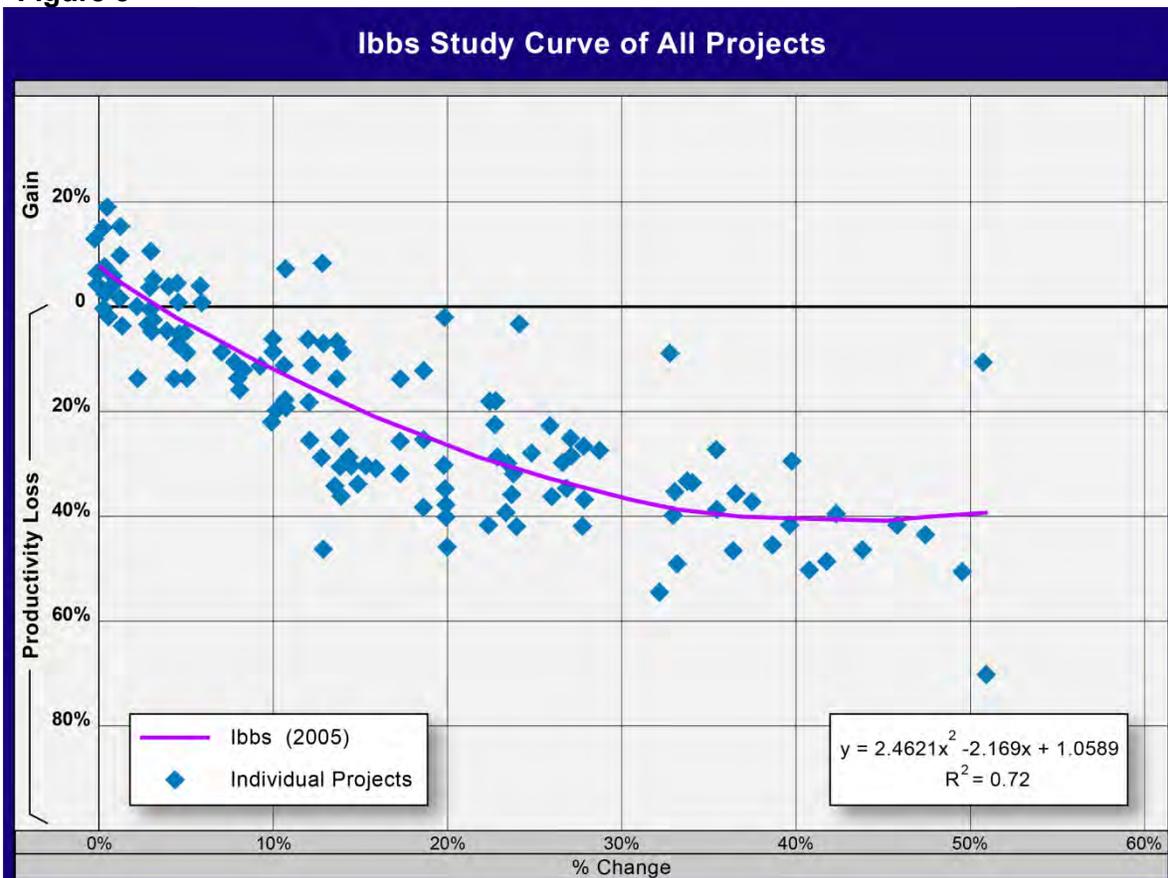
plotted as can be referenced in Figure 3. The curved line represents the best-fit, regression for the total projects under study and the equation for that line is represented by the mathematical expression shown in the figure. The R² value¹⁹ is a measure of the line goodness for fit for the universe of projects in the study; R² = 0.72 indicates a good fit.

Percent Change as used in this bulletin is defined as: $\text{change labor hours}^{20} \div \text{Actual Contract Labor Hours (ACLH)}$. Actual Contract Labor Hours are the total number of actual payroll field labor hours minus change labor hours and minus all appropriate contractor adjustments. These adjustments would include, without limitation, bid errors and contractor field mistakes. Examples of such potential downward adjustments will be provided later in this bulletin.

As described above and as shown in Figure 3, the data collected and analyzed by the Ibbs Study research team were transferred onto charts for use in the construction industry. From the extensive data that was gathered, the research team identified three separate data curves based on the timing of the issuance of changes in scope. The data presented herein represent the estimated impacts to labor productivity when changes at a particular level are issued early, at a median point, or late in the project. These terms, and the means by which projects are categorized as “early,” “median,” or “late” models, are fully defined and explained in a later section of this bulletin. The data resulted in the following three curves.

These two variables, percent change and percent productivity, were

Figure 3



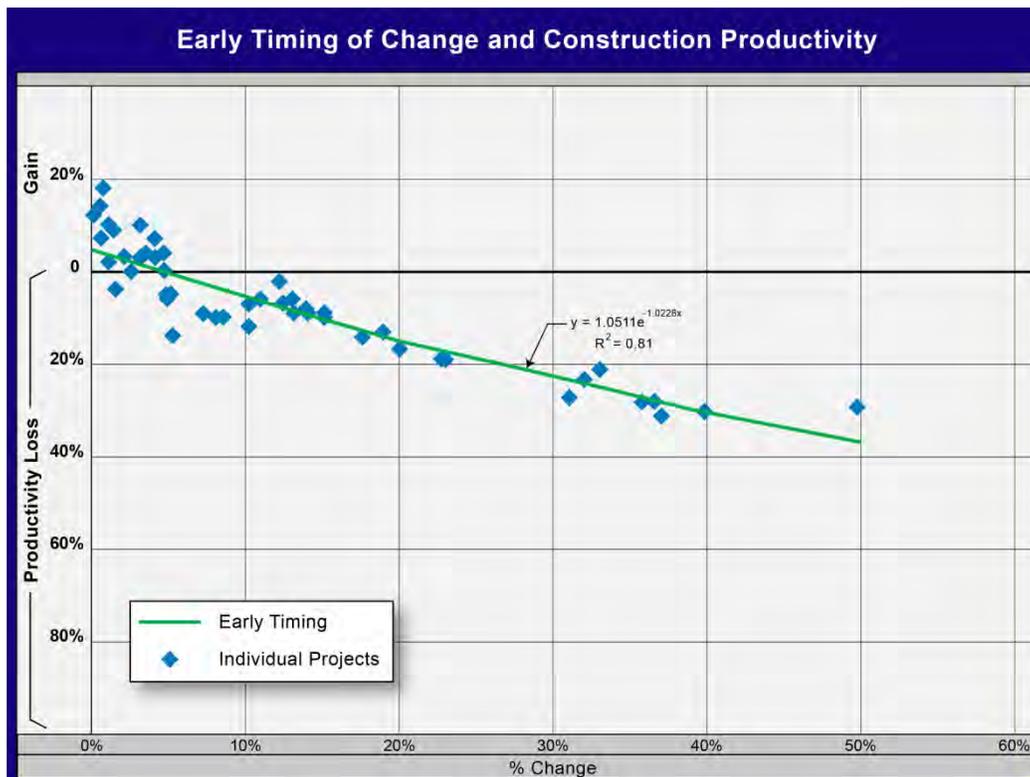
compared, as can be seen in Figures 4 A-C. Each of the data points in these figures represent a project in the Ibbs study. The R² values for the three curves shown in Figures 4 A-C are as follows: 0.81 for the “early” timing curve, 0.63 for the “median” timing curve and 0.76 for the “late” timing curve. All provide for reasonable forecasts of labor inefficiencies that can be expected at various ratios of changes to adjusted base contract hours.

Several points emerge. First, larger amounts of change result in greater loss of productivity. For instance, a project with 20 percent change (measured on the horizontal axis of the median curve) results in a loss of labor productivity of approximately 25 percent. In other words, the cumulative impact of changes causes a reduction in the contractor’s planned productivity of approximately 25 percent.

In this portion of the Ibbs Study projects were ranked as having change at an early, median point or late stage of the project. As to the timing of change, this study utilizes the total ACLH by establishing the mid-point of the project based on the actual utilization of one half of the ACLH, as depicted in Figure 6 on the next page and as described below.

The Change Timing Designation Chart in Figure 6 demonstrates how each of the three timing models is defined. Follow these steps: 1) compute the ACLH as described in this bulletin, we will call that labor hour number X; 2) by referencing payroll or other labor hour data,²¹ determine when, in time, one half of X was actually expended, this is known as the ACLH midpoint; 3) by referencing change pricing folders, time sheets or other data, determine when change work was performed; 4) from that data, determine how many change

Figure 4-A



hours were expended before, and after, the ACLH midpoint; and 5) compute the

percent of change hours expended prior to, and after, the ACLH midpoint.

Figure 4-B

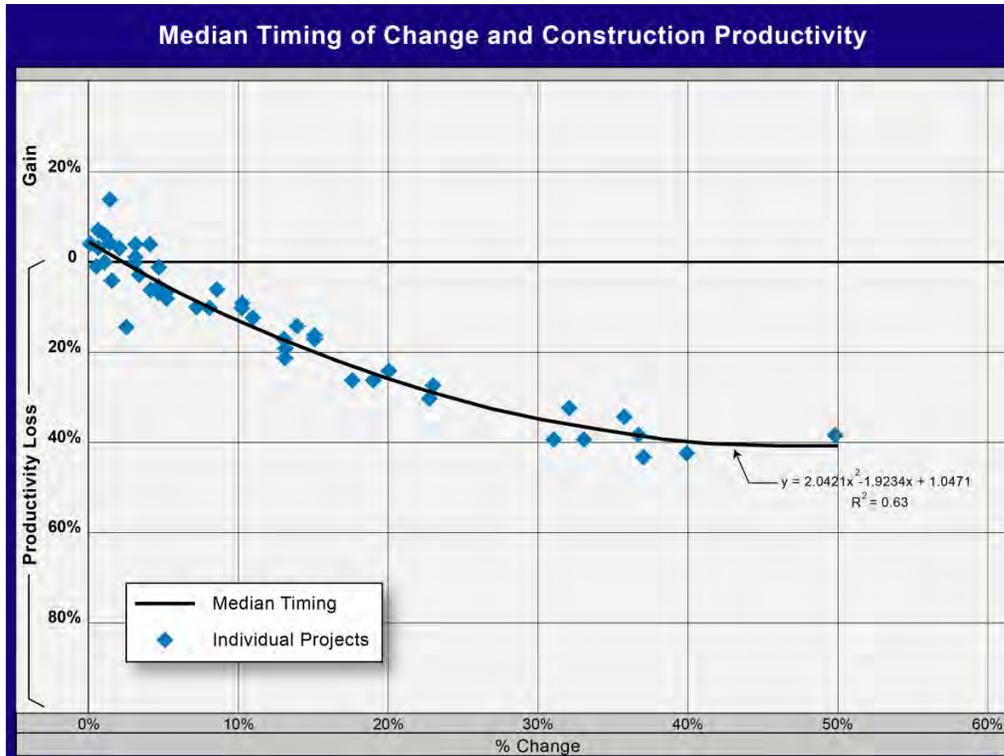


Figure 4-C

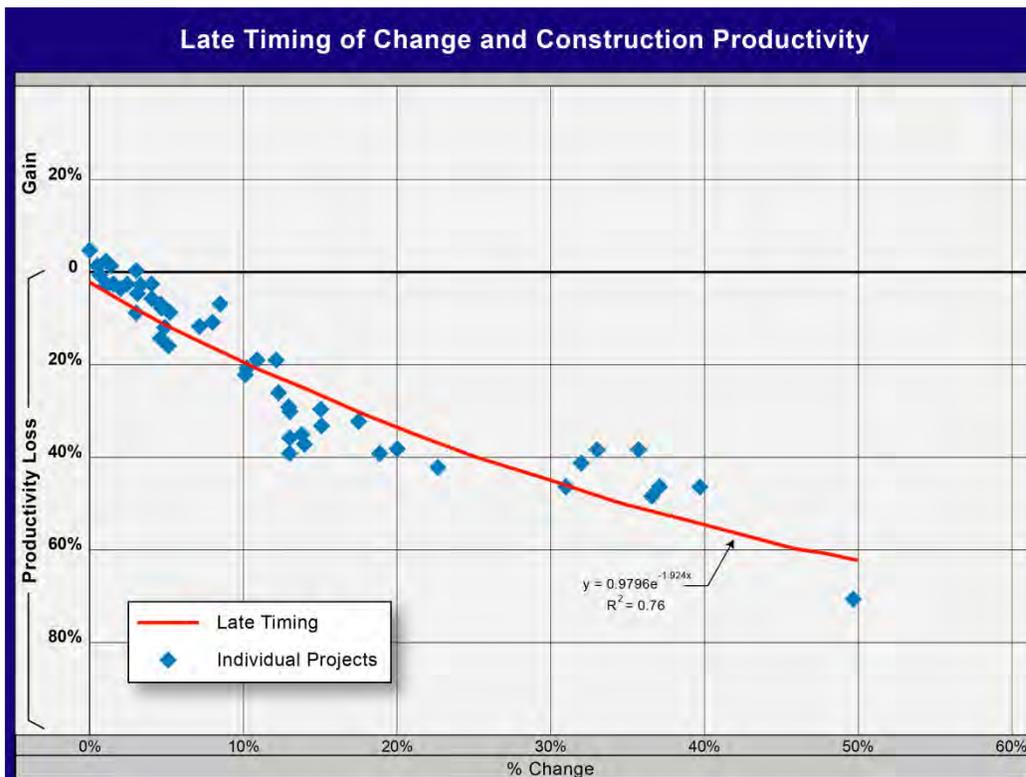
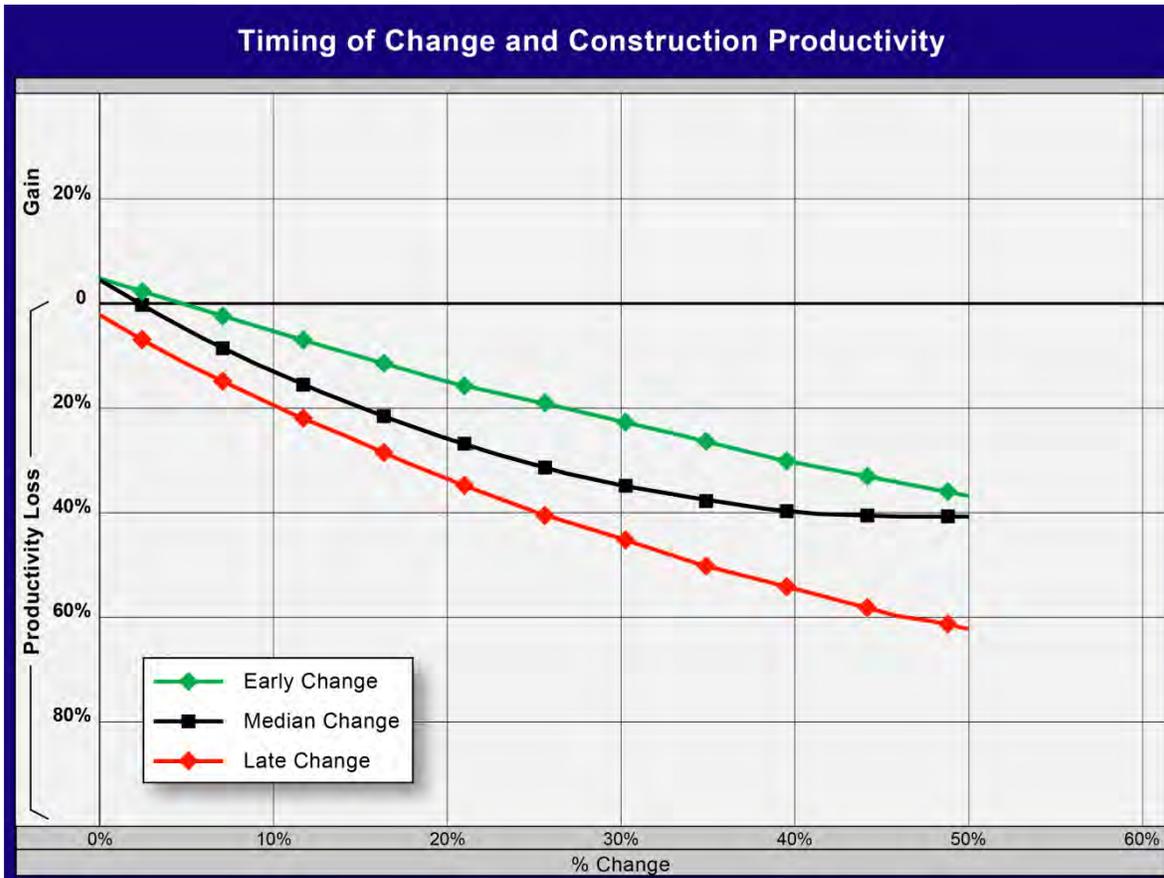


Figure 5



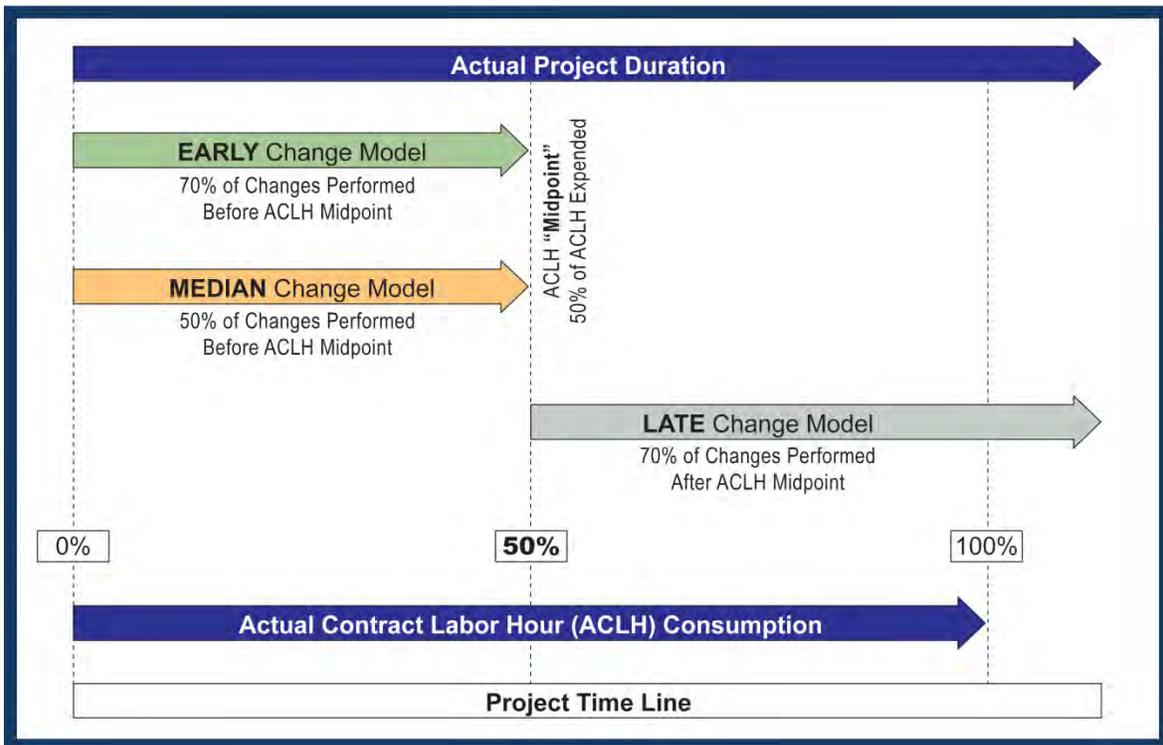
By way of example, the ACLH on a project was calculated to be 16,000 field craft labor hours. The claimant would refer to payroll records to determine when 8,000 field craft hours had been expended on the project. The date on which 8,000 field craft labor hours had been expended would mark the ACLH midpoint for the purpose of determining the timing categories of change. The claimant would then determine when change hours were expended and from that data, compute the percent of change hours that were expended before, and after, the ACLH midpoint.

Early change means that about 70 percent of change hours were expended before the ACLH midpoint, median change means that about 50 percent of the change hours were expended before

the ACLH midpoint and “late” change means that about 70 percent of change hours were expended after the ACLH midpoint.

Note that in most cases, 100 percent of the ACLH hours will be expended before the project has been completed. That is because the ACLH hours exclude various components such as bid labor hour mistakes, field retrofit caused by the contractor and the change work thus the ACLH will achieve 100 percent before all of the labor hours are consumed on a project. Also note from Figure 6 that the ACLH midpoint will probably not match the midpoint of the overall project timeline measured by other indices, such as billing values, total hours consumed or work days accomplished. This is to be expected. As previously noted, 100 percent of the

Figure 6: Change Timing Designation Chart



ACLH will be consumed prior to the actual completion of the project.

As can be seen in Figure 5, projects with early recognition of change incurred less loss of productivity than projects with median or late changes. For example, at 20 percent change, the “late” projects suffered about twice as much productivity loss as the “early” projects. These curves reinforce the notion that it is better to address change earlier in a project than to postpone resolution of the issues causing change.

EXAMPLES OF CUMULATIVE IMPACT QUANTIFICATION

Below are three examples of the use of the cumulative impact studies. These studies provide a basis to estimate a contractor’s loss of labor productivity caused by cumulative impacts. The results gained from applying the Ibbs Study are not represented to be precise

computations. They are represented to be *reliable estimates* of productivity losses when properly applied.

Example No. 1: A project was planned to utilize 16,500 field craft labor hours (excluding non-working supervision). At the conclusion of the project, the payroll reports show an actual expenditure of 30,000 field craft labor hours, excluding non-working supervision. Upon careful investigation it was discovered that there was a bid error of 1,500 field craft labor hours, errors in construction that required 900 field craft labor hours to repair, and 500 hours were recorded via T&M tickets. Moreover, the contractor estimated that 5,500 hours were expended on scope change work, other than the T&M time tickets noted above. Based on the formula described above, the Actual Contract Labor Hours would be computed as follows:

Total field craft labor hours actually expended on the project: 30,000
 Bid error:(1,500)
 Field errors: (900)
 T&M ticket time:(500)
 Scope changes/change order labor hours:(5,500)
 Actual Contract Labor Hours21,600

From the example above, it is clear that the Actual Contract Labor Hours are not simply the actual payroll hours; the ACLH value has been derived by reducing the actual payroll hours by various factors such as bid errors or field retrofit. The factors will vary from project to project and must be determined by the contractor's management team. Once the Actual Contract Labor Hours have been computed, the timing of the labor expenditure must be plotted using the payroll or labor performance reports.

The date at which 50 percent of the ACLH were expended (10,800 hours of payroll labor expenditures out of the total of 21,600 ACLH hours) is considered the midpoint of the project for purposes of assigning the proper curve to the inefficiency analysis that follows.

The next step would be to identify from the actual records, or estimate if such records are not available, the dates during which the change work was performed. Also, the actual (or estimated) labor hours of each change must be determined utilizing payroll reports, field records or an estimate. By determining change hours performed before and after the mid point, the appropriate curve can be selected.

In this example, it was determined that approximately 74 percent of the change hours were expended by the midpoint, thus the first graph (early) on the curve is chosen to calculate the impact to the labor productivity.

Figure 7

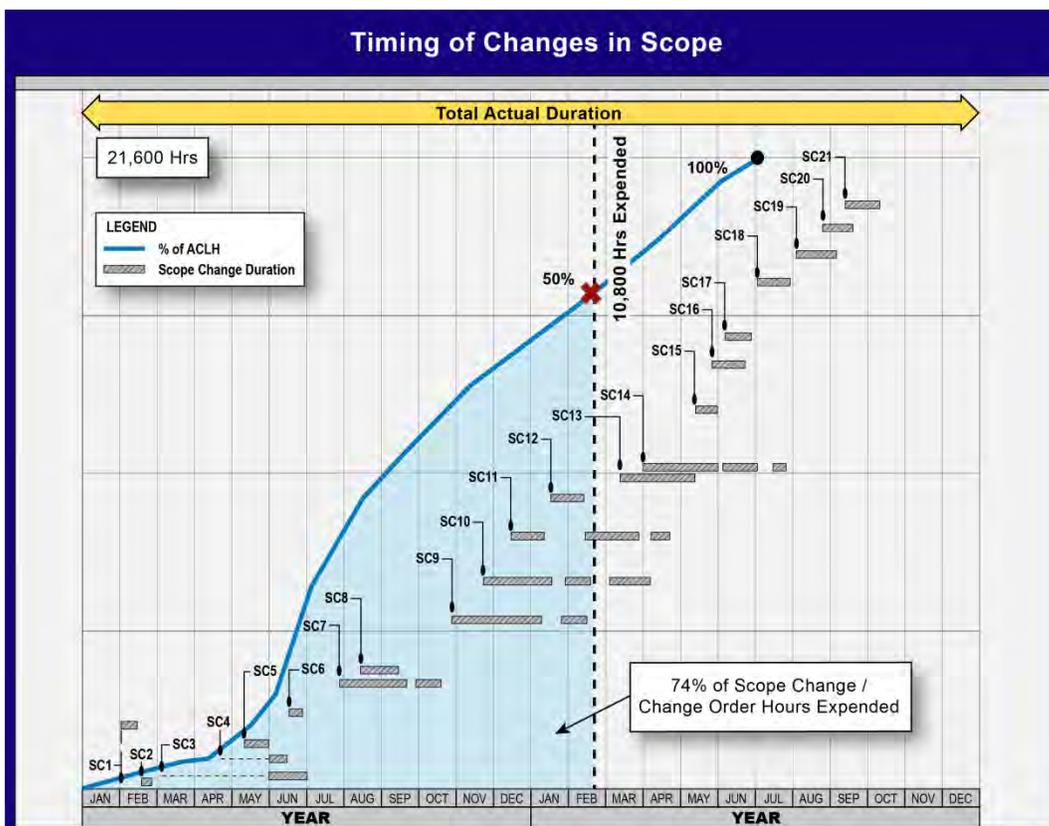
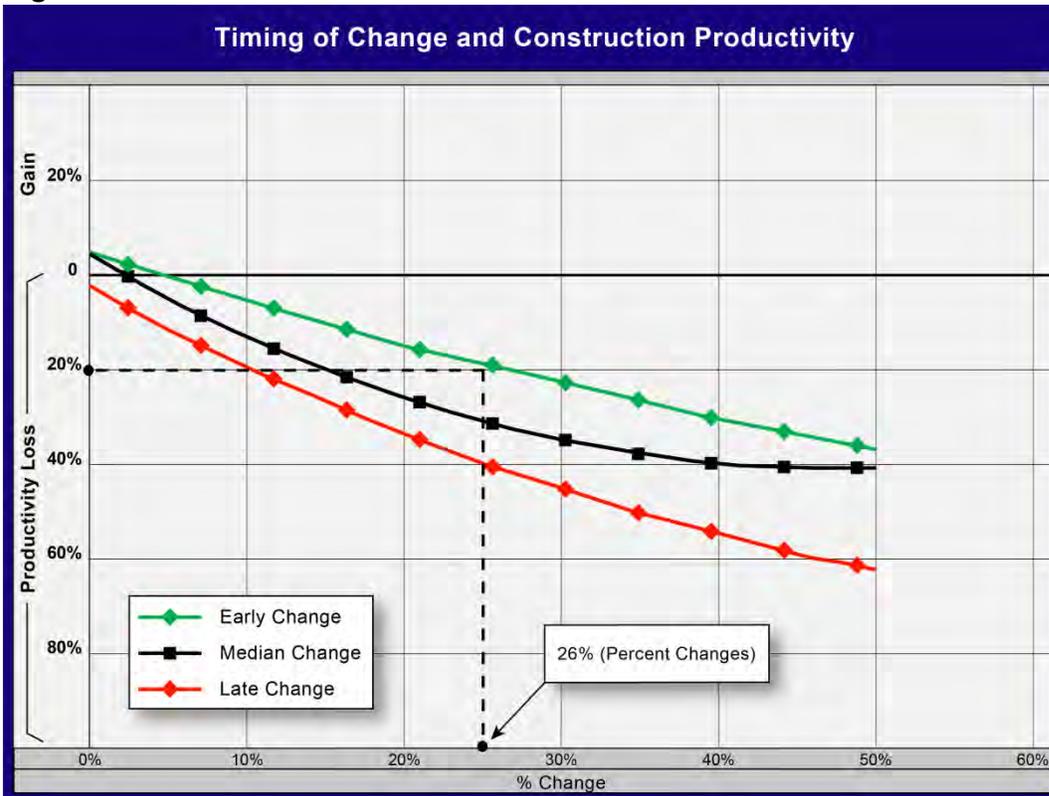


Figure 8



From the formulas provided above:
 Percent Change = Change Labor Hours ÷ Actual Contract Labor Hours. Percent Change = 5,500²² ÷ 21,600 = 25.46% = 26%. The percent change for this example is 26 percent.

From the example above, it was determined that the project sustained a 26 percent cumulative change impact. From the "early" curve on Figure 8 it can be seen that 26 percent intersects the "early" curve at a productivity loss of approximately 20 percent. A loss of 20 percent of the ACLH of 21,600 equals a loss of productivity of approximately 4,320 field craft labor hours.

Special Note: When performing a loss of productivity computation from industry studies, it is advisable to test the results by way of a "modified total cost" evaluation (in this case, labor hours are substituted for the "cost" value). This will allow the contractor to analyze the

amount of labor hours being claimed as cumulative impact inefficiency in comparison with the total unallocated labor loss on the project. From Example No. 1 above, a modified total labor hour calculation would appear as follows:

Total field craft labor hours actually expended on the project: 30,000
Original estimate: (16,500)
Bid error: (1,500)
Field errors: (900)
T&M ticket time: (500)
Scope changes/change order labor hours: (5,500)
Unallocated labor loss due to all causes: 5,100

Since the cumulative impact recovery computed in this example was 4,320 hours, there remains 780 hours of unallocated loss of labor productivity.

This unallocated labor loss can be explained in the contractor's narrative as potential unclaimed losses caused by the contractor's own acts or omissions (so as not to assert an otherwise perfect performance) or simply as an undefined, and unclaimed, amount of lost labor hours.

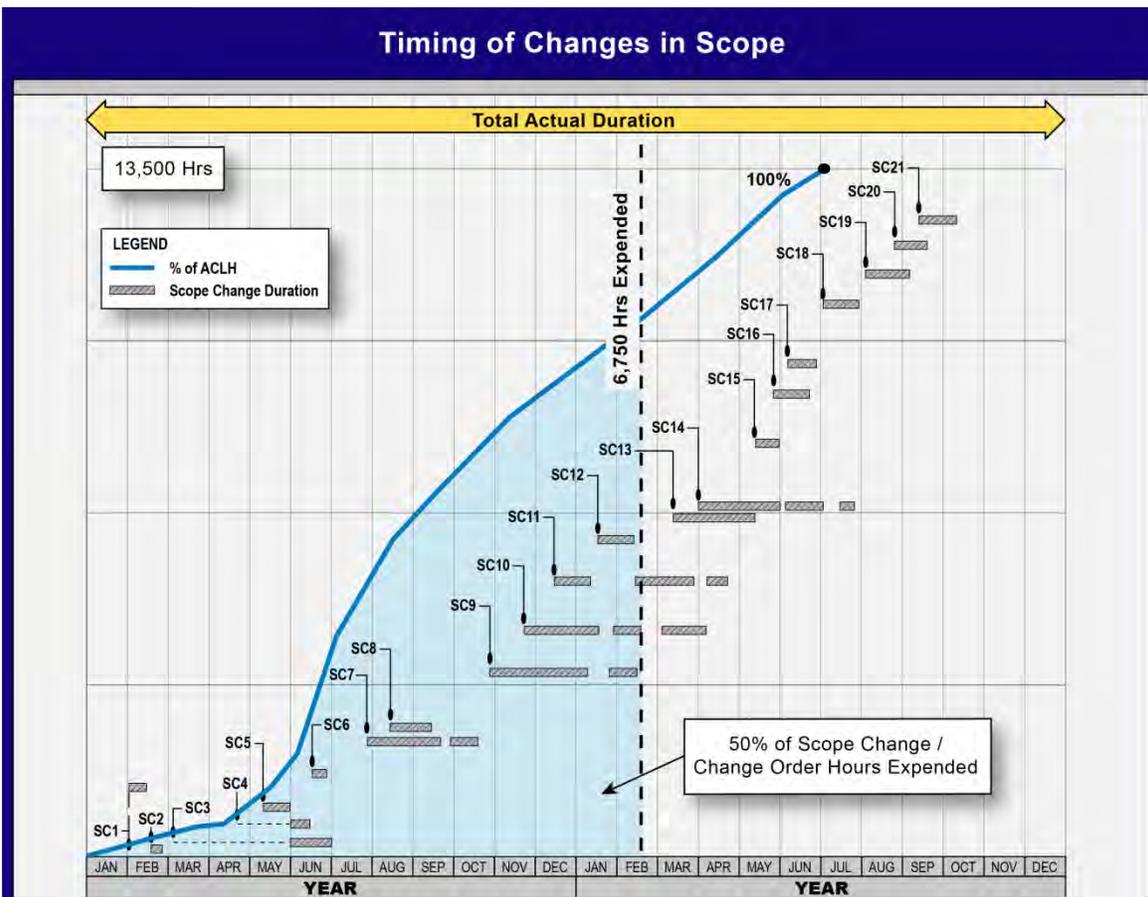
Example No. 2: A project was planned to utilize 8,000 field craft labor hours (excluding non-working supervision). At the conclusion of the project, the payroll reports show an actual expenditure of 20,000 field craft labor hours, excluding non-working supervision. Upon a careful investigation, it was discovered that there was a bid error of 1,200 field craft labor hours, errors in construction that required 1,000 field craft labor hours to repair, and 300 hours were compensated by T&M tickets.

Moreover, the contractor estimated that 4,000 hours were expended on scope change work (net of the T&M ticket hours). Based on the formula described above, the Actual Contract Labor Hours would be computed as follows:

Total field craft labor hours actually expended on the project:20,000
 Bid error:(1,200)
 Field errors:(1,000)
 T&M ticket time:(300)
 Scope changes/change order labor hours:(4,000)
 Actual Contract Labor Hours13,500

Once the Actual Contract Labor Hours value is computed, the timing of the labor expenditure must be plotted using

Figure 9



the payroll or labor performance reports. The date at which 50 percent of the Actual Contract Labor Hours were expended (6,750 hours of actual payroll-supported labor was expended of the total of 13,500 hours) is considered the "midpoint" of the project for purposes of assigning the proper curve to the inefficiency analysis that follows.

The next step would be to identify from the actual records, or to perform an estimate if such records are not available, the actual performance dates of the change work. Also, the actual (or estimated) labor hours of each change must be determined. As described in Example No. 1, the timing component is thereby computed and the appropriate curve is chosen from the timing chart.

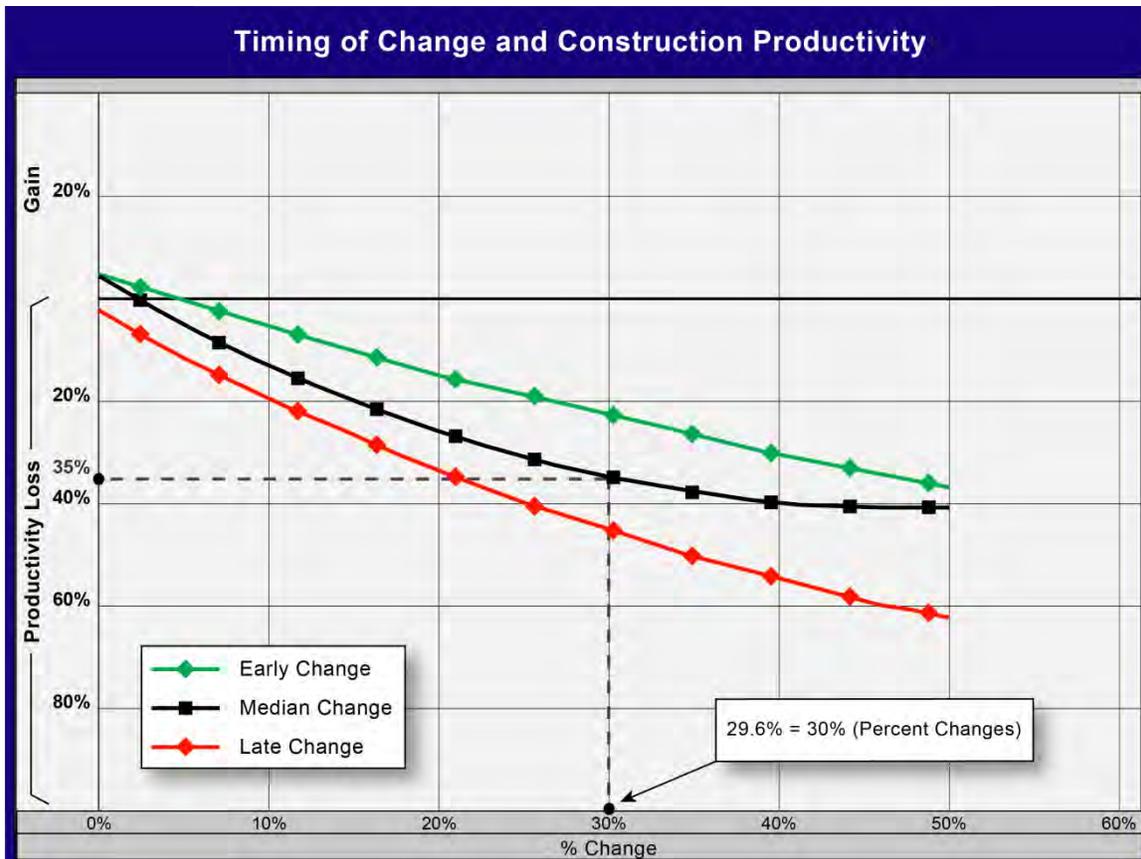
As shown in Figure 9, it was determined that approximately 50 percent of the

scope change hours were expended by the "midpoint," thus the second graph (median) on the curve is chosen to calculate the impact to the labor productivity. Note on this example that the scope change timing has been taken from field records or has been estimated by the project staff. Further, the number of field craft labor hours (actual or estimated) has been determined for each change. Thus, at the time approximately half of the change hours have been expended, the contractor has expended approximately half of its Actual Contract Labor Hours.

From the formulas provided above:
 Percent Change = Change Labor Hours ÷ Actual Contract Labor Hours.
 Percent Change = 4,000 ÷ 13,500 = 29.6% = 30%.

From the above example, it was determined that the project sustained a

Figure 10



30 percent change impact. From the “median” curve on Figure 10 on the previous page it can be seen that 30 percent intersects the median curve at approximately 35 percent. A loss of 35 percent of the Actual Contract Labor Hours of 13,500 equals a loss of productivity of 4,725 field craft labor hours.

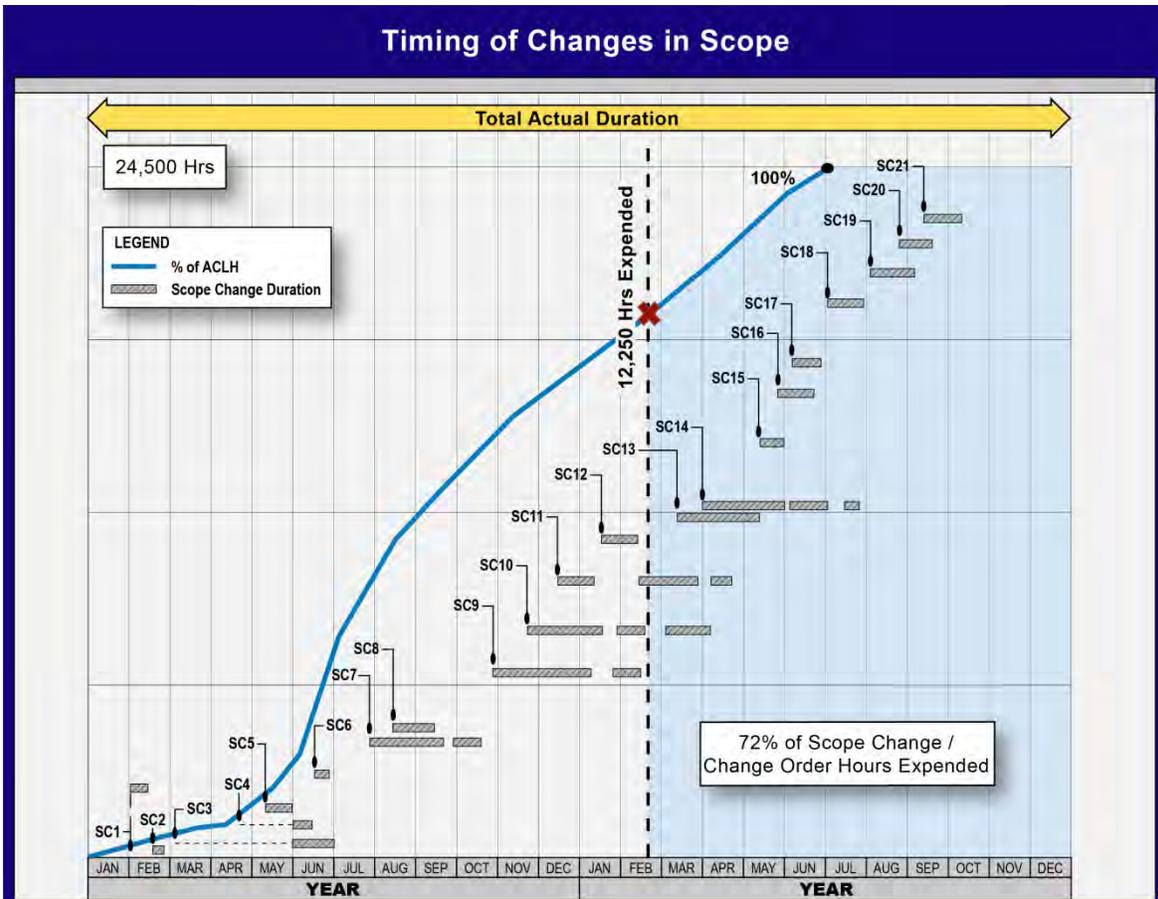
Example No. 3: A project was originally estimated to utilize 8,200 field craft labor hours (excluding non-working supervision). At the conclusion of the project, the payroll reports show an actual expenditure of 40,000 field craft labor hours, excluding non-working supervision. Upon a careful investigation, it was confirmed that the bid was accurate and complete, errors in construction required 2,500 field craft labor hours to repair, and 1,000 hours were compensated T&M tickets.

Moreover, the contractor estimated that 12,000 hours were expended on scope change work. Based on the formula described above, the **Actual Contract Labor Hours** would be computed as follows:

Total field craft labor hours actually expended on the project: 40,000
 Field errors: (2,500)
 T&M ticket time: (1,000)
 Scope changes/change order labor hours: (12,000)
 Actual Contract Labor Hours 24,500

Once the Actual Contract Labor Hours are computed, the timing of the labor expenditure must be plotted using the payroll or labor performance reports. The date at which 50 percent of the Actual Contract Labor Hours were

Figure 11



expended (12,250 hours of actual payroll-supported labor was expended of the total of 24,500 hours) is considered the “midpoint” of the project for purposes of assigning the proper curve to the inefficiency analysis that follows.

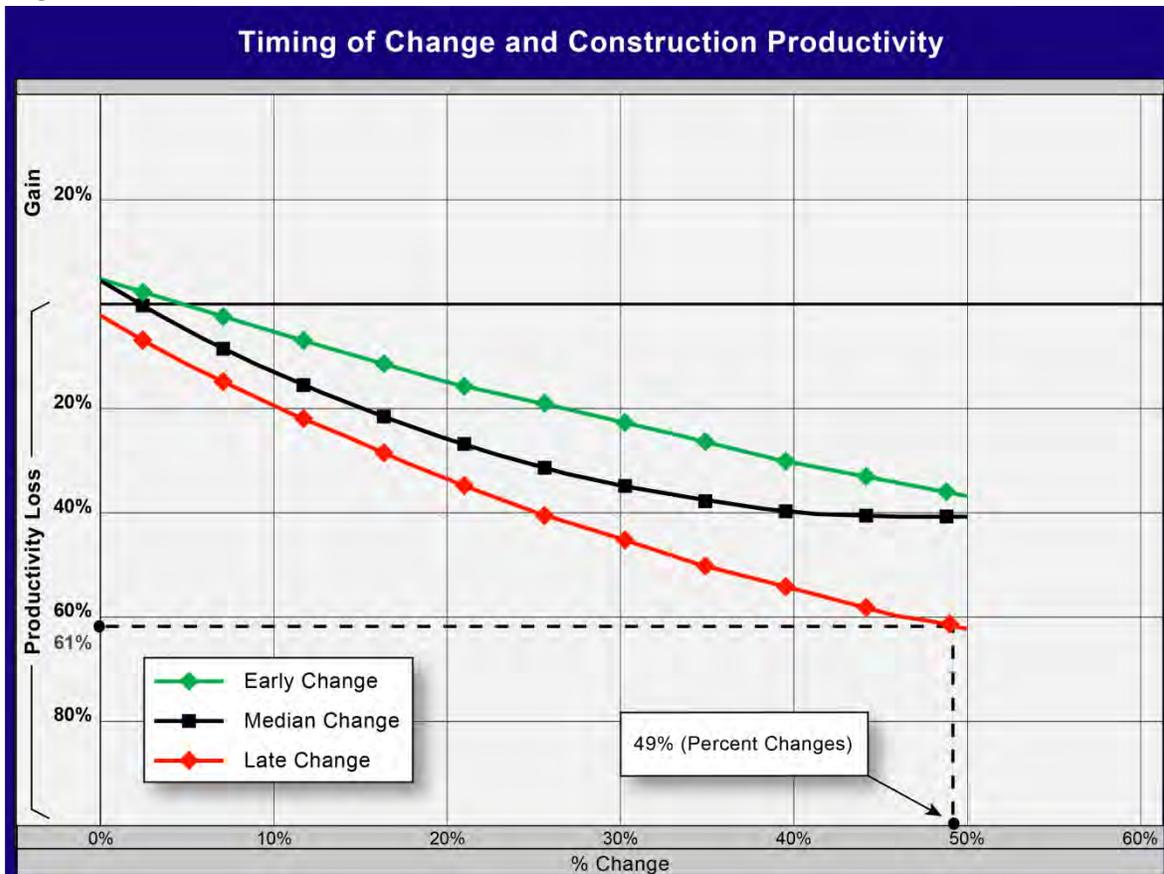
The next step would be to identify from the actual records, or to perform an estimate if such records are not available, the actual start date of the scope changes. Also, the actual (or estimated) labor hours of each change must be determined. From this data applied to the timing chart, it can be determined if the change model is “early,” “median,” or “late.”

In this example from Figure 11, above, it was determined that only approximately 28 percent of the scope change hours were expended by the “midpoint,” thus the third graph (late change) on the

curve is chosen to calculate the impact to the labor productivity. Note in this example that the scope change timing has been taken from field records or has been estimated by the project staff. Further, the number of field craft labor hours has been determined (from charge records such as time sheets, contemporaneous field reports, or estimated) for each change. Thus, at the time approximately half of the Actual Contract Labor Hours had been expended, only 28 percent of the change hours had been expended. Therefore, in the last half of the project, 72 percent of the change hours were expended, making this example a late change project.

From the formulas provided above:
 Percent Change = Change Labor Hours ÷ Actual Contract Labor Hours. Percent Change = 12,000 ÷ 24,500 = 48.9% = 49%.²³

Figure 12



From the above example, it was determined that the project sustained a 49 percent cumulative change impact. From the late change curve within Figure 12 it can be seen that 49 percent intersects the late change curve at a productivity loss of approximately 61 percent. A loss of 61 percent of the Actual Contract Labor Hours of 24,500 equals a loss of productivity of 14,945 field craft labor hours.

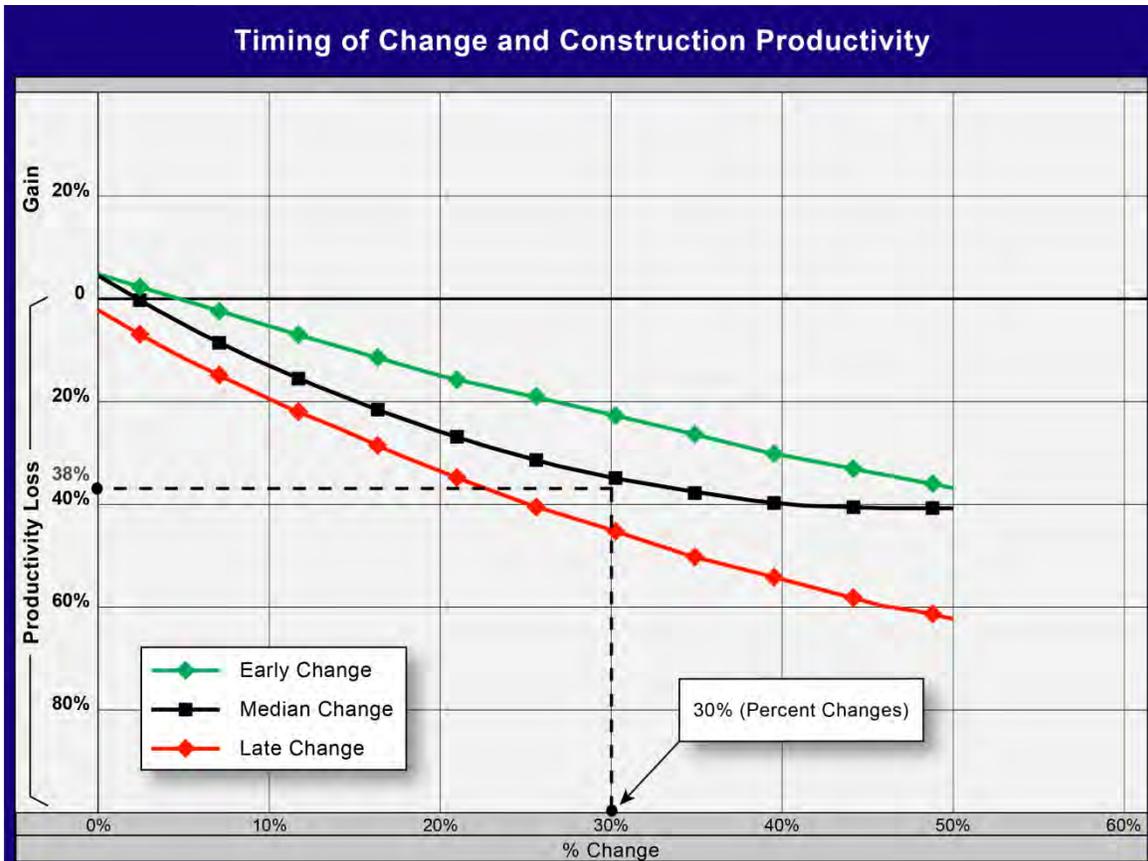
likely that bid mistakes will be discovered before the actual fabrication and construction phases of the project commence. In the past, usually the only way a contractor could verify an estimate was to have the project team perform a re-estimate of the project prior to mobilization. That process is still utilized by some contractors who are not fully adapted to the more advanced technologies.

SPECIAL CONSIDERATION FOR PROJECTS WITH SUBSTANTIAL BID MISTAKE ADJUSTMENTS NOT IDENTIFIED EARLY IN THE PROJECT SCHEDULE

Today’s computerized estimating and BIM coordination processes that are undertaken before a contractor mobilizes on a project make it more

When bid labor errors, even serious ones, are recognized at the outset of a project such that the labor hours that were omitted from the bid are able to be assimilated into the labor plan before work commences, or very early in the project, the labor productivity impacts should be mitigated to a greater extent. Certainly, the contractor will feel the direct financial impact of having to provide the labor hours that were

Figure 13



missed in the estimate; however, such estimating errors would not be expected to diminish the contractor's overall field labor productivity.

However, if a serious labor estimating error were to occur that was not diagnosed early in the project and that required the expenditure of a material number of labor hours in the midst of the project, the contractor's productivity would be expected to suffer in the same fashion as if a change, or series of unanticipated changes, were introduced into the project during the same performance period. The contractor would usually not be able to recover such losses from a prime contractor or owner. In cases where this type of bid error has been identified, it is reasonable to treat this bid error in the same manner as a scope change or series of changes when preparing a cumulative impact analysis.²⁴

Example 4 offers an illustration of how a contractor might address the impact of this type of bid mistake:

Example No. 4: At the conclusion of a project, the contractor's payroll reports show an actual expenditure of 34,500 field craft labor hours, excluding non-working supervision. This amount exceeded the contractor's labor plan by many thousands of hours. Upon a careful investigation, it was discovered that there was a bid error of 2,500 field craft labor hours. Moreover, the contractor estimated that 5,500 hours were expended on scope change work. Based on the formula described above, the Actual Contract Labor Hours would be computed as follows:

Total field craft labor hours actually expended on the project:34,500
 Bid error:(2,500)
 Scope changes/change order labor hours:(5,500)

Actual Contract Labor Hours26,500

As described in Examples 1 through 3, the next step is to identify from the actual records, or to perform an estimate if such records are not available, the dates during which the change work was performed. This special example also requires the contractor to know, or to estimate, the dates when the "missed" bid labor hours were added into the project schedule. In this case, the contractor's bid error labor hours are treated just as if those hours were the result of change.

In this example, it was determined that approximately 50 percent of the change hours and the "missed" labor hours were expended by the "midpoint," thus the "median" curve is chosen to calculate the impact to the labor productivity.

A revised formula can be applied in the case of a major bid labor hour estimate error that was not discovered until the labor to perform the "missed" work was actually required: Percent Change = (Change Labor Hours + Bid Error in Labor Hours) ÷ Actual Contract Labor Hours. Percent Change = 8,000 ÷ 26,500 = 30.2% = 30%. The Percent Change for this example is 30 percent. This percent represents the *total* loss of productivity caused by change and the contractor's bid error.

From the above example, it was determined that the project sustained a 30 percent change ratio. From the "median" curve on Figure 13 it can be seen that 30 percent intersects the "median" curve at a loss of productivity of approximately 38 percent. A productivity loss of 38 percent of the ACLH of 26,500 equals a loss of productivity of approximately 10,070 total field craft labor hours arising from the changes and the contractor's bid error.

The claimant must apportion the total loss of productivity of 10,070 field hours between the contractor and the respondent, as follows: bid error of 2,500 hours; 2,500 hours of contractor caused impact ÷ 8,000 hours of total change = 31% to the contractor's account. Similarly, 5,500 hours of scope change hours ÷ 8,000 hours of total change = 69% to the respondent's account. The allocation would therefore be: 10,070 hours of lost production x 31% = 3,122 hours to the contractor's account and 10,070 hours of lost production x 69% = 6,948 hours to the respondent's account. The contractor would seek a recovery of 6,948 hours of loss of labor productivity caused by cumulative impact but would not claim the 3,122 hours of productivity impacts caused by its own bid errors that had to be remedied in an unplanned fashion in the midst of the project. This approach can also be used to address particularly sizable contractor installation errors that require the contractor to introduce significant, unplanned labor hours into the project during the course of construction to re-install or repair the installation deficiencies.

APPLICATION OF CUMULATIVE IMPACT ANALYSES ON PROJECTS WITH VERY LIMITED PROJECT RECORDS

Sometimes on a limited number of construction projects, events occur that severely reduce the factual data that analysts may rely upon to perform an assessment of productivity. This condition may rise from the failure to contemporaneously maintain anything but the most rudimentary payroll records, or, in other cases, the loss of project records due to changes in the management staff or computer systems. With the inability to question members of the management team²⁵ or to review change files or other contemporaneous

data, the analyst is severely hampered in the use of the methods provided in this bulletin. Suggested steps will be provided that may assist the analyst in the use of the methods included herein, however, as an alternative, the contractor should evaluate and consider the use of the MCAA's labor inefficiency factors contained in the "How to Use the MCAA Labor Factors" bulletin herein to estimate the adverse effects of cumulative impact.

For the purposes of this subsection, the following assumptions have been made:

- The management team, including the project managers and field superintendents, are not available for interview or offer very limited probative value;
- The superintendents' diaries and daily reports are not available or are not useful;
- Change order files do not provide for temporal tracking of the change order work;
- Basic payroll information is available

Given this difficult situation, the following steps are recommended:

A first step would be to consider retaining a competent loss of productivity expert who can advise, in very preliminary terms, on the prospects of recovery given the limited data. Whether through an attorney or a consultant, the contractor can catalogue the available project information to develop the best strategy for a reasonable recovery.

As the contractor's team engages in the collection of all pertinent support for the preparation of the request for equitable adjustment, subcontractors and vendors

may be polled for information to support the timing of change. The owner, designer and, if one was utilized, construction manager may have key information (which probably will have to be obtained through the discovery process) by which the timing and scope of changes can be ascertained. Other sources may be useful such as building inspection and permitting authorities, progress photographs maintained by the owner or architect, and even mapping services.

It is assumed for the purposes of the extreme condition of a dearth of contemporaneous records, that the change orders or change directive documents are available for review. A reasonable estimate of the labor hours involved in each of these changes can be derived from the pricing information by identifying or estimating the labor proportion of the change order and dividing that labor cost by an average hourly labor rate. If the description of the change work does not identify when the change work was performed, the signature dates may be used to estimate its timing. With this information, the change work can generally be determined to be of the early, average, or late variety.

This estimate of the change hours can then be compared to the number of labor hours in the bid. (Adjustments need to be made for any bid errors as discussed earlier in this bulletin.) Dividing the change hours by the bid hours yields a very gross percent change value. For illustrative purposes and using the preceding formula, let us assume that this project's percent change is 10 percent. Depending on whether the project experienced early, median, or late change, the loss of productivity would be between 4 percent and 10 percent, which is useful information, as seen in Figures 4-A, 4-B, and 4-C.

Those same figures also yield another piece of useful information. Inspection of those figures reveals that all the projects in this database which had 10 percent change experienced a loss of productivity. This is demonstrated by noting that none of the data points in those three figures were associated with a productivity index above 1.0. This means that not only did the contractor have a productivity loss in the 4 percent to 10 percent range; it also means that there is a high probability that such a loss was incurred.

The discussion above has been focused on a project with virtually no extant records beyond basic payroll information. This discussion accentuates the need for the contractor to maintain contemporaneous change records that may include the initiating RFI, change proposals, photographs, related correspondence, diaries or notations citing when change work was performed and all associated contract modification documents. Generally, the more robust the recordkeeping, the more compelling will be the resulting request for equitable adjustment.

SUMMARY AND CONCLUSIONS

Virtually all projects, even the most comprehensively planned and designed and carefully scoped, have change. Change can adversely affect labor productivity, which in turn can substantially reduce or even eradicate a contractor's profit. Contractors deserve to be timely and fairly compensated for change. While many owners are willing to pay the direct costs of project change, often there is a resistance and reluctance to pay for the impact costs of change. This resistance and reluctance can arise from the contractor's lack of documentation and the lack of proper citation to industry-accepted means of impact quantification. This bulletin has addressed this latter issue through the

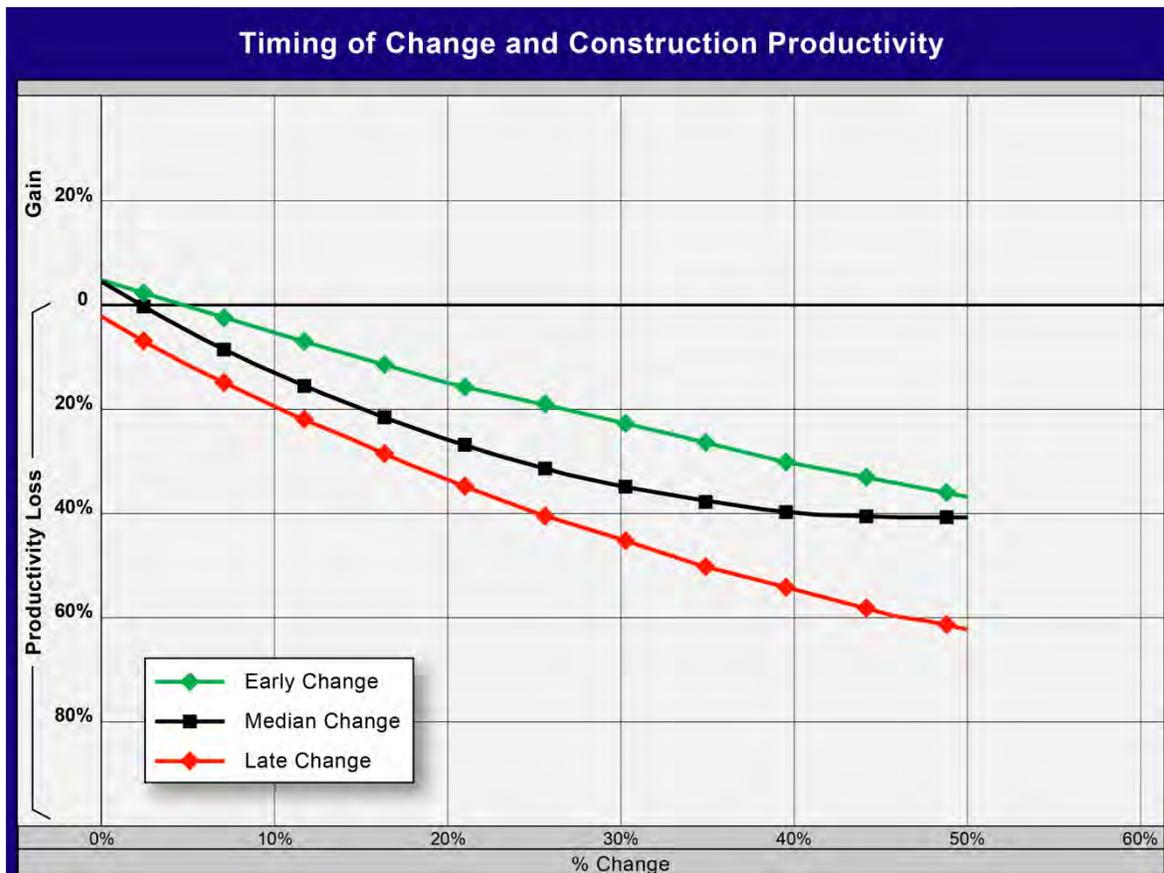
publication of a reliable method to estimate labor inefficiencies arising from cumulative impact.

Contract change often results in disputes over the quantitative impacts of the change, particularly the impacts on labor productivity. As previously stated, those impacts are discussed in this bulletin and an approach to quantifying these impacts is presented. This approach, developed by one of the co-authors of this bulletin, has been used to resolve numerous disputes and has been accepted in mediations, arbitrations and in trial courts.²⁶ That research clearly indicates there are strong correlations between the amount of change and the loss of productivity. The cited research indicates that the timing of change is a key factor as well.

The concepts of cumulative impact and the timing in fluence of change have been accepted in international arbitrations as realities in the construction industry. The Ibbs Study also had been published in peer-reviewed scientific journals.²⁷

Also, contractors should be aware that cumulative impacts may result in critical path schedule impacts. Labor inefficiency can cause growth in activity durations that may erode total float or impact the critical path. This bulletin does not deal with project delay. Your attention is directed to the bulletins entitled "Time Impact Analysis—Measuring Project Delay" and "How to Organize and Submit a Claim," which address potential project delay caused by productivity impacts.

Figure 14: Sample Inefficiency Chart for Readers' Use²⁹



As with all industry study applications, the results should provide for a *reasonable estimate of the damage*—not a precise computation. The contractor making a claim for cumulative impact should perform an investigation of the facts, provide a narrative explaining how the magnitude of change adversely affected the labor productivity²⁸ and should apply the lbbs data and resulting curves in a proper manner. The finding in *S. Leo Harmonay, Inc.* (cited in bulletin PD 2 herein) represents sound reasoning in this regard:

... courts have often recognized that the extent of harm suffered as a result of delay, such as the loss of efficiency claim at issue, may be difficult to prove. Thus, courts have recognized that a plaintiff may recover even where it is apparent that the quantum of damage is unavoidably uncertain, beset by complexity, or difficult to ascertain, if the damage is caused by the wrong.

Every project and every dispute should be evaluated with the facts of the situation in mind. Applying the approach presented herein without careful regard to the actual circumstances that took place on the project could lead to errors in the quantification of the impacts that a project has incurred. However, if the contractor making claim for cumulative impact prepares a comprehensive narrative report that describes the contractor's reasonable plan for the work, how that plan was disrupted and impacted by unanticipated change, and how the contractor estimated its loss of labor productivity by properly applying the methodology provided in this bulletin, the contractor may improve its opportunity to amicably and equitably resolve its productivity loss claim.

The contractor should consider including in the submission of its cumulative impact change request the following items:

- Review of all pertinent documents, such as the contract, executed change order forms, and monthly payment applications, by the contractor's executive management and/or construction counsel to ascertain waiver risks, if any, for recovering cumulative impact;
- Modified total cost calculation showing the unallocated loss of labor productivity;
- Narrative of the contractor's reasonable plan to construct the project within the labor hours contained in its original, or revised, labor estimate and a contrasting description of what events took place to change that reasonable plan—including comparative crew curve graphics, as-planned and as-built schedule analyses, photographs of impacting conditions, pertinent daily reports and correspondence, and other contemporaneous and relevant proofs of the impacting conditions;
- Description of all adjustments that have been made in the computation of the contractor's loss of labor productivity including: estimate errors, contractor's field rework, and total change hours;
- Change timing chart showing the actual or estimated start and finish dates of the changes to the original contract scope of work;
- Application of the cumulative impact methodologies provided in this bulletin utilizing the appropriate curves and calculations;
- Proof of damages as recorded in job cost reports or other accounting documentation and a summary of damages that are sought as the

contractor's recovery in its request for equitable adjustment or claim document.

By properly applying the methodologies described herein and by preparing a comprehensive narrative of the cause-and-effect nexus, a mechanical contractor may enhance its opportunities to recover cumulative impact damages.

Prepared by Professor William Ibbs, PhD, University of California, Berkeley and Paul Stynchcomb, CCM, PSP, CFCC of FTI Consulting with peer review performed by: Michael R. Cables, Executive Vice President of Kinetics Systems, Inc.; Norman Escover, COO of Kinetics; Richard Freeman, Executive Vice President of Stromberg Metal Works; Charles F. Mitchell, General Counsel of The Kirlin Group; and the members of MCAA's Education Committee.

ENDNOTES

¹ Paraphrased from the Veterans Affairs Board of Contract Appeals reported decision in the matter of *The Appeal of Centex Bateson Construction Co., Inc.* VABCA-4613 and 5162-5165.

² The impact of the cumulative effects of multiple changes on a construction project has been described in one Board of Contract Appeals decision as *amorphous* (i.e., all but invisible, lacking definite form, shapeless). Reference the *Appeal of Centex Bateson Const. Co. Inc.*, 99-1 BCA ¶ 30153 (1998).

³ At times the contractor will perform out-of-scope work that is not identified as such until late in the project, when a major labor overrun has been identified and the contractor's management team undertakes a detailed comparison between the base contract work scope and the work actually performed on the project. This comparison can identify large quantities of labor expended on work not contained in, or contemplated by, the base contract but which was required to actually build the project. A common example is labor expended to install extra pipe and fittings not shown on the contract drawings but which are necessary to overcome design deficiencies such as improperly coordinated drawings. Because the labor was not associated with a change in the contractor's cost system, it was never submitted for compensation as changed work. Such lapses

in the contractor's control of the work taking place on a project is lamentable, but should not *necessarily* bar the contractor from an equitable recovery of its reasonable costs, subject to the terms, conditions, and limitations set forth in the contract documents.

⁴ A. Overcash and J. Harris, "Measuring the Contractor's Damages by 'Actual Costs' – Can it Be Done?" *The Construction Lawyer*, Vol. 25, No. 1 (2005), pp. 34-36.

⁵ The Construction Industry Institute (CII) is an organization comprised of more than 100 leading owner, engineering-contractor, and supplier firms that sponsor research into construction-related topics. Founded in 1983, it has earned a reputation for conducting high quality, impartial research that enhances business effectiveness and capital project sustainability.

⁶ This bulletin focuses on inefficient labor hours; however, losses of productivity can also affect other facets of construction costs, such as equipment that supports the work effort being analyzed (e.g., cranes, welding machines and excavation equipment for underground installations). Thus, productive use of equipment, which is typically charged to the project in hourly units, can also be adversely affected by cumulative impact.

⁷ Figures 1-A through 1-C were extracted from the publication entitled "Construction Contract Modifications—Comparing the Experiences of Federal Agencies with Other Owners" published in 1986 by the Committee on Construction Change Orders, Building Research Board and the National Research Council. As of the date of this publication, no more recent studies on the subject of expected change have been identified by the authors.

⁸ Reference *Bell BCI Company v. United States*, U.S. Court of Appeals, Federal Circuit No. 2008-5087 570 F.3d 1337, 2009. For a related decision regarding cumulative impact following the decision in *Bell*, reference *Walsh/Davis Joint Venture v General Services Administration*, Civilian Board of Contract Appeals 1460, March 13, 2012.

⁹ "Design development" changes, a type of change common in design-build projects, are a different type of change for which the design-build contractor is responsible.

¹⁰ An excusable delay to the commencement of the mechanical contractor's work, such as by a differing site condition that delays foundation and vertical construction, may justify such a loss of productivity claim based on an assumed, reasonable overall production rate.

¹¹ “Recoverable” is a term that can be highly qualified or restricted by the terms and conditions of the contract. Many contracts attempt to limit, or eliminate, a mechanical contractor’s right to recover labor inefficiencies. Such contract terms should be the subject of a careful legal review.

¹² “...it is clear that demonstrating an overrun in labor and the existence of numerous changes without some evidence linking the changes to the overrun is insufficient proof of causation. Finally, there must be some proof of a causal connection established showing that the undifferentiated group of contract changes affecting the changed and the unchanged contract work resulted in the loss of productivity on that work.” Reference the *Appeal of Centex Bateson Const. Co. Inc.*, 99-1 BCA P 30153 (1998).

¹³ Even if the contractor determines that all or a portion of the loss of productivity has been caused by the contractor, it is still essential for the contractor to identify the cause and to mitigate the loss wherever possible.

¹⁴ The contractor should differentiate between shortterm “spot” overtime required to address immediate scheduling needs and long term and unplanned overtime that can cause a substantial loss of labor productivity. Reference the bulletin entitled “How to Estimate the Impacts of Overtime on Labor Productivity” herein on the subject of overtime inefficiency.

¹⁵ When the cumulative impact arises from constructive changes that are not recognized until after their performance or, in some cases, until the conclusion of the project, it may not be possible to track the start and stop dates of the change.

¹⁶ These change work start and finish dates should be as accurate as reasonably possible. As previously noted, the date on which a change order is executed may be totally irrelevant to the issue of labor productivity. A formal, executed change order may “roll up” dozens of individual scope changes and may not be approved until very late in the project, thus shedding no light on when the changed work scope was actually directed and performed. On some projects, an owner may never actually execute any change orders and may direct the contractor to perform added or changed work scope under the applicable terms of the contract.

¹⁷ ACLH shown in this figure refers to Actual Contract Labor Hours. This value is not simply direct payroll hours; rather it is a computation of adjusted labor hours that is fully described in the “Change and its Quantitative Effect on Productivity” section of this bulletin.

¹⁸ Over 15 years ago, a cumulative impact study was authored by Charles Leonard (the “Leonard

Study”) and was widely circulated in the construction industry. The Leonard Study found that the cumulative impact of multiple changes on a construction project adversely affected a contractor’s labor productivity. This study also found that the timing of changes affected labor productivity. This study was later criticized in several court cases, primarily for its manner of data collection and statistical analysis. The study utilized in this bulletin was carefully composed and monitored in order to avoid, and then to correct, those data collection and statistical analysis errors for which the Leonard Study was criticized.

¹⁹ The R² value is known as the *correlation coefficient* and is used in statistical models whose main purpose is the prediction of future outcomes based on other related information. This value states the proportion of variability in a data set that forms a statistical model, such as regression analyses as utilized in the Ibbs models. The R² value provides a measure of how well future outcomes are likely to be predicted by the model, thus within the range of 0 to 1, the closer the value is to 1, the more likely it will be that the prediction will resemble the result.

²⁰ In order to offer a more conservative inefficiency estimate, the labor hours contained in T&M tickets are not included in the percent change computation for the purpose of this bulletin. By virtue of the way T&M charge tickets are maintained, they usually have the direct inefficiencies embedded within the T&M entries. We have taken the conservative approach of not including these hours in the computation of the percent change value. However, if a significant portion of the total change hours were recorded on T&M tickets, this exclusion of T&M hours in the percent change computation may be revisited by the contractor, since the exclusion of a major portion of the change hours recorded on T&M tickets could unfairly affect the outcome of the labor inefficiency estimate.

²¹ For the purposes of this bulletin, field craft labor hours should not include non-working labor categories. Such non-working categories could include superintendents, general foremen and foremen, depending on the size of the project, local union requirements and custom and practice of the contractor.

²² The change hour totals in the examples included in this bulletin for the calculation of the percent change value do not include T&M ticket hours, as previously explained herein.

²³ Note that the data points do not support a Percent Change value greater than 50 percent. No extrapolation of the data lines should be performed to allow for Percent Change values in excess of 50 percent.

²⁴ The claimant would compute the loss of labor productivity arising from such types of bid error and demonstrate, in its request for equitable adjustment, that these labor hours were not being claimed in the total labor hours sought in the claimant's recovery.

²⁵ On some projects, the entire field office management team is either terminated or terminates employment, making the process of fact finding even more difficult.

²⁶ As of the date of this publication, there have been no published decisions citing the study that is the subject of this bulletin.

²⁷ "Evaluating the Cumulative Impact of Changes on Labor Productivity – an Evolving Discussion," Dr. W. Ibbs and G. McEniry, *Cost Engineering*, Vol. 50/No. 12, December 2008, Association for the Advancement of Cost Engineering International; and Ibbs, William (2005). "Quantitative Impacts of Project Change: Timing Issues," *Journal of Construction Engineering and Management*, ASCE, 131(11), November, 1219-1223.

²⁸ Construction productivity cases often mention the need to establish the "cause-and-effect nexus," however the nature of cumulative impact renders it virtually impossible to tie individual changes to specific effects in terms of labor productivity impacts. However, that does not relieve the contractor from evaluating its estimating, labor performance and documentary records to demonstrate that the impacts were not self inflicted and to offer a narrative that describes the contractor's plan and how that plan was disrupted by the influences of multiple changes on the project.

²⁹ This chart is provided for the contractor's use in plotting Percent Change and the resulting Percent Productivity. If desired, this chart may be copied and inserted into the contractor's request for equitable adjustment to demonstrate the plotting of the data.



Bulletin

Purchasing for Profit

INTRODUCTION

The mechanical and electrical construction industry is getting more complicated every year, faced with rapid escalation of material and labor costs, ever increasing and aggressive competition from both union and non-union quarters, diminishing gross profit margins, and increased delays and difficulties encountered in attempting to meet construction schedules.

This bulletin is designed to help you establish purchasing techniques that help protect your business and purchases. Before establishing your purchase order system, decide who in your company can set up a vendor. It is important that all vendors be validated by someone with ownership in the company. This not only protects you from someone setting up a bogus vendor for his or her benefit, but allows you to know who your vendors are. Your vendor list should be made up of reliable, financially reputable vendors.

The supplier or vendor who fails to provide critical construction materials in a timely fashion places the contractor in a potentially explosive position. In today's construction market, the prudent contractor simply must pay more attention to contracts with suppliers of key materials. If a key supplier is unable to deliver materials as promised—or

materials do not meet required specifications even though the contractor was assured at bid time that the quoting vendor thoroughly checked out all engineering requirements—he can often find himself in a position where he is facing tremendous additional costs to secure materials from an alternative source. Some of the risk in operating in today's construction market can be eliminated or reduced by a more strict and formal policy regarding the issuance of purchase orders.

A purchase order is a document with a front and back side. This does not mean that it involves two parties, although it most often does. The purchase order form normally contains specific purchase information on the front side – such as date of required shipment, quantity of items involved, description of items, unit price of the items, etc. The second side is usually the back of the purchase order that contains one or more pages of “fine print” intended to protect the contractor should legal questions arise and resolutions of disputes become necessary.

PURCHASE ORDERS: THE FRONT SIDE

The front side is used by the contractor to define what material he needs and to protect his interests in the event a supplier fails to perform as

promised. The front side of the purchase order is also a good place for the contractor (“purchaser”) to limit its exposure by taking exception to the vendor’s quotation and the vendor’s limitation of liability (language usually included within the vendor’s quotation). In light of the fact that most vendors’ quotations are offered subject the vendors’ terms and conditions, standard warranties, etc. the contractor should consider incorporating the following language on the front side of the purchase order:

“PRIOR TO THE ACTUAL SALE OF THE ITEMS CONTAINED HEREIN, PURCHASER TAKES EXPRESS EXCEPTION TO VENDOR’S QUOTATION PERTAINING TO THIS ORDER. ADDITIONALLY, PURCHASER TAKES EXPRESS EXCEPTION TO VENDOR’S LIMITATION OF LIABILITY PERTAINING TO THE PRODUCTS PROVIDED UNDER THIS ORDER.”

Please note that smaller contractors that do not necessarily engage in larger volumes of annual purchases may find it very difficult to negotiate the above language into their purchase orders. However, we urge all contractors to attempt to limit their exposure; the language can always be stricken.

The front side of a sample purchase order (Exhibit A) contains several categories of information such as:

- Date of issue
- Shipping terms (See Bulletin PC3 for FOB information.)
- Payment terms
- Delivery date (call project manager 24-48 hours before delivery)
- Contractor's name and address
- Assigned purchase order number
- Project name
- Project number and account number

- Vendor name, address and contact
- Ship-to address
- Quantities and unit types
- Description of materials
- Line and total prices
- Signature of both parties
- Number of submittals required
- Owner and maintenance manuals required

Review each item for information on the front side of a typical purchase order for some “do’s and don’ts” for properly issuing the order so that the contractor’s position will be protected if a vendor does not meet the requirements of the construction project schedule or the engineer’s specification data.

Contractor’s Name and Address

All purchase orders should be ordered with the contractor’s name and address printed prominently on the form. This will speed the process of completing the form and add uniformity to all of the company’s documents.

Assigned Purchase Order Number

There must be a unique number for each purchase order to be matched with the vendor’s invoice(s). It is recommended that every vendor is to reference all correspondence and invoice(s) with this number.

Project Name

The project name printed or written on the purchase order is required to identify quickly the vendor for the project. This is also a double check with the project number to make sure that the vendor’s invoice will be accounted for with the right project.

Project Number and Account Number

Every project is assigned a number that accounting will use to record each invoice properly for job costing. It must be printed or written on

the purchase order. Most companies require an account number on the purchase order to place invoice costs to the correct job costing code.

Vendor Name, Address and Contact

The complete name, address and contact of the vendor must be written or printed on the purchase order. This identifies the other contracting party.

Ship-to Address

This will help you make sure the material or equipment gets to the right place for use or temporary storage.

Date of Issue

Never issue a purchase order without a date, and have the vendor date his signature. By failing to include the date on the purchase order, a significant argument may result regarding the purchase order date. Potential conflicts between the request for quotation, the vendor's original quote, and later notifications by either party may be avoided by dating the purchase order and all other documents.

Delivery Date

Every purchase order should be issued with a specific delivery date required, if possible. You should try to avoid using vague statements of delivery requirements (e.g., as needed," "when required," "will advise," "ASAP" or other catch-all phrases). If a vendor fails to provide materials in a timely manner and places the contractor in a position of facing significant increased costs as a result, the contractor must be able to show that a contract existed between him and the vendor, and that the vendor specifically agreed to a promised delivery date for the material. Statements such as "will advise" provide a very convenient loophole for the vendor and may mean that the subcontractor will not be able to legally recover the increased

costs caused by the failure of the vendor to meet the required delivery date.

Shipping Terms

Don't think that shipping terms are not important! If you purchase materials and specify that they are to be provided "F.O.B. Jobsite," the term means that the vendor will be responsible for filing any freight claims or pursuing any loss or damage to the goods which occur prior to the time that the goods arrive at the project site. If the purchase order indicates that the shipping terms are "F.O.B. Factory," then once the goods leave the shipping dock at the factory, the vendor's responsibility for them ends, and the subcontractor will have to pursue freight claims, insurance claims, or whatever other means are necessary to recover lost or damaged goods. Any contractor who has ever had the painful experience of having to file and collect freight claims or insurance claims on damaged or lost goods knows that it is an endless procedure and one that can consume literally hundreds of man-hours of time and may still result in a frustrating conclusion. Any time the subcontractor can make the vendor responsible for pursuing these claims, he should do so.

The F.O.B. point also determines *ownership* of the products. Therefore, if a contractor accepts F.O.B. factory terms, that contractor owns the products when the shipment leaves the factory loading dock. Conversely, if the contractor's purchase order stipulates "F.O.B. jobsite" or "F.O.B. delivery destination," the contractor does not own the goods until the products are signed for (after inspection and unloading) at the point of delivery. In all cases, the contractor should not unload a shipment until after the shipment has been inspected for apparent shipping damage. If damaged goods are discovered, the contractor should note the damage

on the shipper's bill of lading prior to signing and accepting the shipment.

Items and Quantities

Unless the contractor is absolutely certain of the quantity of materials involved, he should avoid specifying a specific quantity. For example, if you are purchasing "one lot" of grills and registers from the manufacturer, you may find that stating the exact quantity of each of the items involved presents a problem later. Suppose a vendor quotes quantities of air distribution equipment, which he believes the plans and specifications require. If the contractor repeats these quantities on his purchase order and buys the same number of grills, registers, and diffusers that the vendor quoted, then the contractor will have no recourse if it turns out that the quantities quoted by the vendor are not the same quantities required by the plans and specifications.

On the other hand, if the contractor issues the purchase order and indicates that the vendor is to furnish "one lot as required by the plans and specifications," then the contractor has sufficiently tied the vendor down to providing whatever quantities of grills, registers, and diffusers are required by the construction documents. Normally there is nothing wrong with indicating the quantity required by the contract documents. It is only in those areas of purchase where the exact quantities may be open to various interpretations from different individuals that the contractor should be careful to issue the purchase order calling for "one lot as required by the contract documents."

Description of Items

Suppose you are bidding a job that requires you to provide a 500-ton absorption chiller. If a vendor quotes his particular make of chiller and has the

lowest price, you may be tempted to issue the purchase order to indicate that he provide his specific model of equipment; i.e., "Provide one Model XYZ-123 Acme 500-Ton Chiller complete with accessories as quoted in your proposal dated January 1, 2002." This may turn out to be a major mistake and cause the contractor significant problems. Suppose the Acme chiller, which the contractor has assumed will meet the specifications, is not acceptable to the engineer. Then, in most cases, the Acme representative will be under no obligation to provide another manufacturer's piece of equipment or to meet plans and specifications since he only quoted a specific piece of equipment and that's exactly what you purchased.

On the other hand, it is possible to write a purchase order and to specify that the vendor "Provide 1 each 500-ton chiller in complete compliance with the plans and specifications attached." If this method is used to describe the equipment involved, the vendor, upon acceptance of the purchase order, has agreed to provide one chiller that meets the plans and specifications. If the Acme 500-ton Model XYZ-123 chiller does not meet the plans and specifications, then he is obligated to provide a 500-ton chiller that does meet the plans and specifications. If you have any doubts about a supplier's equipment or materials meeting specification requirements, it is a good policy to write the purchase order so that the vendor recognizes that he has agreed to provide equipment or materials to meet the specifications regardless of his personal interpretation of their requirement or regardless of his proposal.

What about the vendor's fine print on the back of his proposal? If you describe the equipment or materials to be purchased as "one Model XYZ-123 in accordance with your proposal", then you have incorporated, by reference, the

vendor's fine print from the back of his original proposal. This may be a serious error since the vendor's fine print may specifically deny any responsibility for damages resulting from his inability to meet the specified delivery dates or to meet the specification requirements. Therefore, it is a good idea to avoid using phrases such as "in accordance with your proposal" since you are incorporating language that may not be to your benefit. In cases when it is absolutely necessary to note a manufacturer's model number on the purchase order, the suggested language previously mentioned under the heading "PURCHASE ORDERS: THE FRONT SIDE" on pages 1 and 2 (where the contractor "takes express exception to the vendors quotation and any limitations of liability") will help to ensure the contractor is not tied into the vendor's/manufacturer's terms and conditions (fine print).

The best policy for purchasing materials is to tell the vendor that he is to provide "one lot," or a specific quantity of materials or equipment, "in accordance with plans and attached specifications." You should attach a copy of the pertinent specification requirements to the purchase order so that the vendor will be aware of the requirements that must be met in order for his equipment to be acceptable.

Add warranty language to the PO when odd warranty time frames or temporary usage are required. Also see bulletins "Understanding Manufacturer's warranties" and "Temporary Usage of Equipment" for additional concerns for warranty issues for the PO.

Pricing

There is no hard and fast rule about entering either a lump sum or individual unit prices on a purchase order. The contractor about to issue a purchase order should think about the

following: If the purchase order only indicates a lump sum, there may be arguments in the future over the value of individual items on the purchase order. It may be necessary to change, add, or delete items from the purchase order at a future date. Therefore, it would be wise to indicate the unit prices for these items as well as a lump sum total. When purchasing materials that require a "quantity discount," it is a good idea to indicate the discount on the purchase order should the supplier later claim that the price or discount of purchased materials has changed.

Another reason to avoid issuing a purchase order that states "furnish all in accordance with your proposal" is that suppliers' prices may change during the contract term. If the supplier's proposal clearly contains a statement indicating that his prices are "subject to escalation and final price is to be determined at time of shipment," by referring to his proposal, you may have given the supplier a contract with an escalation clause, while at the same time agreeing to provide the mechanical work without being able to escalate your material price.

The contractor could state on the front side of the last page of the purchaser order:

"ALL PRICES, INCLUDING UNIT PRICES, SHALL REMAIN EFFECTIVE (WITHOUT INFLATION) FOR THE DURATION OF THE PROJECT. THE QUANTITIES NOTED HEREIN ARE APPROXIMATE AND THE PURCHASER MAY REDUCE OR INCREASE QUANTITIES AT THE UNIT PRICES NOTED AS MAY BE REQUIRED. RETURNED PRODUCTS ARE NOT SUBJECT TO RETURN/RESTOCKING CHARGES."

Additionally, at the time the purchase is made, we suggest the

contractor obtain breakout pricing for non-taxable items such as freight (freight is non-taxable in some states) and a breakout price for labor required for startup and demonstration of the products being purchased. The contractor should indicate the freight amount on the purchase order, especially if freight is non-taxable in the state where the product is delivered, to clearly define the exact amount of the purchase order, including “applicable” sales taxes.

If the project is tax exempt, attach the tax exempt certificate provided from your contract with the PO, and note on PO front that project is tax exempt. This will save you time with vendor billing inconsistencies.

Finally, review the completed purchase order for accuracy.

Startup Subcontract

We suggest the contractor take the breakout price for the startup (as noted above) and include that portion of the vendor’s responsibilities in a separate “startup agreement” document (refer to Exhibits C, D and E, attached, for example startup subcontract documents). The contractor should have insurance provisions in its standard subcontract terms. Insofar as the purchase order terms have no provision for the vendor to provide insurance when performing “on site” services, utilization of a “subcontract” to the vendor for performing startup and demonstration activities will further protect the contractor from any injuries, including death, property damage or other losses and/or damages caused by the vendor. Without these insurance requirements, the contractor is left exposed to possible damages caused by vendors performing activities on the contractor’s job site. Make sure you transfer the “contract insurance liability limits” and other “contract pass through

paragraphs” for the particular project into the subcontract and list whether additional insured’s are required.

Signatures

Make sure that your vendors and suppliers sign and accept your purchase order before you accept and pay for any of their materials or equipment. It is best to insist that the supplier sign and accept the purchase order in your office the day you give him the order. If this is not possible, then you should instruct the supplier to sign and return the purchase order and state that the purchase order is not considered to be valid until your firm receives and accepts the signed order. Your accounts payable department should be instructed not to pay any supplier or vendor unless there is a signed and accepted purchase order on file.

If the purchase order is sent to a supplier with the understanding that he will sign and return it later, then a policy or procedure must be instigated to ensure that the signed purchase order, when it finally returns to the contractor’s office, has not been amended or changed in any way that would become objectionable to the contractor.

Finally, a word about the “tail that wags the dog.” Many suppliers are such large organizations that they are able to demand or insist upon terms and conditions on purchase orders that are not in the best interest of the contractor. The vendor may refuse to ship his product without shipping terms of F.O.B. Factory or he may refuse to accept your fine print that indicates that his failure to meet the promised delivery date will make him responsible for any resulting cost incurred. In many instances, it will be impossible for the contractor to force the supplier to agree to a contractor’s terms or conditions. If this is the case, the contractor must simply recognize that he is accepting additional risk in

return for a lower supplier price, or he may be unable to find an alternative source of supply and have no choice but to accept this risk.

In many cases, purchasing based on the lowest dollar quoted ultimately costs the contractor more money in the end. For example, if the contractor has a prime contract on a federal project and he chooses to purchase a major portion of the contract materials from a supplier who later declares bankruptcy, the courts do not view that bankruptcy declaration to be an excusable delay. The contractor will be held to the original completion date, and the fact that the supplier went broke will provide absolutely no relief for the contractor. Purchasing based on "low dollar" alone does not always make good economic sense. Select suppliers and vendors that will provide an acceptable as well as economical product. Careful attention to the issuance of purchase orders to vendors and suppliers will improve the contractor's chances of survival and may make his life much more pleasant.

PURCHASE ORDERS: THE BACK SIDE

The back side of a typical purchase order (Exhibit B) usually contains the "fine print" which protects the contractor from non-performance. However, do not neglect the back side. It is extremely important. If a contractor does not have "fine print" developed for purchase order agreements, he should do so as soon as possible. We have developed a sample format for "fine print" which a contractor could use in working with a competent local attorney for tailoring to the specific requirements of the state in which he is operating. Different states have different legal requirements regarding contracts. What may be an acceptable set of "fine print" in the state of New York may not provide adequate protection for a

contractor in Louisiana. It is an intelligent and effective investment of a contractor's effort and money to spend a couple of hours with a good construction attorney to develop adequate "fine print." The language should be updated every few years to comply with changes in the law.

EXHIBIT A

PURCHASE ORDER

YOUR COMPANY / MECHANICAL CONTRACTORS

[Address]

[Phone]

TO:

P.O. No. _____ This number must appear on all invoices, shipping memos, bills of lading and packages.

Order Date _____, 2__

Our Job No. _____

Ship To: _____

___copies of operation, maintenance & installation instructions are required for the owner's use. Final payment will not be made until after these instructions are received.				PLEASE
Payment Terms <input type="checkbox"/> Original Order <input type="checkbox"/> Confirming order. DO NOT DUPLICATE SHIPMENT		___copies of submittals required. <input type="checkbox"/> approval required before shipment <input type="checkbox"/> approval not required		ADD
				STATE
				SALES TAX
<p>According to plans and specifications as prepared by _____, dated _____ including the following addenda and bulletins:</p> <p style="font-size: 1.2em; font-weight: bold; transform: rotate(-10deg); margin-top: 20px;">ACKNOWLEDGEMENT COMPLETE AND RETURN ACKNOWLEDGEMENT AT ONCE</p>				
Even though your quoted price may include freight, startup & other similar nontaxable items, all invoices must be itemized so that freight, startup & other non taxable items can be identified.				(Total)

(COMPANY)

Your Purchase Order is Hereby Acknowledged and Accepted, including terms and conditions stated on the face and reverse side hereof.

Authorized Signature _____ Date _____

We will _____ Our Order _____

Ship on _____ No. is _____

Person Controlling This Order _____

EXHIBIT B
GENERAL CONDITIONS AND INSTRUCTIONS

1. Identification of shipments. The Purchaser cannot and will not be responsible for any material received unless each package, case, etc., is clearly identified on its outer covering as to: 1. Seller 2. Purchase Order Number. If Purchaser furnishes shipping tags for direct shipment to Purchaser's customer, Seller assumes responsibility of nonacceptance of shipments by Purchaser's customer in the event such shipping tags are not attached to packages, case, etc. On shipments direct to Purchaser's customer where no shipping tags are furnished, packages, cases, etc., must be marked as specified on face of order.
2. Boxing, Packing or Cartage. No charges for boxing, packing or cartage will be allowed unless stated hereon or later agreed to by this company in writing.
3. Invoices. Invoice showing Purchase Order Number must be mailed to the Purchasing Department of the Purchaser not later than the day following shipment, irrespective of whether shipment is in part or in whole.
4. Inspection. The material or apparatus to be supplied against this Purchase order shall, at the Purchaser's option, be subject to inspection and test at the maker's works.
5. Rejected material. Rejected material shall be returned to the Seller at Seller's expense.
6. Time of delivery of this order is of the essence, and Purchaser reserves the right to cancel without cancellation charges all of any part of this order if not filled within the specified time. exercise of such right of cancellation shall not be deemed a waiver of any other right reserved to the Purchaser herein, or by law, for any delay or failure to deliver as specified.
7. No partial shipments accepted unless agreed upon by both parties.
8. The Seller agrees to comply with any and all federal, state, county and municipal and/or other local regulations, laws, ordinances and enactments of whatever kinds, applicable at the time of sales or which may become effective during the period of construction or fabrication, shipping and/or installation (if installation is included) of the materials comprised under this Purchase Order.
9. The price or prices of this order are not subject to change or any surcharges resulting from the imposition now or in the future of any sales taxes, federal, state, municipal or otherwise, unless agreed to or requested by Purchaser.
10. In the event approval is not secured from the Owner, or if the Owner's order to the Purchaser is cancelled, cancellation of this order shall occur automatically, without cancellation charges by the Seller, and no obligation of any description whatsoever, shall exist on the part of the Purchaser toward the Seller.
11. The contract price appearing on the Purchase Order is final as to payment for the material covered by the specifically listed items, as defined by the enumerated specification paragraph numbers, with exceptions as noted, and there shall be no additions to or other modifications or such contract price except as such modifications may result from actual change in the specifications. If such changes become necessary, any alteration of the contract shall be covered by separate order, which shall be issued to cover such changes. Seller shall not proceed with changes affecting contract price without specific authorization in WRITING from the Purchaser.
12. Payment and discount periods shall commence only upon receipt of both the material and proper invoice or invoices at designations specified in this Purchase Order. The Purchaser reserves the right to return to the Seller for correction any and all invoices containing error and/or not in agreement with this Purchase Order.
13. The Purchaser reserves the right to return to Seller at the invoice price all items which are regularly carried in Seller's stock.
14. Seller represents and warrants to Purchaser that all material and/or equipment rented, leased or purchased under this Purchase Order meets all standards of the Occupational Safety and Health Act of 1970 and Construction Safety Act of 1969, as amended from time to time, and of applicable state and local laws, regulations, standards or requirements pertaining to safety, as amended from time to time.
15. All material and/or equipment furnished under this order shall be guaranteed by the Seller against defects, and Seller agrees to replace without charge to Purchaser said material and equipment, or remedy any defects, latent or patent, not due to ordinary wear and tear, or not due to improper use or maintenance, which defects may develop within one year from date of acceptance by Owner, or within the guarantee period set forth in applicable plans and specifications, whichever period is longer.
16. All material and equipment furnished under this order shall be subject to the approval of the architect, engineer, or any other party designated, and Seller shall furnish the required submittal data and/or number of samples for said approval. In the event such approval is not obtained, the order is cancelled, with no liability on the part of either Purchaser or Seller, unless the order is placed with the understanding that the material and/or equipment is to be supplied of the type and in such a manner as to meet requirements of plans and specifications. In the latter case, Seller shall comply without further cost to Purchaser.
17. All material and equipment furnished hereunder shall be in strict accordance with plans, specifications and general conditions applicable to the contract of Purchaser with the Owner or another contractor, and Seller shall be bound thereby in the furnishing of material and equipment under this Purchase Order.
18. Seller shall guarantee equipment covered under this purchase order to produce capacities or meet design specifications and function: (1) as called for in the plans, specifications or addenda; and (2) as herein set forth; and (3) as published or warranted by the manufacturer for the equipment involved. In the event the equipment does not meet the foregoing requirements, Seller shall immediately on notice replace same, or remedy any deficiency, without expense to the Purchaser; and further, Seller shall pay to Purchaser all consequential loss or damage resulting therefrom.
19. The Seller hereby agrees to indemnify and save harmless the Purchaser for and against all claims, liability, loss, damage or expense, including attorneys' fees, by reason of any actual or alleged infringement of letters patent, or of any litigation based thereon covering any article purchased hereunder.
20. Seller shall furnish all necessary lien waivers, affidavits or other documents required to keep the Owner's premises free from liens or claims for liens, arising out of the furnishing of the material or equipment herein, as payments are made from time to time under this purchase order.
21. All prior representations, conversation, or preliminary negotiations shall be deemed to be null and void, superseded by the terms of this order, and no changes will be considered approved unless this purchase order is modified by an authorized representative of Purchaser in writing.
22. In the event of default of any of the terms or conditions set forth herein, the Seller agrees to pay all costs resulting therefrom, including but not limited to reasonable attorneys' fees.
23. This purchase order, when accepted by Seller, shall constitute a valid and binding contract.

EXHIBIT C

MECHANICAL CONTRACTOR

The "Contractor" herein
 Street Address
 City, State and Zip Code
 Telephone: (Thi
 Facsimile:

**START UP AND TRAINING
 DEMONSTRATION TO
 CUSTOMER SUBCONTRACT**

s Subcontract is to be used
 when the amount is less than
 _____)

Date: _____
 Contract No. _____
 Job No. _____

SUBCONTRACTOR

PROJECT

1. This Agreement covers the furnishing by the Subcontractor of all instructors and personnel, for the complete start up, training, and demonstration for the _____, in accordance with the requirements set out on Attachment "A" attached hereto and for the price of \$ _____.
2. This Agreement is the entire Agreement between the parties. All prior representations or agreements, whether written or oral not incorporated herein, are superseded. For the purpose of this Agreement, the word "Customer" refers collectively to the General Contractor, Owner and/or any other entity for which work is done directly or indirectly, in connection with this Agreement.
3. Subcontractor agrees to indemnify and save harmless the Contractor and/or Customer from any loss, expense, damage, or injury caused or occasioned, directly or indirectly, from all fines, penalties or costs incurred by Contractor or Customer, pursuant to the Occupational Safety and Health Act of 1970, as amended, and all federal, state and local construction safety laws by reason of Subcontractor's non-compliance with those laws, or by reason of the conduct of Subcontractor, its employees or agents.
4. The Subcontractor agrees to indemnify, defend and hold harmless the Contractor and any party the Contractor is required to indemnify, defend and/or save harmless under the Contract Documents and their respective officers, directors, principals, agents and employees, from and against any and all claims, actions, losses, expenses, damages, injuries, demands or any liability whatsoever, including, without limitation, reasonable attorneys' fees and other costs (collectively, the "Losses"), arising in whole or in part and in any manner, from the acts or omissions of the Subcontractor, its officers, directors, principals, agents, employees or subcontractors, in the performance of this Agreement. The Subcontractor shall defend and bear all costs of defending any actions or proceedings brought against the Contractor and any party the Contractor is required to indemnify, defend and/or save harmless under the Contract Documents and their respective officers, directors, principals, agents and employees, arising in whole or in part out of any such acts or omissions, provided, however, that the Contractor and/or Customer shall have the right to select counsel to conduct such defense. This indemnification shall be fully applicable to all Losses even though such Losses may have been contributed to, or are alleged to have contributed to, some act or omission of the Contractor. The parties acknowledge that the indemnification provisions contained herein are material inducements to the execution of this Agreement and are provided in consideration of the mutual promises, agreements and covenants contained herein and other good and valuable consideration, receipt and legal sufficiency of which are hereby acknowledged.
5. The Subcontractor shall procure for the work, and maintain in force throughout the project, Worker's Compensation Insurance, Employer's Liability Insurance, Comprehensive General Liability Insurance and Automobile Liability Insurance. The Subcontractor's General Liability Insurance policy will be endorsed to provide that the policy general aggregate is applied on a per project basis. The Contractor, and all other entities so required by contract, and their directors, officers, representatives, agents and employees shall be added as Additional Insureds to all of the Subcontractor's insurance policies (except Workers' Compensation). The Subcontractor's insurance shall apply on a primary non-contributory basis. The insurance of the Contractor and all other Additional Insureds will not be called upon to contribute to any claims covered by the Subcontractor's policies referenced in the certificate. Subcontractor shall have all policies endorsed to provide a waiver of subrogation in favor of Contractor and all other Additional Insureds. Subcontractor's Workers' Compensation coverage shall apply to all employees including those engaged in operations a way from the project site. Subcontractor's Workers' Compensation coverage shall also cover Corporate Officers. The Subcontractor will furnish proof of insurance required under this Article 5 in accordance with the Contractor's "Certificate of Insurance" attached hereto as Attachment "B". The Subcontractor's Comprehensive General Liability, Automobile Liability and Employer's Liability shall be written with limits of liability not less than those required of the Contractor under its Contract with the Customer, or as listed below, whichever is greater. The Contractor has the right to withhold all payments under this Subcontract until receipt of the Subcontractor's Certificate of Insurance, fully executed by the Subcontractor's insurance company showing compliance with the provisions of this Article 5.

General Liability:	\$1,000,000	Each Occurrence	
		\$2,000,000 General Aggregate – Per Project	
Automobile Liability:		\$1,000,000 Combined Single Limit – Bodily Injury and Property Damage	
Workers' Compensation:	Statutory		
Employer's Liability:	\$1,000,000	Each Accident	
		\$1,000,000 Disease - Policy Limit	
		\$1,000,000 Disease - Each Employee	

All of Subcontractor's insurance policies shall contain a provision that the coverage afforded thereunder shall not be canceled or not renewed, nor restrictive modifications added, until at least thirty (30) days prior written notice has been given to the Contractor. The Subcontractor waives all rights of recovery against the Contractor, Customer and such other parties as are required by the Contract Documents, for losses within the scope of Subcontractor's insurance.

EXHIBIT C

6. In the event the Subcontractor delays in the performance of any of the provisions of this Agreement, or becomes bankrupt or insolvent, the Contractor shall have the right to cancel this Agreement upon three (3) days written notice mailed or delivered to Subcontractor at its last known address.
7. All diagrams, data, manuals, information or samples, which are called for in the specifications, or which are reasonably necessary for the proper completion of this Agreement are to be furnished promptly by the Subcontractor in the quantity requested. This Subcontract shall not be deemed completed and retainage will not be released until all operating manuals, test reports and other documents required herein are furnished and approved.
8. Subcontractor shall provide a sufficient number of skilled personnel to maintain the progress required by Contractor. All personnel used and employment terms engaged in by Subcontractor shall be acceptable to the Contractor and will be such as will not cause nor, in the judgment of the Contractor, threaten to cause the disruption of operations of the Contractor, Customer or any other laborer, materialman, supplier, subcontractor or general contractor.
9. Invoices shall be accompanied by or be on a properly completed "Subcontract Requisition" form to be provided to Subcontractor by the Contractor. A 10% retention will be withheld until the date of completion.
10. Changes, extra work or deductions may be ordered in the work, and the agreed price adjusted accordingly. No such modification shall be undertaken without prior written authorization by Contractor. In the event that Subcontractor proceeds without such written authorization, it shall be deemed a waiver by Subcontractor of all claims for additional payment thereof.
11. Subcontractor shall comply with all federal, state, local and other laws, regulations and other such instruments pertaining to the project. You are encouraged to employ minority workers in your labor forces and minority businesses in your procurement activities, and you shall not discriminate in employment or procurement because of age, sex, race, creed, disability, color or national origin.
12. The Subcontractor is responsible for the safety and health of its personnel at all times. The Subcontractor shall not permit its personnel, in the performance of this Agreement, to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous to their safety or health. The Subcontractor shall perform its operations under this Subcontract in accordance with the Contractors "Manual of Uniform Rules, Regulations and Safety Requirements for Subcontractors Performing Work" and "Fitness for Duty Policy".
13. Subcontractor agrees to perform its work under this Agreement in accordance with a schedule to be provided by the Contractor, which schedule may be subject to change as working conditions require. The performance of the work by the Subcontractor in accordance with such schedule is of the essence under this Agreement. Unless expressly modified or limited in this Agreement, the parties agree that all representations, warranties, covenants and other obligations of Subcontractor shall survive the execution, performance, default and/or termination hereof and shall continue thereafter and maybe even be enforced by Contractor or Customer.
14. All documents and other material generated by Subcontractor pursuant to this Agreement shall be considered, to the extent allowed by law, as "works made for hiring" for Contractor (as defined under U.S. Copyright Law, as amended) and Contractor shall be deemed the sole and exclusive owner of all right, title and interest therein, including, without limitation, any and all copyright and other proprietary rights relating thereto whatsoever. In the event that any documents or other material does not qualify as a "work made for hire," Subcontractor hereby assigns to Contractor for no additional consideration, all rights, title and interest in and to such documents and/or other materials. It agrees to cooperate with and assist Contractor in applying for and executing any applications and/or assignments reasonably necessary to obtain a patent or copyright thereon.
15. Subcontractor shall comply with the EEO Clause in Section 202 of Executive Order 11246 as amended, 41 CFR 60-250 and 41 CFR 60-741, as amended, which are incorporated herein by specific reference.

SUBCONTRACTOR

MECHANICAL CONTRACTOR

Accepted By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: _____

Date: _____

Date: _____

EXHIBIT D

ATTACHMENT A

Subcontractor shall provide all required materials, labor, equipment, tools, supervision, etc., necessary to perform all start-up, commissioning, and training demonstration for the _____ in strict accordance with the Contract Documents inclusive of, but not necessarily limited to:

MANUFACTURER'S REPRESENTATIVE AND COMMISSIONING OF SYSTEMS:

- A. Provide the services of a competent factory trained Engineer or authorized representative of the manufacturer to instruct the Owner, inspect, adjust and place in proper operating condition the _____.
- B. Assist and supervise the Contractor in the formal commissioning of the _____ during overall HVAC systems commissioning.
- C. Submit to the Contractor a written report summarizing the results of the commissioning and performance of the _____.

MECHANICAL CONTRACTORS NOTE:

THIS IS A SAMPLE SCOPE.

MECHANICAL CONTRACTORS MUST REFER TO INDIVIDUAL SPECIFICATION SECTIONS AND/OR JOBSITE REQUIREMENTS FOR EXACT START-UP, TRAINING, DEMONSTRATION AND/OR COMMISSIONING SCOPE REQUIREMENTS FOR EACH PRODUCT PURCHASED.



Bulletin

Purchase vs. Lease Considerations

INTRODUCTION

Leasing personal property, which includes jet planes, ocean-going vessels, railroad cars, computers, furniture, equipment, machinery, trucks, cars, cows, hogs, and the like, came into existence shortly after the end of World War II. By the late 1950s, leasing was blossoming, and by the mid-1960s, it was in full bloom. Today, leasing is an established industry, which plays a major part in the economic life of this country.

Before discussing leasing as a business concept, it is wise to understand some of the terms used, such as:

- *Lessor*, which denotes the owner of the equipment to be leased, and *lessee*, which denotes the user of the equipment.
- *Renting* is an arrangement whereby the lessor makes equipment available to the lessee. It may be automotive or contracting equipment, leased on a long-term or short-term basis to meet temporary requirements, emergency conditions or peak load needs.
- *Leasing* is an arrangement whereby the lessor makes equipment available to the lessee. The equipment may be of the lessee's own specifications, for his use exclusively, and leased full-time on a year-round basis, as if it was lessee-owned.

TYPES OF LEASES

Beyond this definition of leasing, there are additional variations available. In automotive leasing, the lease can be either an *open-end* or a *closed-end lease*, a *full-service lease* or a *net lease*. In equipment leases, it is either a *finance lease* or an *operating lease*.

Under an automotive *open-end lease*, the lessee is responsible to the lessor for an agreed upon value of the automotive equipment at the expiration of the lease term. Further, the lessee guarantees to reimburse the lessor should any deficiency occur. In turn, the lessor guarantees the lessee a refund of any amount collected over and above the specified residual value at the time the equipment is returned.

A *closed-end lease* is one in which the lessor assumes the responsibility for the value of the equipment upon its return, and no further charges are made other than damage, which is covered in the lease agreement itself.

A *full-service lease* is an automotive lease in which the lessor includes in his rental charge the cost of license, tax, safety inspection fees, insurance (collision, comprehensive, and liability), and agrees to pay all maintenance, except for gas, washing and garaging. A *net lease* is the furnishing of automotive equipment to a lessee with no services

included. This lease may be either an open-end or closed-end lease. In fact, both a full-service and a net lease could still be either open-end or closed-end.

A *financial lease* is the acquisition of equipment without purchase. Under a financial lease, the rental payments are spread over a period usually equivalent to the useful life of the equipment to the lessee. The time is usually shorter than the total useful life of the equipment. The lessee pays the lessor a series of payments, the amount of which exceeds the purchase price of the equipment. In addition, during the term of the lease, the contract cannot be cancelled, and the lessee is committed to continue leasing the equipment for the full term of the lease.

An *operating lease* permits the use of equipment without the risk of ownership. Operating leases are such that the lessee, upon giving notice to the lessor, can cancel the lease and return the equipment. In this case, the lessor is assuming the responsibility of ownership because the lessee does not guarantee any residual value collected by the lessor.

VEHICLE LEASING

If a company wishes to lease vehicles, one should be aware that automobile leasing is sold on the basis of service rather than on cost of benefits. Many lessees will not have an accurate record of the actual cost of the vehicles and will be inclined to make a snap judgment in favor of ownership without taking into consideration such items as full depreciation costs or the cost of executive time spent managing details.

The prime reason for considering leasing vehicles should be the advantage of not having to make capital investment in automotive equipment.

Another advantage is being assured of the predetermined cost of equipment and operations for budgeting purposes. All companies have some kind of budget. However, accurate budgeting of transportation costs is more difficult when automotive equipment is owned. Repairs are not often anticipated, and charges against a fleet are usually not tabulated until possibly 10 days after the end of the month in which they occur. In leasing, the monthly payments can be set up in the budget, and even if the lessee provides gasoline and oil, average mileage figures will permit a reasonably accurate determination of the costs involved. At the same time, leasing eliminates the need for a multitude of records to support tax deductions.

A leasing firm and an automotive dealer can each make a good case for lease versus purchase costs. The contractor can make a reasonable evaluation of what the costs mean by tabulating, for example, the costs of owning and leasing vehicles in the form of a chart. It is intended to be only a sample and not necessarily applicable to all concerned. Each contractor should tailor this chart to his/her own accounting procedures.

EQUIPMENT LEASING

Profits are made by the use of assets, not by ownership. The potential lessee should be reminded that the asset is still available to him/her, and the freed working capital can be used elsewhere in the most timely, effective and profitable manner. The leased equipment brings its own return in production dollars. If a company must delay the purchase of equipment because of a strained capital position, the benefits to be realized from the equipment must also be postponed. In today's competitive market, it is essential to replace worn out or obsolete equipment. The increased efficiency in productivity may more than pay the cost of the lease.

The tax advantage of leasing is pointed out often. A true lease (without a purchase option) has the advantage of a rapid write-off of equipment costs. The entire leasing cost may be deducted as a business expense. If equipment is leased for a 5- or 10-year period, the leasing cost can be written off during the leasing period—5 or 10 years. The Internal Revenue Service regulations explicitly permit the tax payer to deduct all lease payments that are ordinary and necessary to its business. However, this rapid write-off is not available if the equipment is purchased for use on an installment basis, since the installments are not lease payments. Therefore, leasing might possibly result in tax savings. Tax timing and cash flow may not make leasing attractive for certain concerns.

These and all other matters concerning a lease should be reviewed with a tax counsel. (In certain instances, it may also be advisable to get a ruling in advance from the Internal Revenue Service. This should be checked also with tax counsel.)

LEASING PROBLEMS

By way of caution, leasing does not work for every company. As in any case where it seems you can “eat your cake and have it too,” there are some conditions that would make leasing disadvantageous. Leasing is not good medicine for a sick company. It does not help a declining business because you must be able to use conserved capital intensively.

In relation to an improved cash flow situation, many leasing companies sell services, which offer merchandise on short-term leases. These feature lease payments, which far exceed the depreciation that would have been allowed had the asset been purchased. Instead of causing the least drain of cash in earlier

years, the accelerated payments required by this plan actually compound the problem, and the Internal Revenue Service views the accelerated cash flow provisions as tax postponement devices.

Another point to consider is that the courts are interpreting lease contracts according to the intent of the parties. This means that care should be taken when drafting the contract to correctly reflect the intent. The concept of intent must be separated from the concept of desire. While the parties may desire to have their contract construed as a lease, the terms of their lease may show that the real intent in the legal sense is to negotiate a conditional sale.

Purchase options should be examined closely. Remember that equipment helps make profits because it is used, not because it is owned. If a purchase option must be included, it should be based on the fair market value of the asset at the time it is believed the option will be exercised.

Rental agreements that cover a relatively short part of the expected life of the equipment involved, with a rental cost that approximates the price at which it could have been purchased (and where the lessee may continue to use the equipment for an additional period at a relatively nominal payment) might be held legally to be a sales contract. Such a condition might apply even though passage of title is not expressly provided in the agreement. This is another example of where care must be taken to assure that the intent and desire of the parties are reflected correctly in the agreement.

SUMMARY

Although leasing may improve the appearance of a balance sheet,

companies should footnote their lease commitments on their balance sheet. These should show the firm's lease contracts that have an effect on the company's cash position for future years.

One of the main advantages of leasing from the lessee's standpoint is the cost. A lessee may determine that he can finance equipment or operate his fleet for less cost than a comparable leasing program. If this is true (i.e., the advantages of reduced cost of owning outweigh the previously stated advantages of leasing), then perhaps the contractor may choose to own vehicles or equipment or he may elect to use both systems (i.e., own equipment and lease vehicles).

Please note this final word of caution. Have your regular counsel and a competent tax counsel (if your regular attorney is not well versed in tax law) and your independent certified public accountant check all aspects of your proposed lease and its resultant effects on your operating statement and balance sheet before concluding any leasing operations.



Bulletin

FOB Terms

DEFINITIONS

Who assumes risk, claims, control, and taxes? The shipping terms delineated in your purchase order set the rules. Make yourself aware of the advantages and disadvantages of the various shipping methods and terms available. The Uniform Commercial Code, Section 2-319, establishes the terms and definitions.

Many contractors prefer to use FOB jobsite to eliminate the liability for goods damaged in transit.

The important terms to know are:

FOB: Freight on Board

FOB Destination: FOB jobsite; FOB city and state of:

FOB Point of Shipment: FOB factory; FOB origin; FOB city and state; FOB seller's point

Freight Allowed¹: Shipments will move freight equivalent to the charges buyer pays to the carrier. These charges will be deducted from the total cost of the goods when paying the seller's invoice.

Freight Prepaid: Seller will pay transportation charges to the carrier and that buyer will remit the full amount of the invoice without deduction of freight.

Note in particular the area of "Freight Prepaid" vs. "Freight Allowed;" consider these in your cash flow planning.

Are you aware that when a shipment is FOB factory, you can choose the carrier and routing regardless of who pays the freight charges?

When equipment arrives damaged, are you obligated to pay the seller? Consult the terms of your purchase order.

FOB FACTORY

(Manufacturer's point of shipment)

Advantages

- The buyer can select a carrier.
- The buyer may pay the carrier and eliminate a possible mark-up on freight.
- Freight may be nontaxable.²

Disadvantages

- The title passes when manufacturer passes merchandise to carrier.

¹ In many cases vendors are actually quoting and shipping equipment under the terms "FOB Factory-full freight allowed" meaning you are assuming title at shipment, but prepaying the freight. However, the amount equivalent to the charges buyer pays to the carrier will be deducted from the total cost of the goods when paying seller's invoice. The specific meaning should be obtained from the vendor.

- Invoice date is effective at time of placement on carrier.
- Risk in shipment is borne by the buyer.
- Claims must be filed, litigated and settled by the buyer.
- Insurance: A good procedure is to check with your insurance agent about your coverage on in-transit material where title has passed. Many serious problems can arise in the event of carrier bankruptcy, refusal to pay claims, etc. Special coverage is available at a nominal rate. Also, problems with concealed damage may arise.
- Possibility increases of collect shipments.

FOB JOBSITE

(City, State, etc.)

Advantages

- Title passes when equipment is delivered.
- Invoice is due at time of receipt on jobsite.

Disadvantages

- Seller may include a mark-up on freight.
- Risk of shipment is borne by the seller.
- Damage claims, etc., are the responsibility of the seller.
- Freight may be taxable.
- Buyer may not select carrier.
- Buyer must trace shipment through seller.

In summary, know and understand the freight terms and tax consequences. Do your homework carefully in the preparation of your purchase order. Remember that, since it is the basic instrument, it will be interpreted against you, the maker. Therefore, be clear and explicit in the definition of terms and conditions.

² It is necessary to check with your local taxing authority to determine if freight is taxable. Since many states do not tax freight, it is imperative to have the cost of the freight separated out.

EXAMPLE:

Quoted Price of Equipment	\$50,000
Less Freight and Delivery Charges	<u>5,000</u>
Net Taxable Cost of Equipment	\$45,000
Sales tax @ 5% (¥\$45,000)	2,250
Add Freight	<u>5,000</u>
Amount Billed and Paid	\$52,250

In many cases vendors are actually quoting and shipping under terms "FOB Factory-full freight allowed" pre-paying the freight.



Bulletin

Why Mechanical Contractors Should Be Paid for Materials Stored On/Off Jobsite

There are valid reasons why mechanical contractors should be paid for materials and equipment purchased early, although not immediately needed, and why they should be paid in whole or in part for the cost of storage, extra handling and insurance involved.

Today's world of construction is fraught with problems of spiraling material and equipment costs and related material shortages. To assure substantial completion within the contract time for the contract sum on any job, certain equipment and materials have to be ordered well in advance of their incorporation on the job. This is especially true for the mechanical contractor whose work is more equipment-oriented than the general contractor and most other specialty contractors.

If a mechanical contractor is to complete the job for the contract sum and still realize a profit in today's market, he must purchase major equipment and materials as soon as he receives his notice to proceed. This can tie up needed working capital in a hurry, especially on jobs of long duration. It is essential that architects and owners recognize the need for early purchase of certain equipment and materials. It is imperative that the contractor be paid promptly for the

proper storage, insurance and extra handling of materials. Otherwise, time targets cannot be met nor realistic construction costs maintained.

The American Institute of Architects in 1974 recognized the need for a payment policy on stored materials. The 1976 revision of A-201, under paragraph 9.3.2, provides for payment of off-site storage provided certain conditions are met. Therefore, it is believed that the AIA recognizes the problem and subscribes to early purchase and storage of equipment and materials by the contractor.

At the first job conference, the mechanical contractor should bring this matter to the attention of the general contractor and the owner and request written authorization for payment of stored materials both on and off the jobsite. A written procedure should be developed for payment that would include paid invoices, storage receipts, insurance requirements, inspection, etc.

There are certain advantages to a mechanical contractor having control of where early purchased equipment is stored, such as security, proper protection from the elements, sufficient time

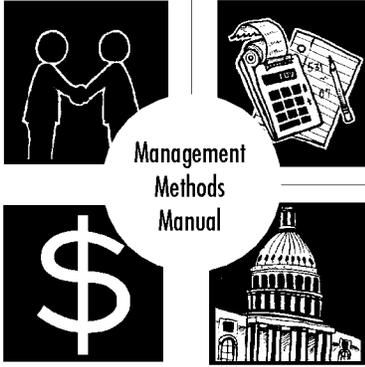
to check and ensure all components are included in the shipment, etc. The owner has an equal advantage of eliminating or reducing costly delays caused by late shipments or the unavailability of equipment. Accordingly, the mechanical contractor should neither have to bear the burden alone of storage costs, including insurance, nor of the occasional extra transportation and handling costs.

In summary, the owner, architect and general contractor should all be realistic about the mechanical contractor's material problems, since they affect total job progress.

Every effort by the MCAA member should be made at the local level to have a clause included in the General Conditions of the specifications and into subcontract agreements.

However, in situations where equipment storage costs are not taken into account by a contract clause, the MCAA member should not neglect to consider such costs when preparing estimates.

Of course, members are prohibited by law from agreeing on what items of cost they will or will not include in estimates. Each member must make such decisions independently.



Bulletin

What is Indirect Job Cost?

INTRODUCTION

Among the interesting aspects of the Mechanical Contracting industry are the wide variations in methods used to get reimbursed for the many items that may not be classified exactly as *direct* job cost. The direct job cost items, such as labor, materials, and subcontracts, are usually well defined and, therefore, will not be discussed here.

In this bulletin, we examine items which are often overlooked as job costs, but which actually are; these indirect cost items include hand tools, equipment and truck rental, deliveries, warehousemen, sheet metal and fabrication shop expense, consumable and expendable supplies, project administration, guarantees, taxes, insurance, etc.

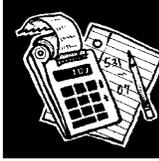
There are many valid reasons as to whether these items should be classified as General and Administrative cost or as job costs. We will not attempt to argue either side of the question, but your answer may generally depend on the market you are in.

On "hard money" jobs, your method of charging may not be a factor in the bid price

and profit as long as everyone connected with the job realizes exactly which costs are in job costs and which are General and Administrative charges. On any negotiated work, cost-plus work, or time and material, there can be a great difference in your profit, depending on your method of arriving at your cost. However, if you do not properly document your costs on the indirect cost items, you can easily be the low bidder and then proceed to lose money on the job.

To discuss methods in charging the indirect costs, you should first divide them into categories as follows:

1. Equipment & Truck Rental
2. Consumable & Expendable Supplies
3. Licenses, Taxes, Insurance, Guarantees, Legal, Recruiting and Finance Charges
4. Project Administration
5. Items related to Labor Costs
6. Safety & Drug Testing



EQUIPMENT & TRUCK RENTAL

If the equipment is consigned full time to the job, you should charge a monthly rental to the job.

If the equipment is used part time or hourly, you should charge a weekly, daily or hourly rate to the job.

If your shop foreman or equipment foreman consigns the equipment to projects, he should keep track of where the equipment is used, and initiate the charge by recording the time used on a time sheet.

Division 1 of the Foreword to MCAA, "Tool & Equipment Rental Guide" gives a good definition of the items usually considered in developing rental rates. All other costs associated with the equipment would be in the direct job cost.

An exception might be an hourly rate that you would develop for temporary assignment or for deliveries that would include the operator or driver, fuel, maintenance, etc.

CONSUMABLE AND EXPENDABLE SUPPLIES

Each contractor should develop his own definitions of small tools and consumable and expendable supplies. A good place to start in developing your definitions is the MCAA "Tool and Equipment Rental Guide," Divisions II and III of the Foreword.

Consumable and expendable supplies should be charged as direct job costs.

LICENSES, TAXES, INSURANCE & GUARANTEES

Normal business licenses are usually considered as General and Administrative costs. Any special license for a job, and all permit fees, should be a job cost.

Sales and use taxes on materials and equipment incorporated into the job and on consumable and expendable supplies should be job costs. Taxes relating to labor will be covered in a following paragraph.

Income tax and property tax would *not* be a job cost.

Liability or property insurance related to dollar volume should be a job cost.

Insurances related to labor is covered in Bulletin IN 1.

Guarantee or warranty reserve, based on dollar volume or other parameters the company determines, should be a job cost.

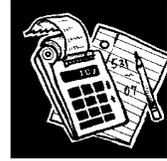
Legal and recruiting expenses would be direct job costs when these expenses are directly related to the job.

Finance charges, normally a General and Administrative Item, could be a job cost when you can relate the charges directly to the job.

PROJECT ADMINISTRATION

Personnel permanently stationed at the jobsite are normally considered job cost. This includes project manager, project engineers, purchasing, expeditors, payroll and billing clerks, secretaries, etc.

Personnel not assigned to the jobsite should be charged to the job in relation to time spent. This is usually acceptable on the project managers, project engineers, purchasing, and expeditors. It may be more difficult to divide up the time of the office staff and charge them to jobs, but certain cost-plus jobs that demand extensive billing breakdowns and submittals of invoices should be charged for this type of service. It may be easier to charge the personnel involved in billing and submit-



tals and other related items if the personnel can be physically stationed at the jobsite and in view of the owner.

When any of the above are charged into the job cost, their rate should include all fringe benefits, payroll taxes and insurances, automobile expenses, etc.

ITEMS RELATED TO LABOR COST

The items listed below are usually considered to be functions of labor costs. One way to handle them is to program them into labor cost and charge them directly into the jobs.

- Fringe Benefits
- Payroll Taxes and Insurance
- Travel and per diem
- Hand Tool Expenses
- Fabrication Shop or Sheet Metal Shop Expense
- Liability or Property Insurance
- Premium Time

A. Drug Testing

1. Cost for man to take test
2. Cost for test
3. Random Testing Cost
4. Administrative Cost Associated With Keeping Records

B. Safety

1. Cost For Safety Director
2. Cost to Give ToolBox Talks
 - a. Lost Productive Labor
 - b. Handout Materials

C. Safety Orientation

1. Lost Productive Labor
2. Handout Materials

D. Permits

1. Hot Work Permits
2. Tank Entry Permits
3. Welding Permits
4. Lockout Permit

Further guidance in the allocation of job costs is found in the MCAA *“Accounting & Financial Management Manual.”*



Bulletin

Company Safety Programs

Introduction

Worker safety and health in the mechanical industry has become a top priority for mechanical contractors for a number of reasons, including:

- our moral obligation to protect workers;
- increasing contractor liability;
- increasing workers compensation costs;
- increases in other accident related costs; and
- the growing demand by construction owners, general contractors, construction managers, etc., that contractors establish and implement comprehensive safety and health programs.

The information in this bulletin is drawn from MCAA's *Model Safety and Loss Prevention Program*, the best publication available for mechanical construction contractors who are planning to develop company safety programs or revise existing programs. It helps the user build a program that focuses on preventing the most common injuries and other dollar losses in the mechanical industry. The publication is as valuable to contractors whose companies are not large enough to support a full-time safety professional

as it is to contractors whose companies have retained full-time safety personnel. We recommend that you refer to this publication for a more detailed look at the development of a company safety program.

Basic Components of a Company Safety Program

All company safety programs should be tailored to the specific needs of each individual company. However, there are ten basic components that should be covered in every company safety program.

1. Corporate Safety Policy

A corporate safety policy prescribes a course of action to reduce the number of work-related injuries that occur within a company. The policy should state the company's intentions regarding worker protection and establish the criteria to be used to measure its overall safety performance. The statement should also address the worker's role in reducing the number of job site injuries and illnesses. Each worker should be provided with a copy of the policy statement and encouraged to read it carefully.

2. Corporate Commitment

Successful company safety and health programs must have complete commitment from the chief executive

officer (CEO) all the way down to the workers in the field. To get commitment from managers and workers, the CEO must demonstrate his or her personal commitment to worker safety and health. Suggested ways to demonstrate total commitment are:

- The CEO should write a corporate commitment letter and provide a copy to each manager/supervisor and worker by including it in the written company safety program.
- The CEO should take every opportunity to personally express to the company's employees his or her belief that worker safety and health is the company's top priority.
- At every company meeting, safety and health should be the first topic of discussion.
- In smaller companies, the CEO should participate in new worker safety orientation training sessions by describing the company's commitment to providing workers with a safe and healthy work environment. This is also a good time to make it clear that the workers play a major role in helping the company achieve its safety goals. The CEO should take the time to describe the company's safety incentive program and disciplinary action program. In larger companies, a senior supervisor or safety director should deliver the same message.
- The CEO should publicly recognize each worker who earns a safety incentive award and should present awards at a well-attended company meeting.
- The CEO should start every large-scale company safety meeting with a brief report on the company's safety performance.

3. Worker Training Requirements

Safety and health training provides workers with the information they need to protect themselves from job site hazards. Safety and health training is a major key to keeping workers safe on the job site. To be effective, training must be:

- Relatively short in duration;
- Conducted during regular working hours;
- Specific to the workers' industry; and
- As appealing as possible.

Training should include at a minimum:

- New worker safety orientation;
- Weekly toolbox safety talks; and
- Task specific training as required by OSHA.

4. Disciplinary Action

A disciplinary action policy is an established course of action to be taken when workers fail to comply with safe work rules and other company policies. The policy is important because it:

- Sends a message to the workers that unsafe acts will not be tolerated;
- Provides employers with a defense against discrimination claims in situations where workers must be discharged for committing unsafe acts;
- Gives employers an affirmative defense against OSHA citations and fines in many situations.

5. Safety Incentives

A safety incentive program has proven to be an effective management tool to heighten and maintain the awareness of workers with regard to job site safety and health. Safety incentives:

- Help workers stay aware of safety and health issues;
- Make workers more likely to spot safety and health hazards;
- Make workers more likely to address the safety and health hazards they observe;
- Make workers more likely to watch out for the safety and health of co-workers; and
- Help reduce the incidence of fraudulent injury/illness claims.

6. Substance Abuse and Drug Testing

Controlling substance abuse in the work place is another key to preventing workplace injuries. Workers who are under the influence of alcohol and/or drugs:

- Experience changes in the way they ordinarily think or approach problems;
- Find it difficult to concentrate;
- Lose their ability to make good judgments;
- Experience much slower reflexes;
- Lose depth perception; and
- Are four times more likely to be involved in a workplace accident.

7. Work Site Hazard Analysis

Before starting a new job the work area should be analyzed to determine:

- Whether one or more hazards already exists; or
- Whether hazards will be created by work to be performed.

An example of an existing hazard would be lack of oxygen in a confined space that must be entered by a worker. A work site hazard analysis would determine the need for air sampling and other safe confined space entry procedures so they can be planned accordingly.

An example of a hazard created by the work would be hot work in an area where combustible materials are stored. Performing hot work in the area creates a hazard. Without the hot work there is no hazard. A work site hazard analysis would determine the need to remove the combustible materials or isolate them from the heat, sparks and slag before work begins.

Implementing work site hazard analysis as a regular part of your safety program is not difficult to do. Most experienced supervisors and workers already do it to some degree without even thinking about it.

8. Accident/Incident Investigation

Management conducts the investigation of accidents and incidents that do not result in worker injury so that procedures or work rules can be established to prevent their recurrence. Thorough investigations help to determine the cause and identify factors that lead to the accident/incident. More than one supervisor should conduct the investigation.

9. Modified Duty

A modified duty policy is designed to bring workers who are receiving workers' compensation benefits back to work as soon as possible. Workers who are physically unable to perform their regular work tasks can usually perform less strenuous work tasks. For example, a worker with a low back muscle strain could inventory materials or answer telephones in a trailer or office.

By getting workers back to work as soon as possible, companies save a fortune in workers' compensation expenditures. It costs much less for companies to bring workers back on modified duty with full pay and benefits than it does to

allow them to stay home collecting workers' compensation benefits.

10. Recordkeeping

The Occupational Safety and Health Administration (OSHA) requires employers to keep records of occupational illnesses and injuries. In some situations, employers must also report them to OSHA.

In addition to MCAA's *Model Safety and Loss Prevention Program*, MCAA has many new, user-friendly safety and health resources written or produced specifically for the mechanical industry. For information on these resources or any safety topics or issues call MCAA at 301-869-5800.



Bulletin

Emergency Procedures

Introduction

Emergencies, disasters, accidents and injuries can occur at any time, usually without warning. Knowing what to do and what not to do in the event of an emergency is your individual and corporate responsibility. This guide is designed to acquaint you and your employees with a plan for handling most kinds of emergencies and the actions that should be taken to protect lives and property.

Being prepared for an emergency will help minimize its worst effects, especially panic and confusion. At a minimum, you and your employees should know the answers to the following questions:

1. Where are the exits?
2. How will visitors and employees with disabilities be evacuated?
3. Are vital records protected?
4. Where is the emergency plan, and where are the emergency phone numbers?
5. If the building has multiple floors, who will serve as the emergency coordinator?

Regardless of the emergency, **THINK BEFORE YOU ACT**, and then act quickly and decisively.

Emergency Phone Numbers

In case of emergency, call **9-1-1** (if lives and/or property are in immediate danger).

Additional contacts:

- Fire:** _____
- Police:** _____
- Ambulance:** _____
- Hospital:** _____
- Security:** _____
- Building Manager:** _____
- Safety Coordinator:** _____
- Poison Control:** _____

Safety Area:

Evacuation

1. If safe, secure vital records and shut down electrical equipment.
2. Proceed to your predetermined exit or alternate exit in an orderly fashion. Close all doors as you leave.
3. The emergency coordinator should make sure all staff and visitors evacuate the area.
4. Assist employees and visitors who are in need. If you are unable to provide assistance, notify

the Floor Warden or other emergency personnel of the problem and location.

5. **DO NOT USE ELEVATORS. USE THE STAIRS.**
6. **DO NOT OPEN DOORS THAT ARE HOT TO THE TOUCH OR IF SMOKE IS PRESENT.**
7. If you cannot avoid smoke to exit the building, stay low enough to the floor to keep your head below the smoke level.
8. Once outside the building, proceed to your designated safety area and stay there. Follow instructions of emergency personnel.

Evacuation of Disabled Persons:

Persons with disabilities may need assistance to reach safety. Explain the nature of the emergency and your plan to help them. If they are able to proceed alone, offer to assist others.

Persons with Physical Impairments may or may not use a wheelchair. If a person is in a wheelchair, move them to a safe area outside the building. Be aware that the person may have special equipment, such as a catheter, leg bags, braces, oxygen, prosthetics, etc.

Persons with Visual Impairments may need guidance out of the building. Explain the emergency, who you are and, as you walk, the direction you are turning, and any obstacles ahead.

Persons with Speech or Hearing Impairments may need help understanding the emergency and how to respond. Get their attention and write a brief note explaining the situation and what they need to do.

Fire

For large fires:

1. **ACTIVATE THE FIRE ALARM**, alert others, move everyone away from the area of the fire.
2. **LEAVE IMMEDIATELY!**
3. **CLOSE DOORS** to confine the fire as much as possible.
4. **CALL 9-1-1** as soon as possible to report the building address and location of the fire.

For small fires:

1. Alert others and move everyone away from the area of the fire.
2. Use fire extinguisher on the fire, only if safe to do so.
3. Notify the fire department that the fire is extinguished.
4. If you are unable to extinguish the fire, follow procedures for large fire (above).

If your clothing catches fire:

1. **STOP!**
2. **DROP!**
3. **ROLL!**

When a fire alarm is activated:

1. **Follow your Emergency Evacuation Procedures.**
2. **DO NOT USE ELEVATORS, USE STAIRS.**
3. Leave your personal possessions.
4. Proceed to the nearest exit.
5. Listen for emergency instructions.
6. Report to the safety area and wait for more information.

DO NOT RETURN TO BUILDING UNTIL INSTRUCTED TO DO SO.

If trapped in a room:

1. If the door or door knob is hot or smoke is visible, do not open.
2. If possible, place a damp cloth or towel at the base of the door (or something to block the opening) to prevent smoke from entering.
3. Close doors and windows to contain the smoke.
4. If available, place a cloth over your mouth and nose to filter out smoke.
5. Stay low enough to the floor to keep your head below the smoke level.
6. Do not open or break windows unless necessary to escape.

Fire Drill

It is recommended that the coordinator schedule a fire drill at least twice each year to be sure all employees are thoroughly familiar with fire emergency procedures. Before scheduling the first drill, the coordinator should brief all employees on the information contained in this bulletin.

The coordinator should record the amount of time it takes employees to evacuate the building. The coordinator should also check to see whether employees have reported to their designated area outside the building.

Be sure the building is secure before instructing employees to return.

Floods

In the event of a flood, either from an inside or outside source, take the following steps:

1. Notify the building supervisor.
2. To the extent possible, secure vital records.
3. If possible, shut off electrical power. Alternatively, avoid elec-

trical equipment – such as computers, copiers or other office equipment – and outlets that may be near flowing water.

4. If the source is inside the building, evacuate the building according to the evacuation instructions.
5. Do not reenter the building until instructed to do so.
6. If the source is outside the building, evacuate to the building's highest level or the roof, and await further instructions.

Tornados

Even with modern, sophisticated weather tracking systems, tornados can develop quickly and move very rapidly. In areas of the country where tornados are common, commercial buildings are usually equipped with shelters.

When a tornado warning sounds, proceed to the shelter as quickly as possible. Take a radio with you to keep track of the storm's location. Do not leave the building until the storm has passed.

If your building is not equipped with a shelter, take the following steps:

1. Go down to your building's basement or lowest level and get inside a storage room or similar windowless area.
2. Protect yourself from flying or falling debris.
3. If available, turn on a radio to track the storm and its status.
4. Do not leave the building until the storm has passed.

Medical Emergencies

If a person is in need of immediate medical attention, remain calm, and **call 9-1-1**. While you're

waiting for assistance and, depending on the victim's condition, take the following steps.

If the person is unconscious, check his/her breathing and pulse. If neither is detected and a defibrillator is available, apply it at once. If a defibrillator is not available, and if you are trained in CPR (cardio pulmonary resuscitation), clear the person's airway and begin recovery procedures.

If you are **not** trained in CPR, stay with the victim, call for help and stabilize the victim by keeping him/her warm.

If the person needs first aid, take appropriate steps to stabilize their condition until help arrives.

If the person is seriously injured:

1. Remain calm.
2. Do not allow the person to move or be moved.
3. To prevent shock, keep the person warm and elevate his/her legs if they are not injured.

Hazardous Materials Spill-Release

Mechanical, plumbing, and mechanical service contractors use a variety of hazardous substances in their work. You should have on file Material Safety Data Sheets (MSDS) for each hazardous substance used in your business. In the event of a spill or release, make available the appropriate MSDS to the fire department or remediation team that responds to the incident.

In the event of a spill or release of a hazardous substance:

1. Direct all personnel near the incident to evacuate the area immediately.
2. Notify the fire department.
3. Notify the building manager.
4. Do not attempt to clean up or otherwise handle the spilled/released material.
5. Wait for the fire department to arrive and direct personnel to the location of the spill/release.



Bulletin

Safety and Productivity: Does Improving One Increase the Other?

Introduction

For many years, a popular mantra in business, particularly construction oriented businesses, has been *safety, safety, safety*. And, for good reason. Companies that establish comprehensive safety programs will reduce worker accidents and injuries, and in so doing, the direct and indirect costs associated with such incidents.¹

Those costs can be significant. Direct costs are all costs covered by Workers' Compensation insurance, which include transporting injured workers, their hospitalization, prescription drugs, and wage replacement.

Indirect costs in construction are conservatively estimated to be 20 times the direct costs of accidents.² These include costs other than direct costs that cover the injured worker, the crew of the injured worker, crews in the vicinity, replacing the injured worker, damaged property, and administrative costs.

Reduced costs are not the only benefit that a company realizes when it establishes a comprehensive safety program. A review of the literature indicates that a company's productivity

also improves along with its business. A construction safety expert put it very succinctly:

"Those who work safely have higher productivity, less worker turnover, and less waste. Thus, the contractor who produces the best safety results should have the best bid, since it has numerous competitive cost advantages. The safer contractor will have lower overhead costs, insurance costs, labor costs, and also superior management methods and work practices."

"Additionally, contractors with bad safety records are going to be recognized as dangerous by the workers, resulting in higher labor turnover. Turnover adds to the costs of the unsafe contractor, through increased costs for training, increased production costs due to lower skill levels of his labor force, or increased accidents. Research has shown that newer workers have a higher rate of accidents on the job. Where there is no process to gauge the full value of the strength of a contractor's process at project inception, the final tally will prove that it would have been cheaper to hire the safer contractor."³

A Construction Users Roundtable study, "Improving Construction Safety Performance," reinforced the above statement. It said, "The high cost of accidents gives owners as construction users good reason to concern themselves with the safety efforts of the contractors they hire. Past research has shown that accidents are, to some extent, controllable by all levels of construction management. Reasonable reductions in the frequency and severity of accidents would lower the \$8.9 billion cost of accidents by as much as \$2.75 billion, or 8% of direct construction labor payroll a year. "

The study went on to say, "One way that an owner can carry out this responsibility is to hire contractors who have a record of good safety performance. A prospective contractor with a history of good safety performance is more likely to perform safely in the future than a contractor with a poor, or less-than-average, safety record." Furthermore, "Contractors who hold their management accountable for accidents, as well as productivity, costs, schedules, and quality generally have the best safety records."⁴

Apple Computer tracks time lost resulting from an employee injury and includes indirect as well as direct costs. For example, an employee with an eye injury goes to the hospital, goes through rehabilitation, and returns to work all at a cost to the company of \$10,000. Those are direct costs which detract from the company's profits. Apple's Miller says, "But we also incurred roughly four to five times those costs indirectly—through loss of productivity, hiring and training a temporary employee, and so forth."⁵

The following provides several examples of companies that instituted either safety programs that produced improved productivity, or established

quality management programs that achieved improved safety levels. Although none of the companies studied for this relationship were in the construction business, the benefits likely apply and the results are worth exploring.

The Link Between Safety and Productivity

The link between safety and productivity typically happens during the safety improvement process. To find hazards, every aspect of a production process must be examined, and in the process, inefficiencies, obstacles, sources of waste, and product defects are uncovered that reduce productivity. Thus, improved productivity and quality are by-products of the safety improvement process, and vice versa.⁶

For example, safety team members at a Georgia Gulf plant in Delaware City, DE, reported a common downward trend in both incidents and quality problems when they began the "Use Your Head to Erase All Dangers" program.⁵ Another example is the Phelps Dodge copper mine in Morenci, AZ, which, after changing its management approach, tripled its employee copper production while reducing its injuries sevenfold.⁷

Kerry, Inc., a multinational producer of specialty food ingredients, established a "Safety Improvement Program" (SIP) in its Covington, KY, plant and achieved significant gains in productivity. Existing information was reviewed, priorities were set, target completion dates were scheduled, and progress was evaluated at six-week intervals. A joint labor-management safety committee was established and management issued a statement of safety commitment. Injury investigations were expanded to include near-misses and Job Safety Analysis (JSA) was implemented. Employees

selected the “Top 5 Concerns,” and an incentive program was introduced.⁸

The results were startling. The injury/illness incidence rate decreased from 51.2 cases per 100 employees before the program to 9.6 after, an 81 percent decrease. The lost workdays incidence rate decreased from 417 per 100 employees before the program to 29 after, a 93 percent decrease. Workers compensation costs decreased from \$0.67 per employee-hour to \$.01, a 99 percent decrease.⁹

Pounds of product produced also increased more than 20 percent while the operating budget increased less than one percent per year. Product runs increased from an average of 7.8 days to 16.1 days. The equipment on-line percentage increased from 80.1 percent to 88.7 percent.¹⁰

Another example is U.S. Enrichment Corporation in Paducah, KY, a gaseous diffusion low level uranium enrichment plant employing 1,600 people. It is the only U.S. producer of fuel for commercial nuclear power plants.

“USEC developed a program called ‘Survive and Thrive,’ a modified Japanese 5S program based on the principle that a quality environment brings improved safety and productivity. ‘Survive and Thrive’ emphasizes planning, good housekeeping, standardization of work practices, communication, and discipline. Every employee is expected to report problems, which are reviewed and evaluated daily and appropriate action is taken. All employees have authority to stop work if they identify a hazard or detect a procedural error. USES has also established a joint labor-management safety committee to evaluate progress. A substantial capital investment was made to upgrade facilities to meet regulatory

requirements.¹¹”

The program produced significant improvements in productivity and safety. Over six years, injury frequency rates decreased 67 percent from 8.31 cases per 100 employees to 3.07. The lost workday cases incidence rate also decreased 73 percent from 4.1 per 100 employees to 1.1. Productivity per employee increased 24 percent. Total output almost tripled. There is now 100 percent on-time delivery of product. Costs have decreased 20 percent over five years.¹²

International Paint in Taipei, Taiwan, is a manufacturing company with about 100 employees. In April 1995, it instituted a health and safety program which included management commitment, training, engineering, enforcement, and incentives. A health and safety committee was established to conduct hazard identification audits. Two-way communication between workers and managers improved, and line manager responsibility was enhanced. By the end of 1997, occupational injury and illness incidence rates decreased from 33.5 to 10.2 while productivity increased from 100.8 kg per employee-hour to 115.1.¹³

Common Factors of Success

The fundamental prerequisite for success common to all these cases was commitment from top management. Other essentials include establishing a clear plan of action and involving all employees in the program.

Most of the companies began by establishing baseline data. Three areas were usually covered: a review of compliance with mandatory standards or regulatory requirements; a review of injury/illness data for prioritization of problems—frequency, severity, and

cost; and a review of injury investigations for causal factor information.

Then, hazards were identified by one or more of several means either by employees who were familiar with the processes and procedures, or by audits, or by Job Safety Analysis (JSA), or Job Hazard Analysis.

Enlisting participation and cooperation of all employees in the program followed. That occurred either through the establishment of a safety committee (involving workers and management) or through the establishment of an incentive campaign (i.e., reinforcement of behaviors).

Successful implementation of safety and health programs rested on several common factors including detailed plans and objectives, assigned responsibility, and effective two-way communication. In these cases, implementation of the safety and health programs also included engineering modifications to equipment and facilities; written procedures based on JSA; written standards and guidelines; regulatory compliance programs; and employee training (on standards, procedures, and guidelines).¹⁴

The key to making it all work is continuous review, evaluation, and improvement through observation of safe practices and procedures, audits, inspections, and monitoring of participation at all levels.

References

¹Jim Bifulco, "Safety Saves Lives and Dollars," from *New York Construction News*, March 2001 (accessed via <http://www.totalsafety.org/nycnmar01.html>).

²Ibid.

³Ron Prichard, "Debunking the 13 Myths of Construction Safety," International Risk Management Institute [electronic bulletin

board], May 2002. (accessed from <http://www.irmi.com/Expert/Articles/2002/Prichard05.aspx>).

⁴"Improving Construction Safety Performance," (Report A-3), Construction Users Roundtable, Cincinnati, OH, Reprinted July, 1990, p. 1

⁵David Murray, "Why Managers Buy In to Safety," *Safety + Health*, September 1998.

⁶A. Hoskin, "The Role of Safety in Improving Productivity: Case Studies from Six Countries," National Safety Council, USA (November 25, 2002), p 1.

⁷"Integration of Total Quality Management and Safety Systems," Center for Quality and Productivity Improvement, page 13 (accessed from <http://cqpi2.engr.wisc.edu/cprc/background.html>)

⁸Ibid.

⁹A. Hoskin, pp. 1-2.

¹⁰Ibid.

¹¹Ibid.

¹²A. Hoskin, pp. 3-4.

¹³Ibid.

¹⁴A. Hoskin, p. 4.



Bulletin

Proactive Safety Approach

INTRODUCTION

Positive – Awareness – Coaching – Teamwork (P.A.C.T.) is a proactive approach to safety in the workplace. It developed from one company's dedication and commitment to making safety a top priority. This guide will help your company develop a comprehensive safety plan or improve an existing one.

P.A.C.T. was developed by Nooter Construction Company (Bensalem, PA) over a six-year period, beginning in 1996. The company designed the program to be comprehensive and to involve all employees, from top management down. **P.A.C.T.** was to become an integral part of Nooter's corporate culture.

Most important, however, is that **P.A.C.T.** is effective. Before the program was initiated, Nooter's Recordable Incident Rate was 6.7; by the end of 2001, the rate had dropped to 1.89.

In recognition of its achievement, MCAA presented Nooter with the **2002 E. Robert Kent Award for Management Innovation at MCAA 2003**. In the spirit of the award, this bulletin describes the components of **P.A.C.T.** so that the industry may benefit.

POSITIVE

Positive stands for a proactive safety attitude, focused on planning, rather than reacting to, project safety issues. Through positive reinforcement of the plan (i.e. rewarding execution through incentives), the program becomes self-sustaining.

The first steps in implementing the **P.A.C.T.** program involve an internal review of a company's existing safety incentive program to determine how it could be strengthened to achieve 100 percent effectiveness. The plan should take into account all of the levels of the company's safety program, its procedures, as well as basic benchmarks (i.e. Zero Recordable Incidents). The plan should also incorporate team-based awards to foster the teamwork concept. An important component is to reward employees for safe behaviors when they occur.

Finally, the company philosophy should revolve around positive reinforcement. A key element behind the success of the **P.A.C.T.** program is that employees feel comfortable identifying safety issues without fear of retribution. Open communication between managers and employees is, therefore, essential.

AWARENESS

Awareness stands for a new mindset among all members of a project. This is accomplished by educating project managers about the company's safety expectations.

Using the **P.A.C.T.** principals, Nooter created a *Performance Evaluation Table* which assesses the teams' overall participation in the program (see Exhibit A). Each row represents a specific *Performance Indicator* crucial to the success of the overall program, and each Performance Indicator is weighted according to its affect on the overall process. The Performance Indicators are as follows:

- **Recordable Incident Rate:** All injuries that can be recorded.
- **Total Incident Rate:** The total number of incidents, including minor injuries (i.e., such as those requiring First Aid).
- **Near Miss Report:** All possible incidents.
- **Foreman Training:** Evaluates the foremen and how well they understand the **P.A.C.T.** process (See Coaching below):
- **Craft Training:** Evaluates the employees on a specific project, their initial, as well as continual, training throughout the project.
- **Job Pre-Plan:** Completion of two major documents – *Site Specific Safety Plan* and *Job Hazard Analysis*.
- **Job Safety Analysis:** This dynamic document is the heart of the **P.A.C.T.** process and determines how well defined safety concerns are on a specific project.
- **Inspections:** Indicates how often audits are performed on the process (it is recommended that audits be performed weekly).

- **Surveys:** Performed by craft employees to foster continual improvement in the **P.A.C.T.** process.
- **Lessons Learned:** After a project is completed, the project team meets to discuss safety procedures that worked well and those that need improvement. The resulting information is shared with all company employees to promote more effective safety procedures on projects.
- **Cooperative Committee:** A monthly review across all levels of management and customers regarding the **P.A.C.T.** process.

Foremen/supervisors evaluate the teams' performance in each of the Performance Indicators and scores are given indicating proficiency. To obtain a score, the foreman/supervisor uses his/her best professional judgment in choosing the Performance Level that pertains to the proficiency achieved in each of the Performance Indicators and then multiplies it times the weight assigned. The score provides a benchmark as teams/individuals/projects develop their safety proficiency. The score also indicates areas where teams require additional training.

COACHING

Coaching is about improving the safety skill sets of all project members. Through foremen training in hazard recognition, as well as an effective job plan (also known as a Job Safety Analysis (JSA), crew members learn how to identify job site hazards and prevent accidents. If a job accident was to occur, foremen and crewmembers are not only trained to participate in incident investigations, but also are able to learn from them.

This training is conducted by the project superintendent, the onsite safety representative, and the regional safety manager. Before each job begins, all the

foremen receive this training and participate in the pre-job walk-through.

The **main points** stressed during the Foreman Training are as follows:

- **Foremen's role** during the project
 - **Lead by Example**, such as complying with all safety rules, procedures, and policies; report and correct unsafe conditions in the workplace; ensure employees report all incidents; and make sure injuries are treated promptly.
 - **Hazard Analysis**, which includes identifying hazards that the crew will encounter, hazards that the owner/general contractor can control, as well as job specific concerns that should be addressed before the crew begins to work at a job site.
 - **Job Safety Analysis**, a dynamic document that reviews critical activities to be performed on the job site at any given time. The JSA is reviewed at the beginning of the shift, as well as at mid-shift. It allows the foremen to communicate to the crew the hazards associated with the day's activities and the controls that will be used to eliminate or lessen the degree of the hazard present. This process ensures that the necessary **measures** will be put in place to protect the crew at all times during the workday. These measures are as follows:
 - **Engineering**, which looks at ways to eliminate or reconfigure certain tasks to reduce possible hazard exposure.
 - **Substitution**, which can recommend a lesser hazard potential process to the crew.
 - **Personal Protective Equipment**, which, as a last resort, protects the crew from the hazard itself.
- **Inspections must be performed** to maintain the integrity of the JSA. The corrective action of the inspections of both materials and personnel fall into the 3-T's: **Treat** (fix the item), **Terminate** (remove the item), and/or **Tolerate** (warn the employee of the hazard and take steps to mitigate potential incidents until it can be eliminated). Sample inspections/audits could cover the following:
 - Fire protection
 - Housekeeping,
 - Compressed gas
 - Electrical
 - Rigging
 - Overhead crane use
 - **Incident Investigation deals with the JSA.** However, this is where the foreman can receive the proper forms to record all of the facts associated with an incident. Team attitude should be to communicate all information. Defining fault is not the primary purpose of the Incident Investigation.
 - **Emergency Response**, which details the company's emergency response plan. At a minimum, it should include the following:
 - **Shutdown** all ignition sources;
 - **Evacuate** to primary meeting area;
 - Immediate supervisor shall **take roll of crew present** and report to superintendent;
 - **Resume work** once all is clear.

In summary, the foremen need to realize the importance of their daily interaction in the field. This is stressed through emphasizing that the foremen must lead by example, review any hazards present, attempt to control or abate these hazards, inspect the jobsite daily, keep accurate incident investigations, and have an emergency response plan known to all jobsite crew. By maintaining a safe work environment using the **P.A.C.T.** approach,

the foremen will realize that the results of their actions will have a positive impact on their project, the company, and most importantly, will aid in reducing incidents, injury costs, and downtime.

TEAMWORK

Finally, **Teamwork** stands for the ability to improve the safety teamwork for all parties involved in a project. This is accomplished by establishing an onsite safety communications committee that works with all levels on a project to abate any hazards before work begins.

FEEDBACK/DEVELOPMENT

To ensure continual improvement in safety performances, "Safety Perception Surveys" should be developed to elicit feedback from employees, customers, and subcontractors. Completed anonymously, participants can offer honest feedback on a variety of topics including:

- Knowledge and understanding of management's safety goals
- Employee involvement
- Communication of the safety message
- Corrective action when problems are presented
- Rewards/motivation to participate

Moreover, in-house reviews of projects complete the process by bringing out valuable learning points, re-emphasizing positive characteristics of the JSA, reviewing and extrapolating better ideas for the field, and communicating these ideas back to the team while reinforcing the team concept. Major topics of discussion can include:

- **Safety:** How effective were the safety rules, JSA?
- **Quality:** Did the process allow for a better quality project?

- **Contracts:** From bid to turnover, were there any issues that needed review?
- **Scheduling:** Was there full buy-in on the overall plan of the project?
- **Accounting:** Were cost controls in place and reviewed?
- **Field Service:** Were tools orderly, proper, and timely received?
- **Rigging:** Was the rigging performed safely and without incident?

- **Execution:** Overall, what aspects of the project (manpower, communication, problem solving, etc.) were positive, and what aspects needed more work?
- **Customer Review:** What concerns or issues were effective? Where should changes be made to improve interaction with this customer?

ADDITIONAL RESOURCES

As you develop or enhance the curriculum for the safety training component of your company's **P.A.C.T.** program, consider using the safety training resources available from MCAA. Visit www.mcaa.org/store to download our latest catalog or sign in to the members-only online store. (To obtain a password for the store, visit www.mcaa.org/password.)

Management Methods Manual Bulletin SF 1, What's Involved in a Company Safety Program.

Exhibit A

PERFORMANCE EVALUATION TABLE

Performance Indicators	PERFORMANCE LEVEL											Calculations		
	0	1	2	3	4	5	6	7	8	9	10	Level	Wt.	Score
Recordable Incident Rate	>1.0	0.99 - .90	.89 - .80	.79 - .70	.69 - .60	.59 - .50	.49 - .40	.39 - .30	.29 - .20	.19 - .10	0		10%	
Total Incident Rate	>4.0	3.9 - 3.7	3.6 - 3.3	3.2 - 2.9	2.8 - 2.5	2.4 - 2.1	2.0 - 1.7	1.6 - 1.1	1.0 - 0.6	0.5 - 0.1	0		10%	
Near Miss Report	0 - 9%	10 - 19%	20 - 29%	30 - 39%	40 - 49%	50 - 59%	60 - 69%	70 - 79%	80 - 89%	90 - 99%	100%		10%	
Foremen Training	0 - 9%	10 - 19%	20 - 29%	30 - 39%	40 - 49%	50 - 59%	60 - 69%	70 - 79%	80 - 89%	90 - 99%	100%		15%	
Craft Training	0 - 9%	10 - 19%	20 - 29%	30 - 39%	40 - 49%	50 - 59%	60 - 69%	70 - 79%	80 - 89%	90 - 99%	100%		10%	
Job Pre-Plan	0 - 9%	10 - 19%	20 - 29%	30 - 39%	40 - 49%	50 - 59%	60 - 69%	70 - 79%	80 - 89%	90 - 99%	100%		10%	
JSA	0 - 9%	10 - 19%	20 - 29%	30 - 39%	40 - 49%	50 - 59%	60 - 69%	70 - 79%	80 - 89%	90 - 99%	100%		10%	
Inspections	0 - 9%	10 - 19%	20 - 29%	30 - 39%	40 - 49%	50 - 59%	60 - 69%	70 - 79%	80 - 89%	90 - 99%	100%		10%	
Surveys	0 - 9%	10 - 19%	20 - 29%	30 - 39%	40 - 49%	50 - 59%	60 - 69%	70 - 79%	80 - 89%	90 - 99%	100%		10%	
Lessons Learned	0 - 9%	10 - 19%	20 - 29%	30 - 39%	40 - 49%	50 - 59%	60 - 69%	70 - 79%	80 - 89%	90 - 99%	100%		5%	
Coop / TriPart Mtg	0 - 9%	10 - 19%	20 - 29%	30 - 39%	40 - 49%	50 - 59%	60 - 69%	70 - 79%	80 - 89%	90 - 99%	100%		5%	
Total Score													100%	



Bulletin

Suggested Subsubcontract Form

INTRODUCTION

In 2009, ConsensusDocs introduced the first industry-standard, lower-tier subsubcontract form. The Consensus 725 form was revised in 2011, and is attached for reference (CDS725). The CDS725 provides a fairly simple agreement governing the lower tier subsubcontractor's work. The form is short and is a much streamlined version of upstream industry subcontracts such as the ConsensusDocs 750 or the AIA A401. The CDS725 is a good start for a lower tier subsubcontract, but subcontractors must insure all issues important to them are covered. Below are some items which might be considered:

Subsubcontract Documents:

The CDS725, Article 4 includes a reference to Exhibit B, the list of documents incorporated into the subsubcontract by reference. This exhibit should be carefully completed to insure all necessary upstream documents are listed.

Subsubcontractor's Insurance:

The CDS725, Article 4 includes a reference to Exhibit E, the insurance requirements to be fulfilled by the subsubcontractor (see attached). This exhibit should be carefully completed to secure adequate protection to the subcontractor as well as to fulfill any and

all upstream obligations to the contractor and owner as may be set forth in the upstream contract documents incorporated in to the subcontract.

Owner or Contractor Directed Change Orders:

The CDS725 does not discuss change orders other than those directed in writing by the subcontractor. A subcontractor might therefore assume the risk of directing its subsubcontractor to proceed with an owner or contractor change, with no assurance that the subcontractor itself will be paid for the change order. If this is of concern, the subcontractor may wish to include a separate section under the CDS725 Article 8 specifically addressing changes directed by the Owner or Contractor. For example:

Notwithstanding the above, changes ordered, schedule changes or extra work directed by Owner or Contractor shall be performed and paid for in accordance with the applicable terms of the agreement between Subcontractor and Contractor including all rights of dispute and appeal. Receipt by Subcontractor of payment and/or schedule adjustments from Contractor for such change orders, schedule changes or extra work is an express condition precedent to

any Subcontractor obligation to make payments to Subsubcontractor or adjust the Subsubcontract progress schedule for the same.

The subcontractor should verify that such clauses are permissible and enforceable in the jurisdiction where the project is located.

Specific Partial and Final Release Forms:

The CDS725 does not include a requirement that subsubcontractors submit specific form releases as a condition to payment. The CDS725 can be modified to include, as an additional exhibit listed in Article 4, specific release forms as necessary. This is especially important if the contractor requires the subcontractor to provide such forms from all lower tier subsubcontractors. An example of such a clause might be inserted at the end of the third sentence in Article 9.2:

Subsubcontractor shall furnish any other lien releases, waivers, affidavits or other documents as required by the Subsubcontract Documents as set forth in Exhibit B and/or as required to keep the Owner's premises free from claims, bond claims, encumbrances, or liens of all materialmen, lower tier subcontractors or laborers.

Subsubcontractor shall also furnish written releases, waivers, affidavits or other documents in the forms attached as Exhibit ___ from all persons, firms, or corporations that have furnished to the Subsubcontractor, any labor, services, equipment and materials, whether on or for the Project.

Subsubcontractor shall turn its work over to Subcontractor in good condition and free and clear of all claims, bond claims, encumbrances, or liens and shall defend, indemnify

and hold harmless Subcontractor, Contractor and Owner from all claims, bond claims, encumbrances or liens arising out of the performance of the Subsubcontractor's work. The Subsubcontractor shall, at its own cost and expense (including attorney's fees), defend all suits to establish such claims, bond claims, encumbrances, or liens, and pay any such claims or liens so established. In the event of failure by the Subsubcontractor to comply with this requirement, Subcontractor may, at its sole discretion, pay such claims or bond off any liens. All costs of such action, including attorney's fees incurred by Subcontractor shall be charged to the account of the Subsubcontractor.

Conditional Payment Clause:

There is no "pay if paid" condition precedent clause in the CDS725. If permissible and enforceable in the jurisdiction where the project is located, this may be a desirable modification to the CDS725 in order to clarify that payments will be made to subsubcontractors only after the condition precedent of the subcontractor receiving payment from the contractor is satisfied (for further discussion of "pay if paid" clauses, see the MCAA Methods Manual **Contract Clauses, LL 11**).

A sample condition precedent payment clause to include in CDS725 in lieu of the last sentence of Article 9.2 might be:

Actual receipt by Subcontractor of payment from Contractor for Subsubcontractor's work is an express condition precedent to any Subcontractor obligation to make payments to Subsubcontractor. Final payment shall be due only after completion of all work, acceptance by the Subcontractor, Contractor and Owner, compliance with all

Subsubcontract obligations and Subcontractor's receipt of final payment from the Contractor, which items shall be conditions precedent to the making of final payment to Subsubcontractor.

More Detailed Warranty Provision:

Depending on the nature of the lower tier subcontract, it may be prudent to include a specific warranty clause. For example:

Subsubcontractor shall furnish all warranties and guarantees and all other documents required by the Subsubcontract Documents as set forth in Exhibit B for the Subsubcontractor's work. The Subsubcontractor shall protect the Subcontractor, Contractor and the Owner against any loss or damage arising from any defects in material or workmanship furnished by it under this Subsubcontract for a period as set forth in the (1) plans, specifications and addenda, (2) Subsubcontract Documents as set forth in Exhibit B or (3) for a period of one year from Final Completion of the entire project, whichever is greatest, and Subsubcontractor agrees to replace any defective material and correct any defect in the its work when requested to do so.

Potential Upstream Delay/Liquidated Damages:

CDS725, Article 13.2 has a place to fill in upstream liquidated damages or other delay damages information that might be important to flow-down to the Subsubcontractor. Be sure to complete this article as appropriate.

The attached CDS725 presents a good option for lower tier subsubcontracts. It is better than relying on verbal agreements or signing the subsubcontractor's forms. The CDS725 may also be more practical than modifying industry upstream subcontract forms like the AIA A401 or the CDS750, especially for lower tier subsubcontracts of limited scope and complexity.

The information in this bulletin should not be construed as legal advice. A person should contact their local counsel for specific legal advice regarding the information contained in this bulletin.



ConsensusDocs™
BUILDING A BETTER WAY

ConsensusDocs™ 725 **STANDARD AGREEMENT BETWEEN SUBCONTRACTOR AND SUBSUBCONTRACTOR**

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ConsensusDocs 725

STANDARD AGREEMENT BETWEEN SUBCONTRACTOR AND SUBSUBCONTRACTOR



Job No.: []

Account Code []

This Agreement is made this [] day of [], [] by the

SUBCONTRACTOR, []

and the

SUBSUBCONTRACTOR, [].

CONTRACTOR: [].

PROJECT: [].

OWNER: []

DESIGN PROFESSIONAL: []

Notice to the Parties shall be given at the above addresses.



1. SUBSUBCONTRACT WORK Subsubcontractor shall perform Subsubcontract Work under the general direction of Subcontractor and shall cooperate with Subcontractor so Subcontractor may fulfill obligations to Contractor. Subsubcontractor to provide:

[] (Brief Description of Subsubcontract Work), as more fully described in Exhibit A.

2. SUBSUBCONTRACT AMOUNT Subcontractor agrees to pay Subsubcontractor for satisfactory and timely performance and completion of Subsubcontract Work:

3. INSURANCE Subsubcontractor shall purchase and maintain insurance that will protect Subsubcontractor from claims arising out of Subsubcontractor operations under this Agreement, whether the operations are by Subsubcontractor, or any of Subsubcontractor's consultants or subcontractors or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Subsubcontractor shall provide Workers Compensation, coverage and limits of liability as set forth in Exhibit E.

4. EXHIBITS The following Exhibits are incorporated by reference and made part of this Agreement:

EXHIBIT A: Subsubcontract Work, [] pages.

EXHIBIT B: Drawings, Specifications, General, Special, Supplementary, and other conditions, and addenda. (Attach a complete listing by title, date and number of pages.)

EXHIBIT C: Progress Schedule, [] pages.

EXHIBIT D: Alternates and Unit Prices, include dates when alternates and unit prices no longer apply, [] pages.

EXHIBIT E: Insurance Provisions, [] pages.

EXHIBIT []: Other, [], [] pages.

5. SAFETY To protect persons and property, Subsubcontractor shall establish a safety program implementing safety measures, policies and standards conforming to (a) those required or recommended by governmental and quasi-governmental authorities having jurisdiction and (b) requirements of this Agreement. Subsubcontractor shall keep project site clean and free from debris resulting from Subsubcontract Work.

6. ASSIGNMENT Subsubcontractor shall not assign the whole or any part of Subsubcontract Work or this Agreement without prior written approval of Subcontractor.

7. TIME

7.1. TIME IS OF THE ESSENCE Time is of the essence for both parties. The parties agree to perform their respective obligations so that the Project may be completed in accordance with this Agreement. The term Day shall mean calendar day unless otherwise specifically defined.

7.2. SUBCONTRACT PROGRESS SCHEDULE In consultation with Subsubcontractor, the Subcontractor shall prepare the schedule for performance of Subcontractor's work (Subcontract Progress Schedule) and shall revise and update such schedule, in accordance with Subcontractor's project schedule requirements and as necessary, as Subcontractor's work progresses. Subsubcontractor shall provide Subsubcontract Work scheduling information and shall revise and update as the project progresses. Subcontractor and Subsubcontractor shall be bound by the



Subcontract Progress Schedule. The Subcontract Progress Schedule and all subsequent changes and additional details shall be submitted to Subsubcontractor reasonably in advance of required performance. Subcontractor shall have the right to determine and, if necessary, change the time, order and priority in which various portions of Subsubcontract Work shall be performed and all other matters relative to Subsubcontract Work.

8. CHANGE ORDERS When Subcontractor orders in writing, Subsubcontractor, without nullifying this Agreement, shall make any and all changes in Subsubcontract Work, which are within the general scope of this Agreement. Any adjustment in the Subsubcontract Amount or time of performance shall be authorized by a Change Order. No adjustments shall be made for any changes performed by Subsubcontractor that have not been ordered by Subcontractor. A Change Order is a written instrument prepared by Subcontractor and signed by Subsubcontractor stating their agreement upon the change in Subsubcontract Work. If commencement and/or progress of Subsubcontract Work is delayed without the fault or responsibility of Subsubcontractor, the time for Subsubcontract Work shall be extended by Change Order to the extent obtained by Subcontractor, and the Subsubcontract Progress Schedule shall be revised accordingly.

9. PAYMENT

9.1. SCHEDULE OF VALUES As a condition of payment, Subsubcontractor shall provide a schedule of values satisfactory to Subcontractor not more than fifteen (15) Days from the date of this Agreement.

9.2. PROGRESS AND FINAL PAYMENTS Progress payments, less retainage, shall be made to Subsubcontractor, for Subsubcontract Work satisfactorily performed, no later than seven (7) Days after receipt by Subcontractor of payment from Contractor for Subsubcontract Work. Final payment of the balance due shall be made to Subsubcontractor no later than seven (7) Days after receipt by Subcontractor of final payment from Contractor for Subsubcontract Work. These payments are subject to receipt of such lien waivers, affidavits, warranties, guarantees or other documentation required by this Agreement, Subcontractor or Contractor. If payment from Contractor for such Subsubcontract Work is not received by Subcontractor, through no fault of Subsubcontractor, Subcontractor will make payment to Subsubcontractor within a reasonable time for Subsubcontract Work satisfactorily performed.

9.3. RETAINAGE Retainage shall be [] percent ([]%), which is equal to the percentage retained from Subcontractor's payment by Contractor for Subsubcontract Work. If the Subsubcontract Work is satisfactory and the Subsubcontract Documents provide for reduction of retainage at a specified percentage of completion, the Subcontractor's retainage shall also be reduced when the Subcontract Work has attained the same percentage of completion and the Contractor's retainage for the Subcontract Work has been so reduced by the Owner.

9.4. PAYMENTS WITHHELD Subcontractor may reject a Subsubcontractor payment application or withhold amounts from previously approved Subsubcontractor payment application, in whole or in part, as may reasonably be necessary to protect Subcontractor from loss or damage based upon the following to the extent Subsubcontractor is responsible: (a) failure to timely perform Subsubcontract Work, (b) properly pay subcontractors or suppliers, (c) promptly correct rejected, defective or nonconforming Subsubcontract Work, or (d) third-party claims involving the Subsubcontractor or reasonable evidence demonstrating that third-party claims are likely to be filed unless and until the Subsubcontractor furnishes the Subcontractor with adequate security in the form of a surety bond,



letter of credit or other collateral or commitment which is sufficient to discharge such claims if established.

9.5. **PAYMENT DELAY** If Subcontractor has received payment from Contractor and, if for any reason not the fault of Subsubcontractor, Subsubcontractor does not receive a progress payment from Subcontractor within seven (7) Days after the date such payment is due, or if Subcontractor has failed to pay Subsubcontractor within a reasonable time for Subsubcontract Work satisfactorily performed, Subsubcontractor, upon giving seven (7) Days' written notice to Subcontractor, and without prejudice to and in addition to any other legal remedies, may stop work until payment of the full amount owing to Subsubcontractor has been received. Subsubcontract Amount and time of performance shall be adjusted by the amount of Subsubcontractor's reasonable and verified cost of shutdown, delay and startup, and shall be effected by an appropriate Change Order.

9.6. **WAIVER OF CLAIMS** Final payment shall constitute a waiver of all claims by Subsubcontractor relating to Subsubcontract Work, but shall in no way relieve Subsubcontractor of liability for warranties, or for nonconforming or defective work discovered after final payment, nor relieve the Subcontractor for claims made in writing by the Subsubcontractor prior to its application for final payment as unsettled at the time of such payment.

10. **INDEMNITY** To the fullest extent permitted by law, Subsubcontractor shall indemnify and hold harmless Subcontractor, Subcontractor's other subcontractors, Contractor, Design Professional, Owner and their agents, consultants, employees and others as required by this Agreement from all claims for bodily injury and property damage other than the Subsubcontract Work itself that may arise from performance of Subsubcontract Work but only to the extent caused by the negligent acts or omissions of Subsubcontractor, Subsubcontractor's subcontractors or anyone employed directly or indirectly by any of them or by anyone for whose acts any of them may be liable.

11. SUBCONTRACTOR'S RIGHT TO PERFORM SUBSUBCONTRACTOR'S RESPONSIBILITIES AND TERMINATION OF AGREEMENT

11.1. **FAILURE OF PERFORMANCE** Should Subsubcontractor fail to satisfy contractual deficiencies or to commence and continue satisfactory correction of the default with diligence or promptness within three (3) business Days from receipt of Subcontractor's written notice, then Subcontractor, without prejudice to any right or remedies, shall have the right to take whatever steps it deems necessary to correct deficiencies and charge the cost thereof to Subsubcontractor, who shall be liable for such payment, including reasonable overhead, profit and attorneys' fees. In the event of an emergency affecting safety of persons or property, Subcontractor may proceed as above without notice, but Subcontractor shall give Subsubcontractor notice promptly after the fact as a precondition of cost recovery.

11.2. **TERMINATION BY OWNER** Should Owner terminate the prime agreement or should Contractor terminate the subcontract agreement, or any part which includes Subsubcontract Work, Subcontractor shall notify Subsubcontractor in writing within three (3) business Days of termination and, upon written notification, this Agreement shall be terminated and Subsubcontractor shall immediately stop Subsubcontract Work, follow all of Subcontractor's instructions, and mitigate all costs. In the event of such termination, Subcontractor liability to Subsubcontractor shall be limited to the extent of Subcontractor recovery on Subsubcontractor's behalf under the subcontract agreement. Subcontractor agrees to cooperate with Subsubcontractor, at Subsubcontractor's expense, in the prosecution of any Subsubcontractor claim arising out of Owner or Contractor termination and to



permit Subsubcontractor to prosecute the claim, in the name of Subcontractor, for the use and benefit of Subsubcontractor, or assign the claim to Subsubcontractor.

11.3. TERMINATION BY SUBCONTRACTOR If Subsubcontractor fails to commence and satisfactorily continue correction of a default within three (3) business Days after written notification issued under section 11.1, then Subcontractor may, in lieu of or in addition to section 11.1, issue a second written notification, to Subsubcontractor. Such notice shall state that if Subsubcontractor fails to commence and continue correction of a default within seven (7) Days of the written notification, the Agreement will be deemed terminated. A written notice of termination shall be issued by Subcontractor to Subsubcontractor at the time Subsubcontractor is terminated. Subcontractor may furnish those materials, equipment and/or employ such workers or subcontractors as Subcontractor deems necessary to maintain the orderly progress of Subcontractor's work. All costs incurred by Subcontractor in performing Subsubcontract Work, including reasonable overhead, profit and attorneys' fees, costs and expenses, shall be deducted from any monies due or to become due Subsubcontractor. Subsubcontractor shall be liable for payment of any amount by which such expense may exceed the unpaid balance of the Subsubcontract Amount. At Subsubcontractor's request, Subcontractor shall provide a detailed accounting of the costs to finish Subsubcontract Work.

11.4. TERMINATION BY SUBSUBCONTRACTOR If Subsubcontract Work has been stopped for thirty (30) Days because Subsubcontractor has not received progress payments or has been abandoned or suspended for an unreasonable period of time not due to the fault or neglect of Subsubcontractor, then Subsubcontractor may terminate this Agreement upon giving Subcontractor seven (7) Days' written notice. Upon such termination, Subsubcontractor shall be entitled to recover from Subcontractor payment for all Subsubcontract Work satisfactorily performed but not yet paid for, including reasonable overhead, profit and attorneys' fees, costs and expenses. However, if Contractor has not paid Subcontractor for the satisfactory performance of Subsubcontract Work through no fault or neglect of Subcontractor, and Subsubcontractor terminates this Agreement under this article because it has not received corresponding progress payments, Subsubcontractor shall be entitled to recover from Subcontractor, within a reasonable period of time following termination, payment for all Subsubcontract Work satisfactorily performed but not yet paid for, including reasonable overhead and profit. Subcontractor's liability for any other damages claimed by Subsubcontractor under such circumstances shall be extinguished by Subcontractor pursuing said damages and claims against Contractor, on Subsubcontractor's behalf, in the manner provided for in section 11.2.

12. BONDS Performance and Payment Bonds [] are/[] are not required of the Subsubcontractor. Such bonds shall be issued by a surety admitted in the State in which the Project is located and must be acceptable to Subcontractor. Subcontractor's acceptance shall not be withheld without reasonable cause. The penal sum of the Payment Bond shall equal the penal sum of the Performance Bond.

13. CLAIMS AND DISPUTES

13.1. CLAIMS RELATING TO SUBCONTRACTOR Subsubcontractor shall give Subcontractor written notice of all claims within seven (7) Days of Subsubcontractor's knowledge of facts giving rise to the event for which claim is made; otherwise, such claims shall be deemed waived. All unresolved claims, disputes and other matters in question between Subcontractor and Subsubcontractor shall be resolved in the manner provided in this Agreement.



13.2. DAMAGES If assessed against a Subcontractor, Subsubcontractor may be assessed a share of the damages in proportion to Subsubcontractor's share of responsibility for the delay for the following liquidated or other damages as follows:

However, the amount of such assessment shall not exceed the amount assessed against Subcontractor. Nothing in this Agreement shall be construed to limit Subsubcontractor's liability to Subcontractor for Subcontractor's actual delay damages caused by Subsubcontractor's delay. The Subcontractor and Subcontractor agree to waive all claims against each other for any consequential damages that may arise out of or relate to this Agreement, except for those specific items of damages excluded from this waiver identified above.

13.2.1. SUBCONTRACTOR CAUSED DELAY Nothing in this Agreement shall preclude Subsubcontractor's recovery of delay damages caused by Subcontractor.

13.3. WORK CONTINUATION AND PAYMENT Unless otherwise agreed in writing, Subsubcontractor shall continue Subsubcontract Work and maintain the Progress Schedule during any dispute resolution proceedings. If Subsubcontractor continues to perform, Subcontractor shall continue to make payments in accordance with this Agreement.

13.4. MULTIPARTY PROCEEDING The Parties agree, to the extent permitted by the prime agreement or subcontract agreement, that all Parties necessary to resolve a claim shall be Parties to the same dispute resolution proceeding. To the extent disputes between Subcontractor and Subsubcontractor involve in whole or in part disputes between Subcontractor and Contractor, disputes between Subsubcontractor and Subcontractor shall be decided by the same tribunal and in the same forum as disputes between Subcontractor and Contractor.

13.5. NO LIMITATION OF RIGHTS OR REMEDIES Nothing in this article shall limit any rights or remedies not expressly waived by Subsubcontractor which Subsubcontractor may have under lien laws or payment bonds.

13.6. DIRECT DISCUSSIONS If a dispute arises out of or relates to this Agreement or its breach, the Parties shall endeavor to settle the dispute. Within five (5) business days, Parties' representatives, who shall possess the necessary authority to resolve such matter and who shall record the date of first discussions shall conduct direct discussions and make a good faith effort to resolve such dispute.

13.7. MEDIATION Disputes between Subcontractor and Subsubcontractor not resolved by direct discussion shall be submitted to mediation pursuant to the Construction Industry Mediation Rules of the American Arbitration Association. The Parties shall select the mediator within fifteen (15) Days of the request for mediation. Engaging in mediation is a condition precedent to any form of binding dispute resolution.

13.8. Binding Dispute Resolution If the matter is unresolved after submission of the matter to mediation, the Parties shall submit the matter to the binding dispute resolution procedure designated herein (Designate only one):

Arbitration using the current Construction Industry Arbitration Rules of the American Arbitration Association or the Parties may mutually agree to select another set of arbitration rules. The administration of the arbitration shall be as mutually agreed by the Parties.



[] Litigation in either the state or federal court having jurisdiction of the matter in the location of the Project.

13.9. COST OF DISPUTE RESOLUTION The cost of any binding dispute resolution procedure shall be borne by the non-prevailing Party as determined by the adjudicator of the dispute.

13.10. VENUE The venue of any binding dispute resolution procedure shall be the location of the Project, unless the Parties agree on a mutually convenient location.

14. JOINT DRAFTING The Parties expressly agree that this Agreement was jointly drafted, and that they both had opportunity to negotiate terms and to obtain assistance of counsel in reviewing terms prior to execution. This Agreement shall be construed neither against nor in favor of either Party, but shall be construed in a neutral manner.

SUBCONTRACTOR: []

BY: _____

PRINT NAME: [] PRINT TITLE: []

SUBSUBCONTRACTOR: []

BY: _____

PRINT NAME: [] PRINT TITLE: []

END OF DOCUMENT

DRAFT



**ConsensusDocs 725 Standard Subsubcontract Agreement
Exhibit E, Insurance Requirements**



1. Commercial General Liability Insurance

- \$ [] bodily injury and property damage - per occurrence.
- \$ [] general aggregate.
- \$ [] products and completed operations aggregate.
- \$ [] personal and advertising injury limit.

Coverage shall include Premises and Operations, Completed Operations, Contractors Protective for Subsubcontractor's/Vendor's liability arising out of the hire of Subsubcontractors, per Project Aggregate, Contractual Liability, Broad Form Property Damage. The Subsubcontractor shall maintain completed operations liability coverage for one year after acceptance of the Work, Substantial Completion of the Project, or for the time required by the subsubcontract Documents, whichever is longer.

2. Additional General Liability Coverage - The Subcontractor [] shall/ [] shall not require the Subsubcontractor to purchase and maintain additional liability coverage, primary to any coverage provided by the Subcontractor. If required, the designated coverage shall be:

A. [] **ADDITIONAL INSURED.** Subcontractor shall be named as an additional insured on the Subsubcontractor's Commercial General Liability Insurance policy for operations and completed operations, but only with respect to liability for bodily injury, property damage, or personal and advertising injury to the extent caused by the negligent acts or omissions of the Subsubcontractor, or



those acting on the Subsubcontractor's behalf, in the performance of Subsubcontract Work for the Subcontractor.

B. []. OCP. The Subsubcontractor shall provide an Owners' and Contractors' Protective Liability Insurance ("OCP") policy naming the Subcontractor as insured with limits equal to the limits on Commercial General Liability Insurance specified, or limits as otherwise required by the Subcontractor.

Any documented additional cost in the form of any surcharge associated with procuring the additional general liability coverage in accordance with this section shall be paid by the Subcontractor directly, or the costs may be reimbursed by the Subcontractor to the Subsubcontractor by increasing the Subsubcontract Amount to correspond to the actual cost required to purchase and maintain the additional liability coverage.

3. Business Automobile Liability Coverage with a minimum limit of \$ [] per occurrence to cover all owned, hired, and non-owned automobiles.

4. Workers' Compensation and Employer's Liability, including an "all states endorsement" and, where exposure exists, Federal Employee Liability, U.S. Longshoremen and Harbor Workers, or Jones Act for Statutory Limits and minimum Employer's Liability Limits of: \$ [] per accident / disease - policy limit / per employee

5. Excess Liability following form or umbrella written with limits of at least \$ [] per occurrence. Any Vendor providing crane or hoisting services shall provide general liability limits (primary and excess) of at least \$ [] per occurrence.

6. Professional Liability Insurance shall be provided in the event the Subsubcontractor or its design professional provides design services with minimum limits of \$ [] per claim and a general aggregate of \$ [] for Subsubcontractor services. Deductibles shall be paid by the Subsubcontractor or its design professional.

7. The Subsubcontractor shall obtain insurance coverage(s) in sufficient amounts and form to cover its own exposure to loss for owned, rented, leased, or borrowed tools, equipment, machinery, or any of its property. The Subcontractor and Subsubcontractor waive all rights against each other, the Owner, Constructor, and Design Professional for damages caused by risks covered by the Project Builders Risk policy, except such rights as they may have to the proceeds of the insurance and such rights as they may have for the failure of the Owner or Constructor to obtain and maintain the Project Builders Risk coverage in accordance with the requirements of the Subsubcontract Documents.

8. Required insurance policies shall prohibit coverage cancellation or expiration until at least thirty (30) days after written notice has been given to the Subcontractor. Prior to commencement of the Subsubcontract Work, the Subsubcontractor shall deliver to the Subcontractor certificates of insurance acceptable to the Subcontractor, which acceptance shall not be unreasonably withheld. In the event the Subsubcontractor fails to procure and maintain any insurance coverage required under this Agreement, the Subcontractor may purchase such coverage as required for the Subcontractor's benefit and charge the expense to the Subsubcontractor, or terminate this Agreement.

END OF DOCUMENT.





Bulletin

Indemnification Clauses

INTRODUCTION

Indemnification clauses are often included in subcontracts to transfer risk from the general contractor (GC) to you, the subcontractor. Basically, in that context, indemnification means the obligation of the subcontractor to reimburse the GC for damages arising from future claims for which the GC is or may be held liable.

These clauses protect not only the GC, but usually the owner and possibly designers too, from the consequences of accidents resulting in property damage, personal injury and other described liabilities.

The indemnification clause presents a tremendous potential danger to you, however, and you must recognize that **the indemnification clauses in subcontracts are typically not two-way streets—they work only against the subcontractor**. It is essential, therefore, that before you enter your subcontract, you know precisely the losses for which you will be required to indemnify others.

LIMITATIONS OF INDEMNIFICATION CLAUSES

Certain indemnification clauses make the subcontractor liable for damages though it was in no way responsible for causing them. Because of this, along with the perception that GCs often hold an upper hand in subcontract negotiations, most states have enacted statutes limiting the scope and/or enforceability of construction contract indemnification clauses. These laws are commonly referred to as anti-indemnity statutes. Virtually every anti-indemnity statute is different, so it is important that you know the applicable rules in the states where you work. One helpful starting point can be viewed at [http://www.litmgmt.org/LMI/docs/2009-10-28%20Subcontractor Chart of Anti-Indemnity Statutes 2009.pdf](http://www.litmgmt.org/LMI/docs/2009-10-28%20Subcontractor%20Chart%20of%20Anti-Indemnity%20Statutes%202009.pdf) – but be sure to check the current statute in your state.

Although there are several different types of indemnification clauses, for the most part, you will encounter one of three types in your trade subcontracts. These are sometimes described as:

- Limited,
- Broad form, or
- Intermediate indemnification clauses.

A **limited indemnification clause** is the most favorable for subcontractors and makes the subcontractor responsible for indemnification obligations *only to the extent* the damage was caused by the negligent acts or omissions of the subcontractor or those for whose acts the subcontractor is liable. All states allow limited indemnification provisions. You will find this type of limited indemnity provision in both the AIA A401 standard subcontract and the newer ConsensusDOCS subcontract, form CDS750. Although some GCs' proprietary subcontract forms (GC subcontracts) may contain a limited indemnification clause, most GCs choose to use either intermediate or broad form provisions (unless the same would be void or unenforceable under the anti-indemnity statute in the state where the project is performed, if any.)

A sample limited indemnification clause might read as follows:

The Subcontractor agrees to indemnify and hold harmless the Owner, GC and any of their agents and representatives against all claims, damages, losses, expenses and attorney fees arising out of or resulting from the performance of the Subcontractor's work, because of bodily injuries (including deaths) sustained by any person or persons, or on account of damage to property including loss of use thereof, but only to the extent such injuries to persons or damage to property are due to the fault or negligence of Subcontractor or those for whose acts the Subcontractor is responsible.

Broad form indemnification clauses impose the entire risk of loss on the subcontractor even when the damage was caused entirely by the GC, owner or other named, indemnified party. The subcontractor's indemnification

obligation exists even if the subcontractor is not negligent or at fault in any way and even if the loss is due *solely* to the fault of others. This is the harshest type of indemnification clause for subcontractors and is in fact void under many state anti-indemnity statutes.

By entering a subcontract which contains a broad form indemnification clause similar to the sample below, you could be responsible for holding harmless the GC from just about every possible loss contingency on the project. Most state anti-indemnity statutes as discussed above prohibit broad form indemnification clauses. A sample broad form indemnification clause is as follows:

The Subcontractor agrees to indemnify and hold harmless the Owner, GC and any of their agents and representatives against all claims, damages, losses, expenses and attorney fees arising out of or resulting from the performance of the Subcontractor's work, because of bodily injuries (including deaths) sustained by any person or persons, or on account of damage to property including loss of use thereof, whether such injuries to persons or damage to property are due or claimed to be due in whole or in part to the negligence of Owner, GC or any of their employees or agents or any other person. It is specifically understood that this provision shall be interpreted as indemnifying Owner, GC and any of their agents and representatives from their own sole and/or partial negligence.

An **intermediate indemnification clause** is similar to the broad form clause, but expressly excludes damages arising from the sole negligence of the GC, owner or other indemnified party. Under this type of indemnification

clause, the subcontractor might be responsible for all of the liability resulting from an incident where the GC or owner is 99% at fault. An example of such clause is set forth below:

The Subcontractor agrees to indemnify and hold harmless the Owner, GC and any of their agents and representatives against all claims, damages, losses, expenses and attorney fees arising out of or resulting from the performance of the Subcontractor's work, because of bodily injuries (including deaths) sustained by any person or persons, or on account of damage to property including loss of use thereof, whether such injuries to persons or damage to property are due or claimed to be to the negligence of Owner, GC or any of their employees or agents or any other person. This clause shall not apply where such loss, damage, injury, liability, death or claim is the result of the sole negligence or willful misconduct of the Owner, GC and any of their agents and representatives.

By entering into a subcontract with a broad form or an intermediate indemnification clause, you are agreeing to hold harmless the GC and others for damages resulting from their own negligence. Barring the application of a state anti-indemnity statute, court decisions have held broad form and intermediate clauses to be binding despite their blatant inequity.

WHAT CAN YOU DO TO MITIGATE THE EFFECTS OF AN INDEMNIFICATION CLAUSE?

If you are confronted with a proposed subcontract containing a broad form or intermediate indemnification clause, negotiate a modification to that clause if possible (See Bulletin CT 9). You

should exert strong efforts to persuade the GC to eliminate the provision wherein you agree to hold harmless the GC for losses occasioned by events, acts or omissions over which you have absolutely no control.

Try to include specific language limiting your indemnification of the GC and others to losses arising out of the performance of your subcontract that result from negligent acts and omissions by you, your subcontractors, and others for whose acts you are responsible. Another potential solution is to negotiate a cap on your liability to be inserted at the end of the indemnity clause: "In no event shall the Subcontractor's liability hereunder exceed the sum of \$ _____."

Regarding your sub-subcontracts, be sure that you include, either expressly or by reference a strong indemnification clause compliant with applicable state law. These lower-tier indemnity clauses must be at least as broad as the indemnification clause in your subcontract with the GC. At a minimum, the identical indemnification language and requirements set forth in the subcontract between you and the GC must flow to your lower-tier subcontractors. Otherwise, you may be held responsible to the GC for damages arising out of that lower-tier subcontract that cannot be recovered from your sub-subcontractor under the terms of that sub-subcontract.

CONCLUSION

Always review and understand the indemnification clause presented in any subcontract form as well as the applicable state law in the jurisdiction where the project is located. Seek outside counsel from insurance brokers and attorneys as needed to ensure your understanding of what risks you are accepting. Always try to modify a

subcontract indemnification clause to reflect a limited type provision as discussed above so that you do not end up paying limitless damages resulting from the fault of others.

The information in this bulletin should not be construed as legal advice. Contact your local counsel for specific legal advice regarding the information contained in this bulletin.



Bulletin

Comparison of Industry Standard Form Agreements Between General Contractor and Subcontractor

INTRODUCTION

Several industry organizations have developed form agreements for use in the construction contracting process. The most commonly used form agreement between prime or general contractors (GC) and subcontractors is the AIA A401 (A401). The newer ConsensusDOCS 750 (CDS750), however, is gaining popularity.

The A401 has been in circulation for decades and underwent significant revisions in 2007. The CDS750 was first released in 2007 as part of a large family of contracting documents developed by a group of construction industry associations and organizations, including the MCAA. CDS750 was then revised in 2011. Prior to 2007, the Associated General Contractors of America (AGC) supported the AGC Form 650 Construction Subcontract. The new CDS750 is based in large part on that prior form.

While both the CDS750 subcontract and the A401 subcontract include relatively fair allocations of risks, other proprietary subcontract forms generated by individual GC's can often be unbalanced in favor of the GC and contain some

severely one-sided provisions (for more information, see CT9). More than likely, utilizing either an A401 or CDS750 form will yield terms and conditions more favorable to a subcontractor than a GC's own form.

Both the A401 and the CDS750 are endorsed by the MCAA, either directly or through the MCAA's membership in the Associated Specialty Contractors (ASC). While the forms are similar in many ways, each contains some provisions that are better than the other from a subcontractor's perspective. The discussion below will highlight some of the similarities and differences between these form subcontracts. Please note, however, that when utilizing any form agreement, the parties should insure it matches the industry original, or that any modifications are mutually agreed upon. And, be sure that all the fill-in-the-blanks are completed by the parties.

Note:

The abbreviation "GC" is used throughout this article to reflect the upstream party with whom the Subcontractor is contracting. In the A410, this party is referred to as the Contractor and in the CDS750, this

party is referred to as the Constructor. Also, in the CDS750, the architect/engineer is referred to as "Design Professional."

COMPARISON OF SPECIFIC PROVISIONS IN THE AIA A401 AND CONSENSUSDOCS750

The Subcontract Documents:

A401: The terms and conditions that make up the A401 are found in the written Subcontract itself, the Owner/GC agreement, any other documents referenced in the Subcontract as making up part of the Subcontract *and* the AIA A201 general conditions which are also incorporated by reference into the A401 (to the extent they do not conflict with the Owner/GC agreement). The GC *must make available* copies of all Subcontract Documents to the Subcontractor prior to execution of the Subcontract.

CDS750: The terms and conditions that make up the CDS750 are found in the written Subcontract itself, the Owner/GC agreement, any other documents referenced therein as making up part of the Subcontract. The GC *must provide* copies of all Subcontract Documents to the Subcontractor prior to execution of the Subcontract.

Scope of Work/Code Compliance:

A401: The Subcontractor is obligated to provide all work described in the Subcontract Documents or reasonably inferable therefrom per the A201 incorporated by reference therein. Also, the A201 expressly states that the GC (and therefore the Subcontractor) "is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the

Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require." The Subcontractor's obligations to comply with applicable laws, ordinances, codes, etc. are expressly limited to those bearing on the performance of the Subcontractor's work.

CDS750: The Subcontractor is obligated to provide all work shown in the Subcontract Documents or reasonably inferable therefrom. Though the Subcontractor must examine and compare Owner-furnished Subcontract Documents, the Subcontractor is not liable for any errors or omissions contained therein, unless the Subcontractor knowingly fails to recognize or report a problem to the GC. Further, the CDS750 states that the Subcontractor is not responsible for verifying that the Subcontract Documents are in compliance with applicable codes. However, elsewhere, the CDS750 expressly requires Subcontractor to comply with all "Laws" (defined as applicable laws, ordinances, codes, etc.) at its own expense, thereby potentially creating a conflict within the CDS750.

Progress Payments:

A401: The A401 does not contain a "pay-if-paid provision" (see CT 3), but instead, a "pay-when-paid provision," as follows: "The Contractor shall pay the Subcontractor each progress payment no later than seven working days after the Contractor receives payment from the Owner. If ... the Contractor does not receive payment for any cause which is not the fault of the Subcontractor, the Contractor shall pay the Subcontractor, *on demand*, a progress payment ..." (emphasis supplied). Per the A201 (incorporated by reference into the A401) the Owner has

the express right in its sole discretion to contact subcontractors directly and to issue joint checks to the Subcontractor and GC to help insure the Subcontractor is timely paid. Additionally, the Subcontractor can contact the architect to discover information regarding amounts requisitioned by the GC on behalf of the Subcontractor's work.

CDS750: Similarly, the CDS750 does not contain a "pay-if-paid provision," but does contain a "pay-when paid" clause: "Progress payments to Subcontractor for satisfactory performance of the Subcontract Work shall be made no later than seven (7) days after receipt by the Constructor of payment from the Owner for the Subcontract Work. If the payment from the Owner for the Subcontract Work is not received by the Constructor, through no fault of the Subcontractor, the Constructor will make payment to the Subcontractor *within a reasonable time* for the Subcontract Work satisfactorily performed."(emphasis supplied). The phrase "a reasonable time" is somewhat uncertain when compared to the "on demand" language found in the A401. Note that the AGC has maintained its Form 650 for use by a GC wishing to include a more onerous pay-if-paid provision in a form subcontract. Under the CDS750, upon Subcontractor's request, the GC must provide Subcontractor a copy of the GC's most current payment application to Owner showing amounts approved or paid by Owner on behalf of the Subcontractor's work. Finally, although the CDS200 is silent regarding the Owner issuing joint checks to the GC and Subcontractor, the CDS750 permits the GC to issue joint checks to the Subcontractor and its lower tier subcontractors and suppliers.

Payment for Stored Materials:

A401: The Subcontractor is to be paid for materials and equipment delivered

and suitably stored on-site. Also, the Subcontractor can invoice for materials and equipment suitably stored off the site if approved by the GC. No Owner approval is required.

CDS750: The CDS750 permits payment for materials and equipment suitably stored on-site or off-site, provided all required supporting documentation is satisfactory to the Owner and the GC.

Retainage:

A401: The A401 provides that the GC cannot hold a greater retention from the Subcontractor than the Owner is withholding on behalf of the Subcontractor's work. However, unless modified by the contracting parties, there is nothing in A201 general conditions incorporated into the A401 by reference that requires any reduction of retainage prior to completion of the project.

CDS750: Again, the GC cannot hold a greater retention from the Subcontractor than the Owner is withholding on behalf of the Subcontractor's work provided the Subcontractor's work is satisfactorily performed. However the Owner/GC agreement, CDS200, gives the Owner discretion to release or reduce retention on the work of specific subcontractors, and the GC must then, in turn, release the same to that Subcontractor. Additionally, the CDS200 states that as between the Owner and GC, no further retainage will be withheld by Owner once the work is 50% complete, providing a benefit to trade subcontractors who tend to finish ahead of the project as a whole.

Final Payment:

A401: As with progress payments, if the GC does not receive timely payment from the Owner through no fault of the

Subcontractor or does not pay the Subcontractor within seven days after receipt of payment from the Owner, final payment to the Subcontractor shall be made by GC upon Subcontractor's demand.

CDS750: The GC must make final payment to Subcontractor within seven days after the GC receives the final payment from the Owner. Under the CDS750, if the Owner does not make a timely final payment due to no fault of the Subcontractor, the GC must notify the Subcontractor in writing and pay Subcontractor its final payment "within a reasonable time."

Interest on Late Payments:

A401: Payments due, but unpaid, bear interest from the date payment was due. When the Owner fails to make a timely payment, the GC is to pay the Subcontractor upon Subcontractor's demand, and interest on unpaid amounts due to the Subcontractor should begin to accrue once Subcontractor demands the same.

CDS750: For late Owner payments, the GC is obligated to pay the Subcontractor only the Subcontractor's proportionate share of interest the GC actually receives from the Owner. However, if non-payment is due to the GC's fault, interest begins to accrue on the date payment was due but unpaid.

Changes in the Work:

A401: The GC may direct the Subcontractor to make changes within the general scope of the Subcontract, and the Subcontract sum and performance time will be adjusted accordingly. Prior to commencing the changed work, the Subcontractor must submit a written claim for price and time adjustments. When the GC directs a change in writing, but the parties have

not agreed on price, the Subcontractor must nevertheless proceed. Under the A201 for Owner-directed changes, upon the GC's request, "the Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified."

CDS750: Changes stemming from Owner directives will be processed in accordance with the Owner/GC agreement. When a change not stemming from the Owner is directed by the GC, but the parties have not agreed on the change order price, the GC is to direct the change by way of an Interim Directed Change entitling the Subcontractor to an interim payment equal to 50% of the Subcontractor's estimate of the change. Similarly, the CDS200 states that for Owner-directed changes, if the Owner and the GC cannot agree on the change order price, then the Owner must pay the GC 50% of the GC's estimated cost. The CDS750 states that the Subcontractor is not obligated to perform any extra work impacting its cost or time without first receiving from the GC a change order or a written instruction that complies with the Subcontract.

Schedule/ Delay Damages:

A401: Time is of the essence in this form, making delayed completion a material breach of the Subcontract. The A401 does not contain a "no damage for delay" clause (see CT 9) and, therefore, the Subcontractor has a cause for damages if the GC or Owner delays or interferes with its work. Requests for extensions of time must be made promptly to the GC in accordance with the Subcontract Documents. Liquidated damages set forth in the Subcontract "shall be assessed against the Subcontractor only to the extent caused

by the Subcontractor or any person or entity for whose acts the Subcontractor may be liable, and in no case for delays or causes arising outside the scope of this Subcontract.” The A401 does not address the Owner’s liquidated damages which may be assessed against the GC.

CDS750: Similarly, time is of the essence under the CDS750, and it does not contain a “no damage for delay” clause. The CDS750 contains a provision stating that the Subcontractor is entitled to an equitable adjustment in both Subcontract amount and time for GC-directed changes in the time, order or priority in which the Subcontractor’s work is to be performed to the extent the same increase applies to the Subcontractor’s time and/or costs. If liquidated or other delay damages are assessed against the GC, the GC will assess the same against the Subcontractor to the proportionate extent of the Subcontractor’s responsibility for the delay. The GC is also entitled to recover from the Subcontractor other actual damages that the GC sustains as a result of the Subcontractor’s delay.

Warranty:

A401: The Subcontractor warrants its work to be free from defects (“except for those inherent in the quality of the Work”), of good quality, new (unless the Subcontract Documents require or permit otherwise) and in conformance with the Subcontract Documents. Excluded from the Subcontractor’s warranty are damages or defects “caused by abuse, alterations to the Work not executed by the Subcontractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage.” As per the A201, the warranty runs for one year from substantial completion of the project.

CDS750: The CDS750 contains warranty exclusions similar to those expressed in the A401. The Subcontractor’s warranty under the CDS750 runs from substantial completion of the Subcontractor’s work, though there seems conflicting verbiage between the warranty provision and the substantial completion provision.

Indemnification:

A401: Under the A401, the Subcontractor agrees to indemnify and hold harmless the Owner, GC, architect and architect’s consultants from damages for bodily injury or property damage (other than to the work itself) resulting from its performance, but only to the extent the damage was caused by negligent acts or omissions by the Subcontractor or those for whose acts it is liable.

CDS750: The CDS750 indemnity obligation is also one of comparative negligence making the Subcontractor responsible only to the extent the damage was caused by negligent acts or omissions by the Subcontractor or anyone for whose acts the Subcontractor is responsible.

GC Bonds:

A401: The A401 requires the GC to furnish on request, a copy, or permit a copy be made, of any GC bond covering payment of obligations arising under the Subcontract.

CDS750: The CDS750 requires the GC or Owner to furnish on request a copy of any bond covering the GC’s payment of obligations arising under the Subcontract upon the Subcontractor’s written request.

Dispute Resolution:

A401: At the time of subcontracting, the GC and Subcontractor select the method of dispute resolution they choose to utilize by checking the appropriate box in the form agreement (i.e. litigation, arbitration or other mutually acceptable method). If nothing is selected, litigation is the default procedure. However, as a condition precedent to the selected binding dispute resolution procedure, the parties must first submit to a non-binding mediation in accordance with the American Arbitration Association's Construction Industry Mediation Rules. The cost of such mediation is shared.

CDS750: If a dispute between the Subcontractor and the GC involves the Owner, the CDS750 mandates that the dispute will be resolved in the same tribunal and forum as disputes between the Owner and the GC. For disputes not involving the Owner, the GC and Subcontractor can select at the time of subcontracting either arbitration or litigation. However, before proceeding to litigation or arbitration as selected, the CDS750 dictates that the GC and Subcontractor should first undertake several non-binding efforts to resolve the dispute, i.e. (1) discussions between authorized representatives of the GC and Subcontractor, then, if the issue is still not resolved, (2) discussions between senior executives from each party, then, finally (3) mediation in accordance with the American Arbitration Association's Construction Industry Mediation Rules, unless otherwise agreed. The CDS750 contains detailed timing for all of these steps. Each party bears its own cost for the non-binding steps. However, once the dispute reaches binding litigation or arbitration, the non-prevailing party pays all costs and attorneys' fees as determined by the adjudicator.

Consequential Damages:

A401: The GC and the Subcontractor mutually waive claims against each other for consequential damages arising out of the Subcontract.

CDS750: The GC and the Subcontractor mutually waive their rights to recover consequential damages against each other, but this is subject to certain express exceptions. The GC reserves its rights to pass down to the Subcontractor: (1) liquidated, consequential or other damages that the Owner is entitled to recover from the GC; (2) damages covered by insurance required by the Subcontract. Also, the Subcontractor must obtain similar waivers from its lower-tier subcontractors.

Temporary Facilities:

A401: The GC is to furnish and make available at no cost to the Subcontractor all of the GC's temporary facilities, equipment and services, except as specifically noted in the Subcontract.

CDS750: Allocation of the responsibilities for temporary services is to be addressed by way of a separate exhibit.

Information Regarding Owner's Ability to Pay:

A401: Even without the Subcontractor's request, the GC must make available to the Subcontractor information that the GC has received from the Owner that affects the Subcontractor. Although there is no obligation under the A401 for the Owner to provide financial information to the Subcontractor, the A201 (incorporated by reference into the A401) does permit the GC to obtain this information from the Owner, and the Owner must provide the same as a

condition precedent of the GC's obligation to commence its performance.

CDS750: The CDS750 states that, unless prohibited by the Owner/GC agreement, upon the Subcontractor's request, the GC shall provide information it has regarding the Owner's ability to pay for the work. Under the 2011 updates to the CDS750, unless prohibited by the Owner/GC agreement, the GC must automatically share with the Subcontractor information it receives regarding any material changes in the Owner's financial ability to pay. If the GC does not provide such information to the Subcontractor, the Subcontractor may then request the financial evidence directly from the Owner or the Owner's lender. The CDS200 permits the GC to obtain financial information from the Owner and, as provided in the A201, the Owner must provide evidence of financing as a condition precedent of the GC's obligation to commence its performance.

Liens:

A401: The A401 requires the GC to provide the Subcontractor, upon written request, information necessary and relevant for the Subcontractor to evaluate, give notice of or enforce mechanic's lien rights." There is no express requirement in the A401 that the Subcontractor provide monthly partial lien waivers.

CDS750: The CDS750 allows the Subcontractor to request from the Owner "through the" GC information necessary to preserve lien rights. The CDS750 does require the Subcontractor to provide claim or lien waivers as a prerequisite to payment, but the Subcontract prohibits the GC from requiring unconditional waivers before payment is received by the Subcontractor or for amounts in excess

of payments actually received. A review of the A401 and the CDS750 will quickly reveal that both agreements will likely include a more reasonable allocation of risk between the Subcontractor and the GC than forms prepared by or on behalf of the GC.

CONCLUSION

Although the above discussion touches on many of the provisions contained in these form agreements, when using either of these forms, the Subcontractor should be aware of the full content of each, in particular, the strict timing and notice provisions. Insurance provisions should be reviewed by the Subcontractor's broker or risk manager to insure compliance.



Bulletin

Should You Elect Subchapter S Treatment?

Prepared by Ernst & Young LLP

INTRODUCTION

In prior years, top individual tax rates were lower than top corporate tax rates. This differential in rates caused many to reconsider the feasibility of having their corporations elect to be taxed under Subchapter S, under which the corporation's net income is taxed to its shareholders at their rates (and in proportion to their share holdings), and is not taxed again to the shareholders when distributed to them.

Currently, top individual rates are 39.6%, while the top corporate rate is 35%. This shift in rates has caused S-corporations to consider terminating their S-status and revert back to C-corporation status. This bulletin will explore the advantages and disadvantages of electing Subchapter S treatment, the qualifications to be met, and the rules for making the election if you choose to do so.

ADVANTAGES

There are several advantages to making the Subchapter S election.

A significant advantage is that all income generated by the corporation is taxed only once, in the year that it is earned, to the shareholders. A regular ("Subchapter C") corporation pays tax on its income when it is earned, and the shareholders pay a second tax when it is distributed as dividends, or as a liquidating distribution.

A second advantage is that losses of a Subchapter S-corporation also pass through, and may be claimed by its shareholders (subject to certain limitations on basis, at-risk amounts and passive activity rules). C-corporation losses can only be used to offset future earnings of the corporation.

If income has been taxed to the Subchapter S shareholders and was not dis-



tributed in the year earned, it can be distributed tax-free in a later year.

An S-corporation is also less likely to be challenged on the issue of unreasonable compensation paid to its employee/shareholders.

S-corporations are not subject to Alternative Minimum Tax (AMT) or accumulated earnings tax, where C-corporations are subject to both.

Furthermore, the basis in stock of the shareholders is increased by the amount of income reported by the S-corporation, net of any distributions. This may decrease the amount of gain realized upon subsequent sale of the stock.

DISADVANTAGES

There are also disadvantages and potential pitfalls to the Subchapter S election, of which you should be aware.

The principal disadvantage is that the corporation's income is taxed to the shareholders even if no cash is distributed, which may leave the shareholder with insufficient cash to pay his taxes.

A second disadvantage is that most S-corporations must be or become calendar year taxpayers. This eliminates some planning possibilities of having dissimilar year-ends of the corporation and its shareholders.

One pitfall of the Subchapter S election is that a corporation with unused net operating losses ("NOL's") from its operations prior to the Subchapter S election has a limited number of taxable years to which those NOL's can be carried forward. It cannot use the NOL's against its income in Subchapter S years;

however, the taxable years continue to run. Unless the corporation goes back to Subchapter C status, the NOL's could expire unused.

The "built-in gains" tax is a corporate level tax that applies to certain S-corporations following their conversion from C-corporation status. This tax may apply to corporations upon the sale of assets that had appreciated value at the time of the S election. The effect of this tax is to double tax the "built-in gain." It does not apply to corporations that have always operated as S-corporations or to assets held more than 10 years following the S election.

Another disadvantage is that fringe benefits, such as accident and health plan expenses, premiums for group term life insurance and death benefits, for more than 2 percent of the stockholders may not be deductible and are generally required to be included in the shareholders' income as compensation.

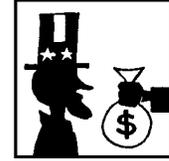
HOW TO ELECT

To elect Subchapter S status, a corporation must meet certain criteria for eligibility, and must file a timely Form 2553 with the IRS. The Subchapter S status is terminated on the date it ceases to meet the eligibility requirements,¹ or it can be revoked by its shareholders as of the first day of a taxable year.

Criteria for Eligibility

To be eligible to elect Subchapter S status,² a corporation:

1. May have no more than 35 stockholders all of whom must be individuals (other than nonresident aliens) or estates, or trusts described in Code Section 1361-



- (c)(2). A husband and wife (and their estates) are counted as one stockholder for this purpose,³ and an estate includes an estate in bankruptcy;⁴
2. May have no more than one class of stock outstanding;
 3. May not be a member of an affiliated group, as defined in Code Section 1504, a financial institution, an insurance company, a DISC, or a former DISC;
 4. Must be on a calendar year for tax purposes (or get IRS approval to a different business year); and
 5. Must not have more than 25 percent of its gross receipts from passive income if it has accumulated earnings from prior "C" years.

Election Form

If a corporation is eligible, its stockholders and officers may elect Subchapter S status by signing and filing a Form 2553. The election form must be signed by all of the stockholders, and by an officer on behalf of the corporation. The form should include the tax identification numbers, addresses and relative shares of the taxpayers.

The election is effective as of the first of January of a year if it is filed on or before March 15 of that year, if the election is made retroactive and the corporation was eligible from January 1; otherwise, the election goes into effect as of the next succeeding January 1.⁵

An election can be revoked with the consent of stockholders holding a majority of the stock. The revocation may provide for a specific prospective revocation date. If no date is specified, the revocation will be effective for January 1 of a year if the revocation is made

before March 15 of that year, or if made later than March 15, as of January 1 of the next succeeding year.⁶

An election will be terminated as of the date the corporation ceases to be eligible under Code Section 1361.

If a revocation or termination is effective other than on the first day of a taxable year, the corporation will have a "split" year, in which it will file two short year returns, one for the Subchapter S period and another, as a regular corporation, for the remainder of the year.

SUMMARY

The Subchapter S election is a very useful tax planning option under some circumstances. Under the current rate structure, the decision to elect and/or remain an S-corp requires a thorough analysis.

As with any tax election, however, all of the consequences of the election should be considered. Moreover, the corporation's activities should be carefully monitored while it is a Subchapter S corporation, to be sure that it does not become ineligible, and that continued use of Subchapter S remains beneficial.

NOTES:

1. Internal Revenue Code (IRC) §1362(d)(2)(A)
2. IRC §1361
3. IRC §1361(c)(1)
4. IRC §1361(c)(3)
5. IRC §1362(b)
6. IRC §1362(b)



Management
Methods
Manual

Bulletin No. TX 2
File: Taxes

Bulletin

Compensation Planning for Closely Held Corporations

INTRODUCTION

We all know the difficulties involved in building and maintaining a successful, efficient, and competent organization. The success of your company can, no doubt, be attributed primarily to your individual efforts as executives, efforts for which you are entitled to appropriate financial rewards. Unfortunately, many active business owners have become targets of attack on the issue of whether their compensation is reasonable in amount. Unreasonable or excessive compensation can be recharacterized by the IRS as a disguised dividend. The issue of whether a corporate payment is "compensation" or a disguised dividend has become one of the most litigated tax questions.

Section 162 of the Internal Revenue Code of 1954 provides that there "shall be allowed as a deduction all the ordinary and necessary expenses . . . incurred . . . in carrying

on any trade or business, including a reasonable allowance for salaries or other compensation for personal services actually rendered. Section 162 thus allows corporations to reduce their taxable income by compensation payments for services actually rendered." If an employee is also a shareholder, the corporation would prefer to pay out its income in the form of compensation, for which it may claim a deduction, than as a nondeductible dividend payment.

The question of what constitutes reasonable compensation for the stockholder executive in a "closely held" corporation is a crucial question for the tax planner, who should take all steps necessary to prepare the corporation for the possibility of challenge by the IRS. In this bulletin, we will discuss the factors used by the IRS and the courts in determining whether compensation is "reasonable," and provide some planning ideas to avoid such challenges.



FACTORS IN MEASURING REASONABLE COMPENSATION

In dealing with the question of deductibility under Code Section 162, primary emphasis has been placed on the question of whether or not the amounts paid were “reasonable.” There is no specific formula to be used in determining whether a particular salary is reasonable or unreasonable; instead, courts have examined the factual circumstances relating to the corporate officer and his salary and decided each issue on the basis of the facts involved.

The Internal Revenue Service and the courts have generally looked to the following factors in determining the reasonableness of compensation:

1. Salary History of the Individual. The principal factor that draws the attention of an auditing IRS agent to a reasonable compensation issue is a sudden increase in the salary of an individual, particularly in a year in which the corporation itself has suddenly prospered. If an employee’s worth to the business has been measured in terms of a given salary during prior periods, the IRS and the courts will want some explanation for any dramatic change. At the same time, the fact that an officer/shareholder has received a very small salary in prior years when the business was growing does not mean that the salary must always remain small.¹ For this reason, salary adjustments should be made gradually and in accordance with contemporaneously documented justification.

2. Dividend History of the Corporation. Although the principal issue is whether a salary level is reasonable, a corporation that generates significant profits and fails to pay any significant dividends provides strong evidence that the salary is, at least in part, a div-

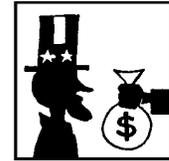
idend payment. In Rev. Rul. 79-8, 1979-1 C.B. 97, the IRS states that the failure to pay dividends is a “very significant factor” in this determination, but goes on to hold that a deduction for compensation will not be denied solely on that basis.

3. Salary of Comparable Employees. If the compensation under review involves a shareholder/employee, the treatment of its nonshareholder or unrelated employees is significant. If a comparable employee receives substantially less than a shareholder/employee, the presumption is that the excess is a dividend payment. On the other hand, generous salary payments to all employees may indicate that the salary of a shareholder/employee is appropriate.

4. Salary Scale of the Industry. Probably the single most significant factor in a reasonable compensation case is a comparison with compensation paid by other companies in the industry.² An employer presents a particularly strong case if he can show that a competitor similarly situated pays as much or more in salary to employees for similar services.

The MCAA “Statistical Survey Report” provides collective data (reported anonymously by MCAA members) on officers’ compensation and may be extremely useful in this regard.

5. Qualifications of Employees. If it can be established that the employee in question is very highly qualified, a salary higher than normal may be justified as reasonable. The appropriate evidence for such a case would be proof that the experience, training, or skill of the particular employee, or the extra efforts he expends, justifies paying a salary at a higher level than might otherwise be expected.³



6. Contribution to the Success of the Business. In some situations, the services of a particular key employee may be indispensable to the continued prosperity of a closely-held business. If it can be demonstrated that the employee built up the business or was responsible for its growth or profits for reasons other than his general employment services, a larger than usual salary would be justifiable.⁴

7. Formality and Timing of Adjustments. Compensation arrangements for the principal officers of a corporation should be considered and approved by the Board of Directors early in the year and memorialized in formal, recorded resolutions. In the case of a closely-held corporation, creation of formal board minutes is more easily controlled by the parties, and is, therefore, of lesser weight. However, the absence of any formal corporate approval of salary arrangements may be grounds for disallowing compensation deductions. In particular, if compensation is determined by use of a formula, the formula should be memorialized in the minutes prior to the time that services are rendered; otherwise, it may be subject to challenge as having been created merely for the purpose of “soaking up” the profits of the business.⁵

The timing of the corporate action is also important. If compensation is determined at or near the close of the year, at a time when large profits are evident, the minutes will be given much less significance.

8. Compensation for Past Services. Compensation paid in a current year for prior services rendered by the employee may be deducted even though that amount, when added to compensation for the current year, exceeds a reasonable allowance for current services.⁶ Once again, it is important to doc-

ument in the minutes of the corporation that an employee's services had gone unrewarded; or even better, that an earlier salary wasn't paid, in order to justify a later deduction when payment can be made.

COMPENSATION PLANNING

Taking into account the factors outlined above, it should not be difficult to bolster your argument that compensation paid to an employee/shareholder is reasonable in amount and should not be recharacterized as a dividend.

In setting salaries, use factors other than ownership shares of the business to fix compensation. If salaries are disproportionate to shareholdings, it is more difficult to recharacterize any excess payments as “dividends.”

A corporation that is profitable should allow for profits and be prepared to pay taxes on its income; avoiding the impulse to pay out all profits in the form of compensation. Corporations should also pay dividends, at least in years when they are profitable, unless there are other reasons for accumulating cash, such as expansion plans, which should be documented in the minutes.

It is always preferable to determine salaries early in the year before the profitability of the corporation can have been determined and to use formula clauses if performance bonuses are reasonably necessary to create incentives for employees. A “bonus” declared late in the year after the corporation has determined its profits is easily identified as a disguised dividend.

Salary amounts, and the reasons used for setting them, should be spelled out in the



minutes of the directors' meetings; prepared contemporaneously with those meetings. Finally, electing Subchapter S status for the corporation may help to avoid questions of reasonable compensation because all the earnings of the corporation will be taxed directly to the shareholders.

With a little help in planning, the unreasonable compensation issue can be avoided altogether, or if it arises, can be substantially mitigated.

NOTES:

1. *Austin State Bank*, 57 T.C. 180 (1971)
2. Treas. Regs. Section 1.162-7(b)(3)
3. *Kennedy, Jr. v. Comr.*, 671 F.2d 167, 176 (1982)
4. *Elliotts, Inc. v. Comr.*, 716 F.2d, 1241, 1245 (1983)
5. *Joseph Garrison*, 52 T.C. 281 (1969)
6. *Lucas v. OxFibre Brush Co.*, 281 U.S. 115 (1930)



Bulletin

How to Set Up Tax-Wise Corporate Minutes

INTRODUCTION

A key factor in the tax planning of every corporation and its shareholders/officers should be the corporate minutes. If they are properly drafted to reflect actual intentions of the corporate directors and shareholders, the minutes can be, and frequently have been, the factor that tips the scales in the taxpayer's favor during disputes with the Internal Revenue Service.

Unfortunately, many closely held corporations act in a very informal manner. These corporations simply fail to keep minutes or merely keep incomplete minutes of even an important corporate transaction. As a result, while many tax dollars have been saved because the minutes reflected precisely what was intended (and what in fact was done), many tax dollars have been lost because the corporation did not have precise, contemporaneous corporate minutes to show exactly what motivated the corporate move.

WHAT TO DO

Do not let it happen to you. Your corporate minutes are within your control. You can exercise that control to insure that they spell out your plans, decisions and intentions so that they will tend to prove the tax result you are

seeking. And if you follow through by executing your transactions according to the prescription laid down in the minutes, you should have no tax problems.

Of course, to have minutes, you must have a meeting. An alternative available in most states is to adopt resolutions by unanimous written consent of the directors; these are just as binding as resolutions adopted at a meeting. Most important, however, is that the directors consider and ratify the corporation's activities and document their decisions in writing. At the very least, to accomplish this purpose, you should hold an annual meeting of directors with your attorney and your accountant just before your fiscal year end.

IRS WARNINGS

If you say one thing in the minutes and then do exactly the opposite, the minutes will not save you. Furthermore, if you are too careless about minutes, they may well hang you. In effect, you may have talked yourself into a deficiency.

Here are some of the areas that are particularly susceptible to attack by the Internal Revenue Service. Care in drafting corporate minutes can pay valuable dividends in the form of tax sav-

ings if the Internal Revenue Service should challenge your transaction.

Executive Compensation: Is it reasonable? The minutes can justify a raise by showing that prior compensation was inadequate, or that competitors would pay as much for the executive's services, or that the services or skills of the executive in question were extraordinary or of special value to the corporation. It is also a good idea to indicate if consideration is being given for past services or reduced compensation in prior years, when profits were lean. Finally, if each year's salaries are fixed before the start of the new year, it is more difficult for the Service to characterize them as nondeductible dividends.

Accumulation of Earnings: Are they unreasonable? The minutes can show that the accumulations were required for expansion, for working capital, for additional bonding, or to carry the corporation through an expected slow business period. The minutes should record the precise nature of the plans for which the retained earnings are required and not just vague references to "future plans." When the expansion is undertaken, the minutes should refer to the use of previously accumulated funds for this purpose. It is also possible to retain funds in anticipation of the company's liability for deferred compensation arrangements, if any.

Corporate Reshuffles: Tax-free or taxable? The minutes can substantiate the existence of a business purpose by showing that the reorganization was undertaken to eliminate intercorporate obligations or to simplify the corporate structure. In addition, the minutes can set forth the details of the plan of reorganization, thus establishing that one existed.

Corporate Dividends: If a stock dividend is declared, it is important to specify that shareholders did not have the option to receive cash; if they did, the entire dividend is taxable. In any case, it is important to note the record and payment date of the dividend, particularly if the payment date is delayed until the following January.

Charitable Contributions: A corporation can take a deduction for charitable contributions approved by its board during the taxable year, if the payment is made within 2-1/2 months of the next year. The minutes should specify when the contribution was approved, to justify the earlier deduction.

Reinvestment of Involuntary Conversion Proceeds: Insurance proceeds or condemnation awards are nontaxable if reinvested in similar business property within two years. The minutes can reflect the reinvestment of the proceeds to augment the company's reporting on its tax returns.

Wage Continuation and Medical Expense Reimbursement: To justify a deduction for wage continuation payments (sick pay) and medical expense reimbursement without taxation to the employees, the minutes must show adoption of a written plan meeting IRS requirements.

Profit Sharing and Pension Plans: The minutes must show the adoption of any qualified deferred compensation plans, such as profit sharing or pension plans, to assure the deduction of company contributions. Additionally, if you have a profit sharing plan, each year's contribution and its amount should be approved by the board before year-end and reflected in the minutes.

CONCLUSION

There are many other situations where well-drawn minutes can be helpful. For example, they can show the abandonment of property, or where and when title is intended to pass. Furthermore, they are particularly useful in justifying a partial liquidation, or establishing the arm's-length nature of transactions between related persons.

Experience shows that delay is the single most important factor that stands in the way of adequate corporate records. Once a corporate move is agreed upon, the necessary background statement and the resolution itself should be prepared immediately. The language, of course, should square precisely with the business and tax result you want to achieve. If in doubt, call your attorney or accountant and ask them how best to describe the intended action.

This bulletin is not intended to be legal advice. A person should seek local counsel for specific information regarding the information found in this bulletin.



Bulletin

Meeting the Requirements for Travel and Entertainment Deductions

INTRODUCTION

For many years, deductions for travel and entertainment expenses have been a battle ground between the IRS and taxpayers. The tax law has tightened the substantiation requirements and reduced the deductibility of some expenses.

To help both you and your company to understand the rules, here is a quick review of the current rules.

MEALS AND ENTERTAINMENT

Expenses for meals and entertainment (including meals and lodging while away from home) are deductible only if the taxpayer can substantiate them by adequate records or sufficient evidence supporting the taxpayer's statement with the following information:

1. The amount of the expense or item
2. The time and place of the meal or entertainment

3. The business purpose of the expense or other item
4. The business relationship to the taxpayer of any other persons entertained.¹

A business entertainment expenditure is deductible only if it is directly related to, or associated with, the active conduct of the taxpayer's trade or business. To meet the directly-related test, the taxpayer must have more than a general expectation of deriving income, or some other specific business benefit, at some indefinite future time. In addition, the taxpayer must engage in the active conduct of business with the person being entertained. Entertaining customers at a nightclub, ball game, theater, or show is deductible if it meets the "associated with" test. To do so, it must directly precede or follow a bona fide and substantial business discussion.

A taxpayer cannot deduct expenses for meals and entertainment to the extent they are lavish or extravagant. An expense is not



considered lavish or extravagant if it is reasonable based on the facts and circumstances. Expenses will not be disallowed merely because they take place at deluxe restaurants, hotels, night clubs, or resorts.

For taxable years beginning after December 31, 1993, new rules apply that reduce the amount of deduction available for meal and entertainment expenses.

A meal expense is only deductible if there is a “substantial and bona fide business discussion” relating to the taxpayer’s active trade or business during, directly preceding or directly following the meal.² The only time that the “business discussion” requirement does not apply is in the case of an individual who eats alone while away from home overnight in the pursuit of trade or business.

Under the new rules, a taxpayer can deduct only 50 percent of the otherwise allowable meal or other entertainment expenses.³ For example, if an individual spends \$100 for a business meal that would be fully deductible under the substantiation requirements, the maximum allowable deduction is \$50. Expenses for taxes and tips are also subject to the 50 percent limit. However, transportation expenses to and from a business meal that are otherwise deductible are not subject to the 50 percent limit.

The 50 percent limit applies to costs of a room that a taxpayer rents for a dinner or cocktail party, tickets to sporting events, and costs of parking at an arena or stadium to attend an entertainment event. Meals furnished by an employer to employees on the employer’s premises are also subject to this 50 percent limitation.

There are exceptions to the 50 percent limitation; some of these exceptions include:

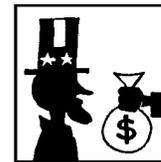
1. The full value of meal or entertainment expense is either included as compensation to the recipient, or is tax-free under the fringe benefit rules.
2. An employer pays for traditional recreational activities, such as a yearly outing or picnic for employees and their spouses.
3. Samples or promotional activities made available to the general public.
4. Expenses incurred for attending a banquet at which a speaker is present and most of the guests are from out of town.

There is an additional limitation in the case of luxury “sky boxes” at arenas or stadiums.⁴ If a sky box is leased for more than one event, the amount deductible is reduced to the face value of a non-luxury box seat ticket multiplied by the number of seats in the sky box. This amount is then subject to the 50 percent limit. Additionally, any separately stated charges for food or beverages are also subject to the 50 percent limit.

Finally, as a general rule, no business deduction is permitted for club dues paid or incurred in tax years beginning after December 31, 1993. This denial extends to business, social, athletic, luncheon, sporting, airline, and hotel clubs.⁵

TRAVEL

A deduction is allowed for ordinary and necessary travel expenses incurred by a taxpayer while away from home in the conduct of a trade or business.⁶ Taxpayers are not away from home unless their duties require them to be away from the general area of their tax homes for a period substantially longer than an ordinary workday, and it is reasonable for them to need to sleep or rest. In some cases,



then, travel expenses may be deductible even though the taxpayer is away from home for a period of less than 24 hours.

The following expenses paid or incurred while traveling away from home ordinarily are deductible: transportation, lodging, telephone, meals (subject to the 50% limitation), and laundry. The substantiation rules for travel expenses are similar to those discussed earlier for meals and entertainment expenses.

SPOUSAL TRAVEL EXPENSES

Both the Internal Revenue Service and the courts have been very restrictive in allowing the deduction of expenses attributable to the attendance of spouses at conventions and meetings. The rules are even tighter for travel expenses incurred after December 31, 1993. The following three conditions must be met for spousal travel expenses to be deductible: (1) the spouse must also be an employee of the company; (2) the travel of the spouse must be for a bona fide business purpose; and (3) such expenses incurred would otherwise be deductible by the spouse.⁷

Under prior law, only the second condition, bona fide business purpose, was required. This provided some opportunity for deducting the spouses' travel costs. Under the

current rules, unless the spouse is a bona fide employee of the company, there is little opportunity for deducting travel costs.

CONCLUSION

Under the current rules, it becomes increasingly important to maintain records to substantiate the trade or business deductions. Such deductions have always been a prime focus of auditing by IRS agents. It is far better to take the time to maintain adequate records than to have to learn the hard way.

The 50 percent limitation on deductions for certain meal and entertainment expenses should not discourage anyone from incurring expenses legitimately related to increasing their business. At the same time, it is now less advantageous to "charge it to the company" under the current rules.

NOTES:

1. Internal Revenue Code (IRC) §274(d)
2. Treas. Regs. §1.274-2(d)
3. IRC §274(i)(2)
5. IRC §274(a)(3)
6. IRC §162(a)(2)
7. IRC §274(m)(3)



Bulletin

ESOP (Employee Stock Ownership Plan)

INTRODUCTION

The Employee Stock Ownership Plan ("ESOP") is an innovative planning device allowing for tax-favored transfers of stock ownership in a closely held business, which received substantial statutory blessing under ERISA. In spite of numerous tax law changes since then, most of which have cut tax benefits generally, the ESOP retains nearly all of its advantages and has become even more beneficial in some cases.

WHAT IS AN ESOP?

A. ESOP Requirements. An ESOP is a defined contribution deferred compensation plan which is qualified to hold stock in its corporate sponsor. Generally, an ESOP is a "stock bonus" plan, except that (1) contributions are not necessarily dependent on the employer's profits, and (2) benefits are distributable in the stock of the employer.¹

Investments in an ESOP are made largely or exclusively in "employer securities," which is common stock of the plan sponsor that: (1) are registered and publicly traded on a recognized exchange; (2) have voting and dividend rights no less favorable than any other class of common stock outstanding, or (3) is noncallable preferred stock that is convertible at any time into common stock having such rights.²

An ESOP is exempt from the requirement that the trustees strive for a "fair return" on investments, at least to the extent that it acquires employer securities.³

B. Leveraged ESOPs. A "leveraged" ESOP is one that is empowered to borrow from third parties to purchase employer securities. The loan may be (and usually is) guaranteed by the corporate sponsor and is secured by the purchased securities, contributions, and plan earnings; it cannot be a liability of the ESOP itself.

PLANNING OPPORTUNITIES

A. Deductions for Employer Contributions. As in the case of defined contribution plans, generally an employer may contribute to an ESOP and claim as a deduction up to 25 percent of the compensation paid or accrued by participants in the plan.⁴

In the case of an ESOP, however, the contribution can be made in the form of employer securities. Thus, the employer can gain a tax deduction without expending cash—a substantial benefit to any growing company.

B. Providing a Market for Insider Stock. Stock in a closely-held business provides control over operations and an opportunity to share in the profits generated. However, it is extremely difficult to sell to an outsider who does not

understand the business. When a stockholder seeks to withdraw from the business, the most logical purchasers of his stock are the corporation itself, other stockholders, or key employees who deserve to be rewarded (or need an incentive to stay). Sometimes, however, these candidates do not have the funds available to purchase the stock; moreover, the funds they would use for payment are after-tax dollars (income after federal and state taxes have been paid).

The ESOP is a better purchase candidate because it uses funds that were deductible when contributed, but were not reduced by any taxes to the ESOP. Thus, there are more funds available to make the purchase. Moreover, the stock acquired by the ESOP will be allocated principally to those employees with the highest salaries and greatest seniority—generally the same key employees you wished to benefit anyway.

C. Provides Financing on a Deductible Basis. If an ESOP borrows to purchase employer securities, it pays back the loan from its earnings and company contributions. To the extent that principal payments on the loan are made with company contributions, the company has financed the sale of its stock on a deductible basis.

To the extent dividends on employer securities held by the ESOP are used to make ESOP loan payments, they will also be deductible to the employer.⁵ The company is also allowed to deduct cash dividends paid with respect to stock held by an ESOP, provided that the ESOP allows participants to elect to either receive the dividends in cash or reinvest them in the ESOP.⁶

D. Provides Favorable Tax Treatment to Sellers. One who sells stock to an ESOP will also enjoy tax benefits specifically designed to en-

courage such sales.

For example, no gain is recognized if a taxpayer sells employer securities to an ESOP if (1) after the sale, the ESOP owns at least 30 percent of the total outstanding stock of the company; and (2) within one year after the sale (or three months prior to the sale), the seller purchases “replacement securities” (which can include publicly traded stocks and bonds) of equal value.⁷ The gain is deferred until the replacement securities are sold or may be unrecognized entirely if they are held until death when their basis is stepped up. The ESOP must hold the purchased employer securities for three years to avoid an excise tax.⁸

E. Create Employee Incentives. Employees who are constantly interested in getting a “piece of the pie” can be satisfied in knowing that, as plan participants, they are truly sharing in the future growth of the company; moreover, upon retirement, they may be paid out in company stock and can retain their interest.

Since those with the highest compensation and greatest seniority benefit the most, employees should be encouraged to remain loyal to the employer and to strive for increasing responsibility—all of which benefit the company’s operations.

DISADVANTAGES AND CONCERNS

A. Loss of Control. Whenever stock in a closely held business is transferred to non-stockholders, the prior stockholders have, to some extent, given up some control. Sales or contributions of stock to an ESOP, in fact, results in a minimal loss of control. In the first place, contributed stock rarely exceeds one-third of the outstanding stock; under most states’ laws, votes of at least one-third of the stock needed to

have any meaningful say in corporate operations. Secondly, ESOPs closely held businesses must allow their participants to vote the stock held in the ESOP, but only on matters that require the consent of share holders holding greater than a simple majority. On other matters, the trustees of the plan can exercise the voting powers. Finally, any shares that are not allocated to the participants' accounts (such as recently contributed shares or forfeited shares held in suspense) may be voted by the plan trustees, who are probably the principal stockholders.

More problematic is that the distributions to plan participants must be distributable in the form of employer securities. ESOP participants include many employees not among the desired "key" group. In general, such persons are not a long-term problem because their current rights are limited to the voting rights outlined above. Upon retirement, few would prefer to receive stock in their old employer and nearly all elect to receive cash instead. The ESOP need only allow them to elect to receive stock⁹ and the employer may impose a right of first refusal on any distributed stock to prevent sales to unfriendly third parties.¹⁰

B. Valuation of Employer Securities. Aside from the expense of instituting the ESOP, the most troublesome administrative cost is incurred in securing an independent appraisal of its value to determine the amount of the contribution. Any closely-held corporate sponsor must use an "independent" appraiser¹¹ to value the contributed stock, and appraisal fees can be quite high.

C. Securities Laws. Participants' interests in an ESOP, and the employer securities it acquires, may be subject to the antifraud and registration provisions of the federal securities laws. Competent counsel should be consulted to avoid problems.

D. Diversification. An ESOP must provide "qualified employees" (those over 55 years old with at least 10 years in the Plan) an opportunity to diversify their plan holdings.¹² The ESOP must permit these individuals to diversify at least 25 percent of their investment during the six-year period when the participant reaches age 55 (or, if later, when the participant completes 10 years of participation). Further, in the final year of the six-year period, the percentage increases to 50 percent. For companies whose ESOP shares are not readily tradable, this provision will accelerate the Plan's repurchase liability.

E. S-Corporations. Beginning in 1998, S-corporations could sponsor an ESOP without adversely affecting their S-corporation status. However, there are restrictions, including, in the case of certain S-corporations whose stock is at least 50 percent owned by "disqualified persons" (i.e., related individuals), allocations under the ESOP may not be provided to such persons.¹³

Also, the following tax advantages of C-corporation ESOPs do not apply to S-corporation ESOPs: The rule allowing deduction of contributions exceeding 25 percent of contributions if the excess is applied to ESOP-loan interest payments, does not apply to S-corporations; the rule permitting deduction of dividends paid to ESOPs does not apply to S-corporations; and the rules permitting sellers to roll over their gain on sale to an ESOP (if the ESOP owns at least 30 percent of the total outstanding shares of the company) does not apply to S-corporations.¹⁴ On the other hand, the earnings of an S-corporation attributable to ESOP stock are not currently taxed to the ESOP,¹⁵ so that taxation on that income is effectively delayed until the employee's account is distributed. Moreover, an S-corporation ESOP does not need to give employees the right to elect to take

distributions in the form of common stock; rather, an S-corporation ESOP may distribute solely in cash.¹⁶

CONCLUSIONS

The ESOP is a “fair-haired” child of the Congress, and while many recent legislative changes have reduced prior tax benefits, ESOPs have emerged less harmed than most.

As always, careful full consideration of the benefits and disadvantages, and reliance on experienced counsel, are necessary to make the most of the planning opportunities, and to avoid the pitfalls.

NOTES:

1. Treas. Regs. Section 1.401-1(a)(iii) and (b)(2)(iii)
2. Section 409(l) of the Int. Rev. Code (all section references are to the Code unless otherwise designated)

3. Rev. Rul. 69-65, 1969-1 C.B. 114
4. Section 404(a)(3)(A)
5. Section 404(k)(2)
6. Section 404(k)
7. Section 1042(a) and (b)
8. Section 4978(a)
9. Section 409(h)
10. Treas. Regs. Section 54.4975-7(b)(9)
11. Section 401(a)(28)(c)
12. Section 401(a)(28)(B)
13. Section 409(p)
14. Sections 404(a)(9)(C), 404(k)(1) and 1042(c)(1)
15. Section 512(e)(3)
16. Section 409(h)(2)(B)(ii)(II)

Employee Stock Ownership Plans

The following are examples of Employee Stock Ownership Plans and the experiences of those companies that established them. The Management Methods Committee is grateful to these companies for sharing this information which may assist other MCAA members in creating ESOPs.

AZCO Inc.

P.O. Box 567
Appleton, WI 54912-0567
(920) 734-5791

In 1949, four individuals, including F. John Barlow, founded AZCO Inc. as a full service (A-to-Z) industrial, mechanical contractor. Starting with a pickup truck and set of tools, Mr. Barlow (also a former president of MCAA) built a strong regional construction and fabrication business.

In 1998, with family members not involved and not interested in the business, Mr. Barlow, at age 84, turned his attention to selling the company to the management team. The original tax basis for the corporation was quite low. The potential capital gains implications for Mr. Barlow were considerable.

After considering alternatives with a highly respected consultant based in Appleton, Wisconsin, the management team settled on an Employee Stock Ownership Plan (ESOP). Under ERISA, the proceeds from the sale of the corporation stock must be invested in publicly traded domestic securities. In exchange for holding the replacement securities for three years, the seller's gain from the sale is deferred. Continuing to hold these publicly traded shares until death results in the stepped-up basis for the owner's estate, avoiding the gain tax altogether.

The ESOP proved to be the only viable alternative because of the high degree of leverage involved. A trustee now holds the shares of AZCO Inc. for the plan which is governed by ERISA. The ESOP takes the place of the former AZCO Inc. Profit Sharing Plan. As the debt in the plan is paid down, the equity of the corporation increases.

Mark Loper, president of AZCO Inc., reports the ESOP has worked well for the company's employees. A greater percentage of the company earnings is going into the employees' retirement account than was the case under the former profit sharing plan. Employees have a tangible stake in the company's well being, which has made them more attuned to the details of the business.

As the company's profits have grown, so has the value of the shares held in the individual participants' accounts. Each year, the trustee directs a third party appraisal of the corporation's value. AZCO Inc.'s management team has anticipated a couple of issues. First, as the company's employees approach retirement, the ESOP may face a long-term cash flow problem as employees liquidate their AZCO Inc. holdings. A repurchase obligation study has been conducted for the ESOP to gauge the extent and timing of the issue. The management team has already created an opportunity for participants to diversify their individual ESOP account. ERISA allows employees who have reached the age of 55, or who have completed 10 years of participation in the plan, to diversify their accounts. AZCO Inc. has accelerated this diversification.

The second concern addresses the perception of an ESOP by potential purchasers. AZCO Inc.'s young management team has a few years to analyze its corporate structure in the event

an exit strategy would entail a sale to a third party.

Tougher Industries, Inc.

P.O. Box 4067
Albany, N.Y. 12204-4067
(518) 465-3426

When Don McKay co-purchased Tougher Industries, the company had only 200 shares of stock. Over the years, its value increased substantially (at one point, the stock split 100/1). About 15 years ago, McKay and the other Tougher owners started looking for ways to pull their equity out of the company without compromising its financial position.

They settled on the ESOP. McKay and another owner decided to contribute 31 percent of their shares of Tougher stock to the ESOP, which is required by federal law if the seller is to avoid tax obligations (the gain is not recognized as taxable because the sold stock benefits the company's employees).

About three years ago, PSEG, a utility company, approached Tougher with a purchase offer. PSEG wanted to buy the whole company, including all the stock, and was not interested in retaining the ESOP. Since the stock held in the ESOP was to be liquidated, the Tougher owners had to hire an independent appraiser to determine the stock's value. And, the liquidation process had to be approved by the federal ERISA (Employee Retirement Income Security Act) agency and the Department of Labor. That appraisal proved very costly for the Tougher owners.

To complicate the process, the buyer ordered its own independent appraisal of the company's value. And, that process produced several claims against the company. Ultimately, the

two Tougher owners gave their 80 employees several million dollars, about one-third of the proceeds from the company's sale. McKay said, "I received four thank-you's from those employees."

If he could do it again, what would he do differently? McKay said, "I would have sold 100% of the stock to the ESOP. It's the only way to go to avoid the hassles we encountered."

Murray Company

P.O. Box 9061
Rancho Dominguez, CA 90224-9988
(310) 637-1500

Murray Company was a family-owned mechanical contracting firm based in southern California that has been in business for more than 90 years. When the owner started making plans for retirement and the sale of the company, he discovered that the tax consequences of selling a company (capital gains taxes) are formidable. Murray's CPA suggested the establishment of an employee stock ownership plan (ESOP) to ease the tax consequences of the sale.

The process of establishing Murray's ESOP began in the mid-1990s. By 1998, the legal foundation for the ESOP was completed. According to Rick Stafford, Murray's chief financial officer, just getting that part took considerable time, effort, paperwork, and legal costs. "The process is complicated and requires specialized expertise in financial planning and tax law."

When the time came time for the final step – the sale of stock in the company to the employees – the owner wasn't ready. The ESOP was "put on hold" indefinitely.

In the spring of 2002, after

Murray's owner became seriously ill, the senior managers decided to finish the ESOP. The process began in early April, and by May 31 (about seven weeks), Murray Company was a 100 percent ESOP. Stafford said, "We got it done with the support of the bank, a lot of hard work and very long hours."

A year later, Stafford said the company is still adjusting to the changes brought about by the ESOP. Stafford explained, "Even though an ESOP is a financial instrument, it also transforms a company's culture from the top down."

"Management decisions no longer just affect the owner or principals. All the employees of the company are affected, and that takes some getting used to."

Stafford has also observed changes in the employees' work habits and attitude. "The employees became owners almost overnight, and there was no time allowed to educate and inform them about what the changes would be and mean," he said.

With hindsight and experience, would Stafford have taken a different route than the one his company followed? "Definitely. We would have allowed a lot more time to manage the cultural changes, which are substantial. We also would have eased into the financial commitment over a much longer period of time."

Federal tax laws allow this more leisurely paced approach:

... No gain is recognized if a taxpayer sells employer securities to an ESOP if (1) after the sale, the ESOP owns *at least* 30 percent of the total outstanding stock of the

company; and (2) within one year after the sale (or three months prior to the sale), the seller purchases "replacement securities" (which can include publicly traded stocks and bonds) of equal value. The gain is deferred until the replacement securities are sold or may be unrecognized entirely if they are held until death when their basis is stepped up. The ESOP must hold the purchased employer securities for three years to avoid an excise tax. (Management Methods Bulletin TX 5).

Stafford also offered a device for companies beginning the ESOP process. "First, do your homework, and there's a couple of really good organizations that provide excellent information on ESOPs. The National Center for Employee Ownership, based in Washington, D.C. is accessible online at www.nceo.org. There's a small membership fee, but it's worth it. The ESOP Association, based in Washington, D.C. is another great source of information (www.esopassociation.org).

"Second, when you begin forming the ESOP, find advisors with ESOP experience, whether they're attorneys or CPAs," he said. "This is a very different area that needs specialized expertise. The attorney who's worked for your family and your business for years will probably not be your best choice, nor will the CPA who does your taxes every year. Hire the experts to protect the interests of both the owners and the employees."

Stafford concluded by giving the Murray Company's ESOP experience positive marks. "The ESOP allows the company to go forward when the owner is ready to retire and 'cash in his chips.' Just be sure to hire the right advisors and allow enough time for the planning and transition to occur."



Bulletin

Preparing for a Sales Tax Audit

INTRODUCTION

In the best of circumstances, state and local tax audits of construction contractors eventually turn adversarial and are, therefore, not to be treated lightly. It is best to be prepared, organized, and focused on resolving the issues with practicality and technical proficiency. To position yourself best, you should know the process and the rules.

Areas typically troubling for construction contractor audits include the following:

1. **Exempt purchases:** Are they really exempt?
2. **Use tax:** Did you pay the right jurisdiction or did you pay at all?
3. **Leasing transactions:** Is the lessor or lessee responsible for paying the sales tax?
4. **Services:** Should you have charged a sales tax for services?
5. **Repairs:** What repairs are subject to the sales tax?
6. **Fabrication:** What part, if any, of the fabrication cost is sales taxable?

The answers to these questions are not necessarily addressed here, but are some of the issues you should plan on addressing during your preparation for an audit and/or during the audit process.

The best plan of action is to be certain these transactions are properly handled even before you are subject to a sales tax audit. Of course, you also want to avoid paying taxes that are not required.

Consult with your attorney and/or tax advisor to help you prepare for the audit and negotiate a fair outcome, if necessary.

Once the audit process begins, be as cooperative and accommodating to the auditor as possible. Your positive attitude may ease the process should it become adversarial later.

THE SALES TAX AUDIT

The sales tax audit process occurs in three distinct phases. Each phase requires you to understand the process, plan, organize, and know your rights. The phases are as follows:

1. Pre-audit
2. Field audit
3. Post audit

How you prepare/organize yourself for each step may be the key to the success or failure of an audit.

PRE-AUDIT

Prior to receiving the audit notification from the state or local government, you should already have a plan on how to effectively defend yourself. When the audit notice is received, make sure it is detailed. It should address the following:

1. Type of audit (traditional or sample)
2. Periods under investigation
3. Commencement date
4. Documentation requested

A **traditional audit** involves the examination of each and every invoice. This is a very tedious and time-consuming process. Alternatively, states may seek to utilize **block sampling**, which involves the selection of data that is used to represent the population. Unfortunately, block samples do not always reflect the entire population. Hence, preliminary knowledge of the population and the sampling procedures are necessary to better assess whether a sample audit should be utilized.

The taxpayer should examine the periods under audit to insure that the period is within the statutory limitation. The rule varies by jurisdiction, but the range is typically 3 – 4 years. Also, if the auditor asks to extend the period of examination, proceed with caution. At this point, your accountant or a tax professional should assess the case before allowing any extension. Signing the waiver could destroy any negotiating leverage that the company may have. The waiver serves to extend the statutory period of limitations. Any professional experienced with sales tax audits will be able to assess the advantages/disadvantages of signing the waiver.

Reverse Audits

The most effective tool for audit preparation is the performance of a reverse audit. A reverse audit is a review of the company's purchases to determine whether the sales tax has been paid properly, and it can result in the identification of inconsistent treatment of purchases or errors resulting in overpayment or duplicate sales tax payments. Due to time constraints or lack of understanding of the rules for construction contractors, the sales tax is often paid erroneously. Examples include certain exemptions on purchases or resale exemptions. The reverse audit can often lead to a refund of overpaid taxes, which is then applied to any impending assessment.

Exemption and Resale Certificates

Crucial, but often ignored, management tools for the audit are the exemption and resale certificates. They can help you avoid tax assessments when used properly. The auditor will penalize the company when they are not in the file.

THE FIELD AUDIT

Audits arise either from 1) routine random selection, or 2) a "triggering event." There are a number of issues that are considered "hot buttons" for any particular state, which may trigger the examination. More common issues include the filing of a refund claim, the results of an audit of a competitor contractor (the tax office is focusing on similar businesses with similar transactions) or the results of an audit of your general contractor customer.

The prevailing areas of activity reviewed in an audit include:

1. Sales
2. Purchases
3. Fixed asset acquisitions
4. Exemption and resale certificate files

Sales are reviewed through an examination of the invoices to determine whether a tax was due and charged. Purchases are assessed by reviewing and determining whether the vouchers indicate that a tax was paid or should have been self-assessed (use tax). Fixed asset records are typically examined to determine what assets have been placed in service. Invoices are evaluated to determine whether the appropriate tax was paid at the time of purchase, whether self-assessed or an exemption exists. This evaluation may consider purchases for the purpose of fabrication. As discussed above, exemption certificates are the final area of review by the auditor.

Sampling

The use of statistical sampling by states in performing audits has gained popularity in recent years. When employed properly, it can result in efficiency. Sampling is flexible and, as a result, it may be manipulated to reflect an inaccurate representation of your business transaction. Hence, care should be exercised in understanding the sampling method and you should be on the lookout for results that, may, in fact, not be a fair representation of your transactions.

Block vs. Random

A block sample is a technical analysis of the audit period's activity that selects a theoretically representative period to reflect overall activity. Block sampling usually reviews a month or a quarter's transactions rather than the full period under examination.

A random sample involves the process of analyzing data through the process of selecting every nth document resulting in coverage of the entire period under examination.

POST AUDIT

Once the field audit has been completed, several steps need to take place.

1. **Review assessments** as well as the auditor's rationale from a technical perspective. Are the conclusions reached founded in the law? Discuss clarifications if necessary.
2. **Discuss appeals process.** Most states have an information hearing process wherein a taxpayer, through representation, files a protest to the formal assessment. Finally, a follow-up meeting is offered to discuss any open issues. Negotiations and trade-offs are available during this process.
3. **Statute of Limitations.** Remember that all states have a statute of limitations. This is the time within which a complaint may be filed. In most states, the time is 3 – 4 years and must be kept in mind when negotiating. Although the state will discuss your formal protest to the assessment, it is the responsibility of the taxpayer to timely file a complaint if he/she disagrees with the assessment. Be aware that oral representations by the agent have no effect on the time limit.
4. **Closing conference and agreement.** A closing agreement is used to terminate and dispose of the dispute

between the taxpayer and the state. It is most crucial as it closes out any open years. Closing agreements are binding on the parties as to the matters agreed upon and may not be annulled, modified, set aside, or disregarded in any suit or proceeding unless there is a showing of fraud, malfeasance or misrepresentation of a material fact. This is a general rule and varies by state. Closing conferences are necessary to discuss any adjustments, negotiation points, or mathematical errors in the work papers. This is also the setting to discuss interest, penalties, and the flow of any information.

PRACTICAL OBSERVATIONS

In conclusion, keep in mind the following:

- In dealing with the inevitable audit, **the best defense is preparation.** A reverse audit performed by your accountant or tax professional will identify risk issues as well as improve the compliance process.
- **The right professional has the technical expertise to dispose of non-issues** raised by the auditor. Your accountant or tax professional will also identify potential refund claims that are available to offset any assessment.
- **Treat the auditor with respect,** but segregate the auditor from the accounting and financial staff to minimize their communication without supervision.
- **Keep your ultimate result in perspective.** Ultimately, the conclusion of an audit is the

product of lengthy negotiation on several points.

- **Being prepared and organized is critical** as it shows the company's commitment to tax compliance. Your commitment to tax compliance may be the audit's most overriding theme for the success of the audit.

PREPARING FOR A SALES TAX AUDIT

Exempt Purchases

Exempt purchases do not require collection or payment of a sales tax. For example, some states may exempt materials and supplies purchased for work involving the U.S. Government; state government; nonprofit educational, religious, or charitable organizations; farmers, and other organizations deemed exempt from sales tax. The rules vary widely by state, so contractors need to check the rules in each jurisdiction in which they work.

Use Tax

Use tax was implemented in most states to complement the sales tax. The difference between the sales tax and the use tax is that the use tax is paid by the contractor when the goods are consumed outside the jurisdiction in which they were purchased. For example, if a contractor buys materials in Maryland to use on a Maryland job, the purchase is subject to Maryland sales tax. However, if the contractor buys materials from a supplier located in Maryland and has them delivered to a Virginia job site, the contractor pays the tax to Virginia.

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Fabrications

Sales tax audits also address issues of fabricators. A fabricator is a business that manufactures, processes, or assembles property for sale that becomes a component for real property upon installation. Fabricators often also act as contractors and actually do the installation. Fabricators generally purchase materials for resale and thus issue exemption certificates to the vendors to avoid paying sales tax on the materials.

Upon sale and installation, the fabricator/contractor collects and pays sales or use tax to the jurisdiction in which the installation occurred, even if the installation resulted in a capital improvement. The fabrication for sales or use tax is valued at the price at which similar items are offered or, if there are no comparables, at the cost of all materials used in the fabrication. The fabricator is also usually required to collect sales tax on installation charges when the installation does not constitute a capital improvement. In those situations in which a fabricator sells products to others for installation by the buyer, the fabricator collects and remits sales taxes based on the selling price.

The Management Methods Committee gratefully acknowledges the contribution of this information by:

*Eric J. Purnell, JD, LLM and Tim Cummins, C.P.A. of **Aronson & Company**, Rockville, MD 20850*



Bulletin

Estate Tax Planning and Succession

INTRODUCTION

Every company, regardless of size, will face succession planning issues at some time. Many experts agree that three of the leading causes of unsuccessful succession are: (1) lack of a succession plan; (2) inability of the company to retain key personnel after the owner exits; and (3) an insufficient personal estate plan.

This management bulletin will address the issues and possible strategies related to estate planning and succession. (See Bulletins CP 3, *How to Get Out and Let Others In* and TX 5, *Employee Stock Ownership Plan*, for discussion of other succession issues.)

All property is subject to potential estate tax upon death. This includes property such as:

- Cash
- Real Estate
- Personal Property
- Retirement Plans
- Investments
- Revocable Trusts
- Tangible Assets
- Annuities
- Life Insurance (in some cases)
- Business Interests

Problems arise for small business owners, especially in small family-owned businesses, when the deceased owner

fails to understand the size of the estate and potential tax obligation, and therefore the liquidity needs of the business or estate to meet the tax obligation. As reported by the United States Congressional Budget Office (CBO) in its July 2005 paper entitled *Effects of the Federal Estate Tax on Farms and Small Businesses*:

“...critics argue that the tax may pose a particular hardship for a small business or family farm. If building up such an enterprise results in a taxable estate without enough liquid assets to pay estate taxes, heirs may have to wholly or partially liquidate the business or farm. Purchasing sufficient life insurance might prevent that problem, but the ongoing cost of paying premiums would reduce the cash flow available to invest in the enterprise.”

The business owner who plans successfully for estate issues will address techniques to reduce or eliminate estate taxes, and will provide liquidity to avoid the forced sale of the company.

ESTATE TAX – HISTORY AND CURRENT STATUS

Taxation on estates and property transfers at death can be traced back to ancient Egypt, as early as 700 B.C. The

first recorded tax was probably levied by Roman Emperor Caesar Augustus nearly 2,000 years ago, the *Vicesina Hereditatium*, a tax on succession and legacies to all but close relatives. (*The Estate Tax: Ninety Years and Counting*, Jacobson, Raub & Johnson). Although there were many different taxes levied on estates at various times in U.S. history, starting with the Stamp Act of 1797, the modern federal estate tax was enacted by the Revenue Act of 1916 to offset a decline in tariff revenues caused by World War I.

In 2001, sweeping changes were made to the estate tax laws. At that time the top estate tax rate of 55% was applied to all estates over \$675,000. The Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) provided for graduated increasing exemption amounts along with graduated reductions in the tax rate, resulting in elimination of the federal estate tax in 2010. However EGTRRA expired in 2011. Congress and the Obama administration agreed on a new federal tax rate of 35% with an exemption on estates valued at less than \$5,000,000 through 2012. Without further Congressional action, the rate will increase to 55%, and the exemption will reduce to \$1,000,000 in 2013.

Many states also have estate taxes. Consult your tax advisor or attorney for the specifics.

THE LIQUIDITY PROBLEM

An estate will face specific liquidity needs in the immediate and short term. Among those needs are estate administration expenses, state estate taxes, federal estate taxes, and ongoing family income needs. The sources of liquidity for the estate include the liquid assets of the estate (cash, life insurance, CDs, etc),

semi-liquid assets (stocks, bonds and annuities) and non-liquid assets (real estate, business interests, etc.). Where the liquid and semi-liquid assets are insufficient to satisfy the liquidity needs of the estate, the business interest or other non-liquid assets will need to be sold. Not only does such a forced sale alter the company succession plans, but the estate is unlikely to receive fair value for the business, and the sale will result in loss of future income to the family.

While the number of family businesses being sold to provide estate tax liquidity is the matter of some controversy, the CBO estimated that in 2000, one-third of family business estates that qualified for the family business exclusion could not pay the estate tax out of reported liquid assets. (*Effects of the Federal Estate Tax on Farms and Small Businesses*, a Congressional Budget Office paper, July, 2005).

STRATEGIES TO ADDRESS LIQUIDITY PROBLEMS

There are two basic strategies to address liquidity issues. First, either reduce the assets in the estate or shift the assets out of the estate. This can be accomplished through the use of trusts and/or gifting. Second, provide liquidity for the estate primarily through the use of life insurance. These strategies are discussed in more detail below.

Trusts

A trust is simply a legal entity that lets you put conditions on how certain assets are distributed upon your death. A trust differs from a will in that while a will deals with all the property distribution in an estate, a trust may only deal with certain property of the estate. Living trusts are set up during the person's lifetime. Testamentary trusts are set up in a will and go into effect after the person's death.

Living trusts can be either “revocable” or “irrevocable.”

- A *revocable trust* allows a person to maintain control over the assets and change the terms of the trust at any time.
- An *irrevocable trust* transfers title in the assets to a beneficiary. A person with an irrevocable trust cannot make changes without the beneficiary's consent, but the appreciated assets may not be subject to estate tax. Life insurance purchased in an irrevocable life insurance trust can allow a person to provide tax free cash for liquidity to heirs by removing the life insurance proceeds from the taxable estate.

Other more complicated types of trusts can provide additional or alternative strategies.

- *Credit shelter trusts* are a mechanism where a person by will bequeaths an amount up to the estate tax exemption, then passing the rest of the estate to a spouse tax free.
- *Generation skipping trusts* allow a person to pass assets tax free to beneficiaries two generations removed (typically grandchildren).

Gifting

Another mechanism that can be used to reduce or transfer assets out of an estate is gifting. Gifts are normally taxed to the recipient at a rate similar to estates. However there is an annual gift tax exemption of \$13,000 per individual recipient per year, and a lifetime gift tax exemption of \$5,000,000. In certain situations, a planned strategy of gifting can be an effective estate reduction technique, but the gift tax laws are complex and, like all of these strategies, require financial and legal expertise.

Life Insurance

Finally, life insurance can be a cost effective mechanism to provide liquidity for an estate. As mentioned above, an irrevocable life insurance trust is one method. Life insurance is also commonly used to back up buy-sell agreements, providing a company with liquidity to buy a deceased owner's shares from the estate. Again, expert advice is necessary. There are many types of life insurance, and not all types will be effective in providing the type of liquidity desired in specific situations.

CONCLUSION

The estate tax implications for family run businesses are considerable and complex. This complexity is aggravated by the fact that the estate tax laws change often, and state estate tax laws must also be considered. The estate plan as a part of a company's succession plan must be carefully considered and updated at least every few years. While business owners may be frustrated by the cost of and time needed with lawyers, financial planners and business appraisers, this is unavoidable given the existing tax system and potential implications to succession of the business. Ultimately the business owner is well advised to use the same focus in preserving the business assets as was used in building them.

This bulletin is not intended to provide legal or financial advice. Please consult your attorney and/or financial advisor for specific advice regarding the information in this bulletin.



Bulletin

Laser Scanning

INTRODUCTION

Contractors have to produce plans for numerous reasons, such as for review, permits and construction, just to name a few. More often than not, if your building was constructed in the latter part of the 20th century, you may have PDF's or possibly CAD plans that you could use. But, what if you do not have existing plans or CAD files on which to base your plans? What if you are required to produce a Building Information Model (BIM) in a retrofit situation where no electronic plans exist? What if you need to measure pipes or ductwork that are 10 feet or more high and there is no ladder? You can use the tried and true method with a tape measure and paper and hope you can reach all the necessary areas. You could use a digital measuring device, but you may need help depending on the size of the space. However, if another person is not available to help, laser scanning may be an option.

LASER SCANNING – WHAT IT IS AND WHAT IT IS NOT

Generally, laser scanning is defined as a controlled steering of laser beams followed by a distance measurement at every pointing direction. In essence, the instrument emits a laser multiple times per second and associates a point on everything it contacts. At the end of the scan, depending on the accuracy you choose, you may have a few thousand points to a few million points per scan.

There are two types of scanners that a mechanical contractor may use: time of flight and phase-based.

Time of flight scanners offer better accuracy for long range scanning (over 50 feet)

Phased-based scanners offer better accuracy for shorter range scanning (under 50 feet).

More often, phase-based scanning will work best for mechanical contractors.

A scanner is not an x-ray machine or a CT scanner. It cannot see through walls or ceilings. To see above the ceiling, you will need to remove the tiles. It works on the WYSIWYG (what you see is what you get) principle. Currently, scanners will not produce much more than the points on objects it scans. You will still need to model what you want from the points that you collect. It is a very rapidly ever- changing technology that has limitless potential in the future.

ACCURACY

Most of the manufacturers will offer accuracy to within 1/8 inch to 1/4 inch. In most cases, this accuracy is usually sufficient. Depending on the settings you choose and the objects that you're scanning, your accuracy may be better.

CONDUCTING THE SCAN

Running the scanner is the easy part. Once the scanner is set up and ready to go, usually all that remains is to just push a button. The key is in the settings used for the scan and target placement. Each manufacturer will have recommended settings that you will need to follow. Targets are not necessary, but are usually recommended.

REGISTRATION/"STITCHING"

Once scanning is complete, you need to register or "stitch" the scans together. The scanning manufacturer most likely will have its own proprietary software for the registration. Depending on your scan and the number of set ups and targets used, the software may register it automatically with minimal user input. You will need to learn the software to be able to work with the features that the software offers. This is one step most users do not consider when they get involved with scanning.

POINT CLOUDS

Once registration is complete, you can place your cloud in your desired software of choice for modeling/drafting.

Most software manufacturers have their own point cloud editing software. There are also third-party software vendors that have add-on's for purchase that work with most modeling software.

SCANNING USES

Laser scanning is typically used for surveying existing conditions to assist in documenting existing features. It could also be used for construction verification

purposes. Key control points should be established to have common reference points for use in orienting your scans. Piping verification, stub up locations, ductwork locations, conduit locations, drains, and equipment can all be scanned and placed against the construction model to verify that components have been placed correctly. Laser scanning can also be used to aid in completing as-built plans once construction is complete.

PURCHASE VS. RENTAL

Scanners are produced by a multitude of manufacturers for a wide range of prices (\$40,000 to \$200,000), depending on what type of scanner you need. However, some companies may choose to rent the scanner on an as-needed basis. That option, however, can be quite tricky and very time consuming. The rental company will usually rent the equipment on a daily, weekly, or monthly basis. Prices vary by area. Be careful to check the availability of the registration software and who will be doing the registration. Some companies may choose to purchase the registration software, thereby avoiding the software rental issue. And, rental companies may offer to extend use of the software for a fee as well.

CONCLUSION

Laser scanning has been used in the civil engineering community for several years. Just recently, the technology has been used in the MEP construction industry. It has its benefits and uses, but it is not ideal in every situation. Laser scanning can be a very powerful tool for any mechanical contractor's tool box.



Bulletin

Electronic Tablet Use in Construction

INTRODUCTION

Contractors are constantly looking for the most efficient and cost-effective way to get tools, materials and information to the field that will result in the most productive installation possible. In the past 20 years, construction technology has played an important role in streamlining how we estimate, draw, track, and ultimately execute projects. Many of us can still remember when computers stayed in the main office and those in the field estimated, purchased, and drew our projects using pencil and paper. The “Renaissance” began with the calculator and radio, then came the desktop computer and cell phone, followed by the laptop computer and Blackberry, and now the electronic tablet and smartphone.

Correctly deployed, the electronic tablet has the potential to transform our industry by providing men and women in the field with information in real time. Determining a deployment strategy is no small task. It is imperative that decisions be made in a logical order to avoid costly re-steps.

In this bulletin we will cover: application selection, hardware selection, and connectivity requirements for the effective utilization of electronic tablets in the mechanical construction industry.

APPLICATION SELECTION

What once was called “software” is now referred to as an “application,” or more commonly in the world of mobile devices, an “app.” The availability of apps is where you begin your research. Everything you do will be colored by the quality of the apps running on the device.

All but the most basic electronic tablets will have some version of the essentials: email, calendar and contacts. The ease of use, however, can vary greatly from platform to platform. What may seem “powerful” or “cool” to an IT manager may be cumbersome and counter-intuitive to someone in the field. This underscores the need to try the device with just one or two people to vet the nuances of the device before a large scale deployment is undertaken. Since the goal is productivity improvement, it is important to minimize frustration and service calls.

Sometimes a very specific app becomes the primary mission of the device. For example, if the client requires you to use a drawing file, then a compatible app may trump other decisions. Other times, the app needs are more generic and several options are available.. Some apps are cross-platform (meaning they support multiple operating systems) while others are platform-dependent.

Clearly, defining a list of apps you want to use is the appropriate starting point.

The following commercially available apps are commonly used in our industry.

Document Viewer

Document viewers enable those in the field to view RFIs, drawings, change orders, isometric drawings, etc. electronically, without the need to stop work to check a physical mailbox in the jobsite trailer. The most important advantage is the reduced time your supervisors spend walking from the jobsite to the trailer. Workers receive the documents immediately rather than when they check their mailbox. On large jobsites where trailers are in a remote location, the time savings can be staggering. This option also allows you to send the correct information to the field in as close to real time as possible.

Schedule Updates

By using some of the commercially available schedule applications, our field crews can update a schedule in real time as they are walking the project rather than taking notes and returning to the office to create and send the update to the GC/owner.

Daily Logs

Creating a custom daily log that's stored on a tablet (whether it's an internal daily log or one dictated by the GC/owner) allows field crews to save time returning to the office to hand off the log to office staff for transmittal to the GC/owner. With the click of a button, field crews can transmit the document directly to the GC/owner and office staff from the field.

Safety Data Tracking and Forms

Safety on the jobsite has come a long way in the last 10 years. The number of GCs and owners requiring pre-task plans, safe behavior observations, and

various site-specific safety permits is increasing. The ability to put these documents in electronic form for easy access by field crews can have a direct impact on field productivity. There are also a number of safety applications on the market that allow you to input safe behavior observations electronically and roll them up to charts for identifying where to focus safety professionals to help avoid a safety incident. The tablet's webcam capability can aid in providing incident documentation or for training purposes when an unsafe condition is identified in the field.

Estimating

Pricing change orders on a job can be a time-intensive process. In many cases, input from field crews is needed to identify what parts were added. This data is then presented to a PE or estimator to plug into software or an Excel spreadsheet to generate a price. This process can be time-consuming when estimates start to pile up. There are some companies that have developed forms that price a change order in the field, thereby reducing a few steps out of the process and increasing accuracy. In cases when the estimating occurs at a main office, the webcam capability of the tablet can provide additional back-up to justify a change as well as better information for the estimating team, while saving the team the time spent visiting the site.

Calendar

Time management is crucial to successful field supervision of a project. Although many of us manage our calendar on our smartphone, the tablet offers the same capability.

Service Calls

The tablet has also changed how many service companies do business today. It has almost become a requirement to survive in the service industry. The software and applications for the service

side of our business is ahead of the curve compared to what has been developed for the construction side of the business. Applications in use today include: scheduling, equipment maintenance, employee and vendor management, billing, inventory management, and accounting.

Material Management

Ordering material directly from the field to a vendor or your purchasing team is much faster when using a tablet. It can reduce steps in the process and provides an electronic history of what was ordered and when. Field crews can have direct access to stock levels and backorders. Coupling the basic ordering process with a receiving system that uses barcoding makes possible real-time material management, including what is left in stock when a job finishes.

Construction Drawings/Isometrics

While it may not be realistic to completely eliminate large-size drawing sets in the field, the use of a tablet can reduce the need for them and allow much quicker deployment of changes to field crews. Tablets also help to reduce the amount of re-work by capturing conflicts quickly. Tablets give supervisors the ability to view and annotate construction drawings in the field. This allows field crews to cut steps out of the process when turning a conflict into an RFI or change order. A tablet also aids in the coordination process by preventing unnecessary rework because field crews had not yet received the latest drawing revision. The use of a webcam on a tablet can provide additional support when trying to articulate a conflict in an RFI or change order.

Productivity Updates/Tracking

The productivity of field crews is critical to the success of a project. Gathering data on the status of an installation and turning that data into useable

information that leads to early identification of a problem can mean the difference between a good job and a bad job. The tablet provides a way to prepare updates in real time while supervisors are in the field and transmit that data into a format that can be evaluated to determine whether the project is on track or needs adjustments. A camera can provide documentation and verification of the status of an installation in case a potential claim is filed.

REMOTE DESKTOP CONNECTIVITY

There are times when the business need is more specific than what can be supported by commercially available apps. For example, if the project needs a specific method of productivity tracking that interfaces with other business systems, it is highly unlikely that a suitable app can be found. In such cases, a couple of options are available: develop an app from scratch or use a Remote Desktop Connection.

Creating an app from scratch is probably not realistic for the majority of companies. It would require a large volume of work (and subsequent cost savings) to offset the high development costs. The Remote Desktop Connection, however, is a secure way to link remote users with the enterprise systems. The app simply connects to the company's application server and the users "see" a screen on their tablet as if they were sitting at a desktop computer in the office. Most remote desktop apps can also be configured to restrict access to a single application on the server, thereby limiting what information is exposed beyond the firewall. Because security is controlled on the server side and data does not pass to the device, there is no risk of an information leak should the device be

lost or stolen. Furthermore, the sharing of information becomes automatic because it is not local to the device. And, as your business systems change, you can immediately deploy the upgrades to desktop, laptop, and mobile users simultaneously.

HARDWARE

The electronic tablet today comes in many shapes and sizes and a variety of price ranges depending on your needs. Some attributes to consider:

Platform

There are currently three primary platforms available for electronic tablets: Windows, Android, and iOS (Apple). Deciding which platform is appropriate for your needs is important as it will affect many other decisions. It is highly recommended that you try out a configured platform fully with a single user before making the platform decision for the company. Small nuances that are not described in the product documentation can make a big difference in the user's experience on the jobsite. Remember: the majority of tablets are designed to be consumer appliances, not business machines. Functionality will not necessarily mimic that of your laptop, even for routine tasks.

Size

Electronic tablets are currently available in four size groups: large phones, seven inch tablets, ten inch tablets, and laptop replacement tablets. Your size decision will be based upon the viewing needs of your user, your emphasis on portability, ease of interface (small devices also have very small touch keyboards) and cost.

Memory and Features

There are a tremendous number of features available on the current array of electronic tablets. Most have become

standard, although a few are not. Two that are not universal but may be critical to your business are a USB port and memory capacity. If you share a lot of files using a USB memory stick, then a USB port is a necessity for your device. For businesses that rely on keeping a number of large files (documents, photos, movies, PDF files, etc.) on the device, large memory capacity may be of great importance.

Accessories

The accessory market has become just as relevant to the utility of the device as the hardware itself. Items such as external keyboards, waterproof covers, GPS receivers, vehicle mounts, and compatible printers can mean the difference between a good and bad user experience with the device.

Connectivity

Connectivity is to the electronic tablet what fuel is to the jobsite truck; without it you're not going anywhere. There are three primary means of connecting your device: 3G/4G cellular, WiFi, and USB. The decision of which mode to employ depends upon a number of factors: cost; availability; data security; application requirements; and timeliness of information.

3G/4G Cellular

Cellular technology represents the most versatile connectivity mode. It's a rare corner of urban America that does not have coverage these days. If you can talk on the phone, most likely your device can also access data. While not as fast as WiFi, 3G/4G data systems are good at meeting the needs of an average tablet user. The access does, however, come at a price; there is a premium for the initial cost of the device and a recurring monthly cost for the data plan. Heavy data users need to be aware of caps or penalties for exceeding the usage allowances under their data plans.

WiFi

WiFi technology is currently the pinnacle of wireless data throughput. Your applications will experience the least amount of lag and, generally, the data is free from monthly usage limits. While public WiFi is not available at most jobsites, a common strategy is to employ a WiFi “hotspot” at a central job shack or foreman’s trailer. These “hot spots” transform cellular technology into a local WiFi network where multiple devices can share a common cellular connection and, therefore, save costs. High data demands, however, will struggle under a shared connection.

USB

For users who do not require a “live” connection, USB connectivity is a valid tool. If your device strategy is to simply replace volumes of paper (company manuals, forms, submittal data, etc.), a one-time upload to a device at the start of the project may be sufficient.

There is one more item to consider when it comes to connectivity and that is Internet usage on the jobsite. Is your company a “Theory Y” company that believes in empowering and trusting employees to make the right decisions or a “Theory X” company with a culture of “locking things down” to keep people out of trouble? An Internet connection can be a valuable tool, but it can also become a time waster if not managed correctly.

ADDITIONAL CONSIDERATIONS

Employee Perception

Done right, the deployment of electronic tablets can be a great motivator and even attractor when hiring employees. It’s a great feeling to work for a company that is willing to invest in the best tools possible, and tablets can be part of this mix. The supervisor’s job might not be easier, but he or she may feel more effective or in control just by

providing better information. Done wrong, it can be a source of frustration. Requiring a supervisor to use a device that doesn’t function correctly can be a serious demotivator.

Security and Control

There is a wide variation in thought on how best to “lock down” a device. Do you allow employees to install their own apps or does the IT department strictly control that? Do you allow employees to take the device home? What about personal use rules? How much of your enterprise is exposed just by turning the device on? There are serious internal policy issues that should be considered and then discussed with employees. The policies should be clear and universally enforced.

COSTS

Devices are available for as little as \$150 for the most basic PDF reader to as much as \$2,000 for laptop replacement tablets. The purchase price is only part of the total cost to consider. The total fixed deployment cost will be the sum of the purchase price, app cost, accessories, setup time, and training time. If your device uses a cellular data plan, count on an additional recurring \$35-\$50 per month depending upon your carrier and region.

Plan for a percentage of devices to suffer field casualties. They are small, slippery, and are sensitive to impacts, moisture, and particulates—the very things we have in abundance at the jobsite. Do your best to provide physical protection and guidance to the user to keep the devices safe, but be aware that there will be casualties. Knowing that, keep a device or two in reserve. The worst scenario is to get everyone dependent on a device only to have it break with a replacement two weeks out.

Finally, consider the devices to be tools with a finite life span. While a Miller welder may last 20 years and a jobsite truck 10 years, a mobile electronic device may only last two or three years.

CONCLUSION

With labor costs now exceeding \$70/hour in some regions, it does not take many hours saved to have a positive return on your electronic tablet investment. Successful deployment requires deliberate analysis of your goals and business needs. Be aware that taking electronic tablets to the jobsite is not a fail-safe process and regardless of how well-planned your efforts, there will be challenges in getting it to work as desired.

Technology is still changing very rapidly; what is a good solution today may be obsolete six months from now. Be prepared to be flexible and ready to adjust your course as your needs and the available resources change. The only thing that is certain is that bid competition will continue to increase and the management of information represents a significant potential for improvement in field productivity. The days of a paper construction project is coming to an end. Everything from plans to CAD files to material lists is moving to an electronic base. Keeping your field as close to this new information source as possible is critical to your success. Companies that figure out how to do this well will enjoy the advantage of bidding more aggressively or retaining more profits on work awarded.



Bulletin

BIM — What Is It and Is It Right for My Company?

Introduction

Building Information Modeling, or BIM, is becoming a standard requirement in project specifications. BIM is a three-dimensional design and construction model for coordinating trades and providing information about the equipment and systems in the model. BIM can be very complicated or it can be reasonably simple. BIM requirements are often defined in the bid or contract documents and are rarely the same for every customer or project.

While BIM presents an additional cost to any project, it can also provide real benefits. Once a company invests in the people and software required to provide 3D drawings for a project, it must look at the whole project and its delivery methods to see the total value in BIM.

If you decide to invest in this technology, you need to understand how it can save money for you as a mechanical contractor.

Making the Investment Pay Off

To reap the greatest benefit from BIM technology, you must look at how to integrate the available software products with your company's fabrication equipment and your piping and sheetmetal installation methods. There are many programs on the market that will fit the needs of various

companies. Many models are being drawn in Revit, which for the mechanical contractor may not have sufficient libraries of piping and sheetmetal components that would help us with fabrication designs. There are some additional third-party software programs that can be used to convert a Revit model into a spec-driven, trade-specific model that can be changed and coordinated with all the other trades to allow you to make fabrication drawings from your 3D model.

When you use these third-party programs, you can design a specified piping model with all of the actual dimensions of the pipe, fittings and valves as well as hangers for your system. You can also coordinate and run the model with other software programs to do clash detection with the other trades.

Taking the Lead Early

It is generally a good idea for the mechanical contractor to take the lead on the 3D coordination effort, since the mechanical generally has the largest equipment and services above the ceilings and in mechanical rooms.

The BIM coordination starts early in the construction process, many months before the trades are onsite, in most cases. The team must decide where the coordination will start as it coincides with the project schedule. Equipment decisions must be made and drawings must be based on the

final purchased items. Once you have areas that are fully coordinated, having sign-off from the other trades is important so that you can use these drawings for prefabrication of hangers, pipe and sheetmetal for the coordinated areas.

To get the greatest efficiency from these efforts, the use of a robotic total station laser or other similar products for locating all of your hangers and equipment corners will save you a lot of time and money. In most cases, it can keep your crews from working off of lifts or ladders while locating all of your hangers from the floor or roof above and using inserts when applicable. Installing your projects in this manner can save a lot of time and reduce unsafe practices of drilling overhead from ladders or manlifts. With BIM and preplanning, seismic cables and inserts can also be included on your drawings which will save you from doing this at a later time.

Using the 3D model for coordination to prefab as much as possible adds to the quality and speed of construction, and yields a better final product. The model will also reduce the jobsite manpower and weather-related slowdowns. Performing the majority of this work in a shop environment with heat, ventilation and fabrication equipment before it is needed on the job will keep you from getting covered up by other trades.

The coordinated model will also help you evaluate such elements as prefabricating building risers, pump skids, coil connection modules, steam pressure-reducing modules and ductwork assemblies.

Using your coordinated model to make your prefab assemblies, you will see the most benefit from this technology.

Getting Started

If this technology is new to you, begin by reading *Achieving Spatial Coordination through BIM—A Guide for Specialty*

Contractors by David E Quigley. This publication, developed jointly by MCAA, NECA and SMACNA, is available through MCAA.

Once you have made the decision to build your projects this way, you will need to get all of your project personnel on the same page. Project management, estimating, purchasing, pipe designers, fab shop managers, foremen and tradesmen all need to be brought together to understand how the technology will be implemented for your company.

Finding the right software and setting up your piping and sheetmetal standards for BIM is the first step. Training your designers to draw using the methods you use in the field and working with your installers will help minimize mistakes when fabricating from the drawings.

Getting this to work is a collaborative effort within the company, and its success depends on all parties' input. When this effort comes together and is successful, the entire company will benefit. Seeing how this technology improves field installation and keeps your job on schedule improves morale and customer satisfaction. It will take an investment in time and dollars to get the full benefit from this technology.

So if one of your next projects requires BIM coordination and you can implement it to the level of shop fabrication and hanger layout, you will see that although BIM adds costs to the front end of the project, it cuts costs in the field and in overall construction.

Conclusion

To be competitive in large projects, most companies will have to embrace BIM technology. If they want to be profitable on these projects, they will need to take it to the level of fabrication. Companies will have to decide to invest in this technology based on the type of projects that they pursue.



Bulletin

Cost and Control of Tools and Equipment

WHY WE NEED TO MAINTAIN TOOL CONTROLS

Since tools represent an important percentage of operating costs, you have a large stake in maintaining control of their distribution and use. The word “control” implies both physical and accounting methods used to protect and account for tools and equipment. Aside from occasional cases of recovery through insurance, few contractors carry significant insurance, and collecting for stolen, lost, wasted or spoiled tools is usually a waste of time. You cannot protect yourself against such losses unless, in one way or another, you provide a method to control this valuable asset. The contractor must ensure that the following guidelines are implemented:

- Use equipment efficiently
- Use of assets economically
- Prevent hoarding of equipment by jobs
- Reduce duplication of purchasing by office and field personnel
- Obtain maximum tool life

Tool control can be broken down into two sections:

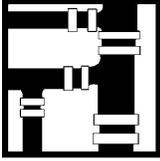
- Control of hand tools (usually items costing under \$300).
- Control of tools and equipment costing over \$300 and carried as a depreciable asset.

The factors affecting major both equipment and small tool costs are similar. The more important factors are discussed in detail in the following paragraphs.

CONTROL OF THE ORIGINAL COST OF TOOLS

When a contractor decides to purchase a tool, he seeks to buy it at the lowest price. He also selects a tool or piece of equipment on the basis of its operational efficiency and suitability for a particular purpose.

When it comes to the more frequent or almost constant purchase of small tools, equipment, and supplies, you should estimate the items needed for the coming year.



Quotations are then solicited from various suppliers. Blanket orders are placed and the items are drawn on an “as needed” basis. Up to 25 percent savings can be realized over the more usual method of buying individual items when needed.

The Accounting Departments Role in Tool Control

As with physical control, accounting control begins with purchasing. Tools and equipment may or may not be bought specifically for a job, depending to some extent on the size of the job. In either case, they do not usually appear on the materials budget. On smaller jobs, they usually come from warehouse stock and are normally controlled by the stock or warehouse budget.

Tool and equipment costs are generally included in a bid as part of the operating overhead. This cost is stated in terms of a percentage of labor and will run an average of 2 percent of labor. When actual consumption exceeds the percentage allowed, it usually means that there is a loss or theft on a scale that requires investigation.

We pointed out earlier that accounting control on tools must start with purchasing. This requires some qualification. Although purchasing policies can readily be coordinated with accounting control, the procedure may not lend itself to such control without an unreasonable amount of detail.

There are three points at which coordination should be considered, regardless of the accounting method used. They are:

1. Purchase orders should be priced at the time purchase is made.

2. A “job copy” should be prepared on all purchase orders and materials contracts bought for a specific job.
3. Terms of purchase should be printed on the purchase order. It is here that shipping instructions, terms of payment, warranties, and the liability for legal fees in the event of litigation should be covered.

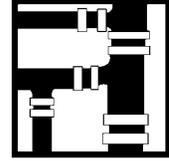
Accounting procedures to be followed at the time tools are received are built around either a receiving memo, the receiving copy of the purchase order, or the buyer’s copy of the vendor’s delivery memo. The separate receiving memo takes more time, but provides the greatest degree of protection.

Many contractors, however, prefer to rely solely on the buyer’s copy of the vendor’s delivery memo. Using the vendor’s delivery slip takes the least time, but it is the most vulnerable to error and fraud. It is almost too simple for warehousemen to merely sign the vendor’s delivery ticket without counting or checking the load or, in fact, without even checking the delivery memo to see that the goods received compare with the items listed. This practice is an invitation to regular delivery people to short the loads and sell the missing items for their own profit. This kind of loss is thrown into inventory where it is hard to detect.

Whichever form is used, it has the effect of telling the accounting department that goods have been delivered to the company and are now the company’s responsibility. If the goods go directly to a job, they will be charged to that job. If they go into warehouse stock, they must be accounted for there.

A recommended minimum receiving procedure would involve these steps:

- Unloading tools at the job or the warehouse.



- Counting or measuring to determine the quantity delivered.
- Inspecting the condition of the items delivered.
- Checking the delivery receipt to determine that the items signed for are the same as the items received.

Once tools reach the warehouse, the accounting procedures and record-keeping vary a great deal. Much of the variation depends upon the extent to which accounting control is applied to warehouse stocks.

Theoretically, proper accounting would require a perpetual inventory utilizing one of the standard inventory methods. As a practical matter, the cost of a full perpetual inventory far exceeds its value to the business. Many contractors merely charge all purchases to cost at the time they are received and make no further attempt to account for them. Then they rely solely on physical controls to prevent loss.

TOOL MAINTENANCE, WEAR AND TEAR AND THEFT

Wear and tear, thefts and losses account for approximately 40 percent of your yearly investment in tools. Based on a spot survey of several local mechanical contractors with annual volumes ranging between \$750,000 and \$20 million, this staggering percentage averages out whether calculated individually or collectively.

Physical Control

Personalizing tools is the first in a series of steps that will help to physically protect them against theft. All tools, equipment, tool boxes, and tool kits should be painted, stenciled or branded. Branding is probably the

most effective method of identification, since it is almost impossible to cut the brand off ladders, tool boxes, or other items. Our last survey shows a majority of the respondents prefer this method over the use of painted markings which are relatively easy to remove. Some suppliers will imprint your company name on electrical cords, screw drivers, hammer handles, etc. at little or no extra charge at the time of purchase.

Many electrical tools come with a one year warranty, branding or engraving these tools with the month and year purchased, i.e. 7/95 will make warranty claims easier to process.

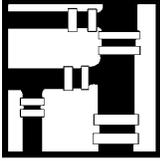
Good supervision remains the best defense against tool loss, theft and mis-use. An employee on site should be designated as the responsible person for ordering the tools needed and verifying the need before dispensing tools. He should demand that broken tools be returned before replacing them. It is also important to know the location of tools on site to reduce duplication.

Theft and the Elements

Theft and spoilage caused by exposure are easier to control in a yard or warehouse than at the jobsite. Since on-site conditions vary widely, each must be handled according to the particular situation.

To test the efficiency of the physical protection given your tools and equipment, you should be able to answer the following questions:

- Are they stored where the weather cannot hurt them?
- Are they easy to steal?
- Are they worth stealing?



- Do you have an adequate system to determine and control such losses?

Have a Well-Kept Warehouse

Another checkpoint in physical control is a well-kept warehouse or yard. It is not unusual, in the absence of such a facility, to find that tools are being purchased while identical items lay unused in the warehouse. An experienced warehouseman should know whether or not he has a given item merely by looking. With an adequate accounting record and requisitions, you have the basis for the cost of tools and equipment. However, accounting methods are not a substitute for physical control.

Ideally, a good storage area should be enclosed. Doors or gates through which any items are received and removed should be in full view of the warehouse office. All doors and gates should be supplied with locks and keys should be carefully controlled. As an added precaution, locks should be changed from time to time. All official keys should be stamped with the words, "Do Not Duplicate".

Similar items should be kept in the same section of your warehouse or yard. When this is not possible, a bin card or some other record should indicate that there are other items of that kind at another location.

When used tools come in from jobs, they should be inspected and listed, with usable items being stored immediately. Any item that requires cleaning, repair or salvage should be placed in a separate area where salvage work can be performed. Before they are stored, all power tools and extension cords should be cleaned and checked to make sure they are ready for use. If repairs are needed, they should be made before the tool is placed with

those which are ready to be sent out on a job. No tools should be repaired on the job. On-the-job repairs not only take the time of the repairman, but also the time of people who should be performing other tasks.

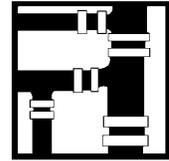
Repairs and Rentals

Some companies repair all tools. Other companies have determined not everything is worthy of repair. Any item, such as a worn out 18-inch wrench, is thrown away. It is much cheaper than having it repaired, since labor costs are greater than a new 18-inch wrench.

When a job is completed, all equipment is returned to the shop. Equipment is never taken directly from one job to the next. There they are checked, repaired, rebuilt, replaced and repainted before being shipped to other jobs. Rental equipment and scaffolding is returned when they are no longer needed at the jobsites. It is the responsibility of the superintendent to send all power equipment back to the shop when not in use. Superintendents must also remind job foreman not to hoard equipment.

One method of getting this message across is to convince the job foreman that this equipment is being rented to his job on a weekly or even daily basis, and that it will increase the cost of his job if this equipment is standing idle. Only job shacks, job trailers, and job trucks are moved from one job to another.

Classes should be organized and foreman and mechanics should be properly informed and instructed in the proper use and care of tools and equipment. This not only provides for the most efficient use of these items but also minimizes down-time due to unnecessary repairs. Proper service and lubrication or "preventive maintenance" is the



most effective and least expensive way of ensuring long, productive use of tools and equipment.

Negligent Use

Here is a cost that is almost impossible to evaluate, but a cost nevertheless—and it can be a substantial one. The previous items deal with keeping obvious costs minimized and under control. Most of the systems mentioned lead to efficient use of tools and equipment. Inadequate repair and maintenance records and inadequate systems for tool maintenance and repair may well result in long work delays at a crucial moment on a job. Not being able to locate a piece of equipment promptly may result in the inability to use that equipment at time of critical need. Even knowing where a tool or piece of equipment is may not be enough unless the mechanical condition of the item is also known.

Too much stress cannot be placed on the importance of proper lubrication, cleaning, adjustment, etc., in the field by the operating personnel.

Preventive maintenance programs, faithfully followed, guarantee the most efficient use. Manufacturers invest thousands of dollars in providing operating and maintenance bulletins with all tools and equipment. Contractors can realize a commensurate return by following manufacturer instructions.

A record-keeping system containing the history of each major tool and piece of equipment is worth the investment.

In the case of repairs, it is important that problems with hand tools or small equipment be communicated accurately to the tool manager.

Contractors find it useful to employ a tool repair tag. This tag allows the person who discovers a problem to explain it to the tool manager in writing.

A simple red tag with wire is effective for identifying defective tools, (see Exhibit 1) In this system, no tool would ever return to the shop for repair without a tag attached.

Defective tools found on the jobsite by OSHA inspectors will often be cause for a citation. Tagging defective equipment and its prompt return to your repair facility will:

1. Protect your workers from injury caused by defective tools.
2. Protect you from possible citations for unsafe or defective tools.
3. Provide more productive up-time by repairing tools and equipment in a timely manner.

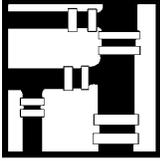
Rules to Follow

To summarize, there are four rules that, if followed will insure successful physical control of your tools and equipment.

- If you are charged for something, be sure you receive it.
- Once you have it, store it where you can find it.
- Make sure it is safe from theft and weather.
- When you release it, be sure you know who took it, what he took it for, and whether he has a right to have it, and check to ensure it is on-site.

MANUAL TOOL CONTROL SYSTEMS

Keeping track of tools and equipment, and exercising better tool cost control should be neither expensive nor complicated. An ef-



fective tool identification and control program revolves around a simple record-keeping system which essentially does two things:

1. It provides basic data at a glance on a given piece of equipment or tool.
2. It alerts your accounting department on how and where the tool is to be charged. Proper use of a record-keeping system develops internal cost-consciousness, and lowers tool losses.

Tool Control Using Magnetic Boards

The simplicity and usefulness of a tool record-keeping system makes effective use of several magnetized boards and tags, using them specifically to control location and flow of major tools, machines and equipment.

In this system, a magnetic tag is prepared for each piece of equipment, identified either with the equipment's serial number or by a company-assigned number.

Tags of different colors are coded for each job, with such headings as "IN SHOP", "IN SHOP FOR REPAIR", "OUT FOR REPAIR". As each tool is moved, its corresponding tag is moved on the board to indicate its new location.

It is a very simple system to set up and maintain. Keeping the board current is the outside superintendent's responsibility. He can tell at a glance where each tool is located and whether it is available for use.

Tool Control using a Bin Card Inventory System

In most cases where a running inventory is kept, it is kept on bin cards by units only. Tool boxes stocked with all the required tools are sometimes furnished to workmen. In this

system, the boxes are numbered and the stock of tools checked each time a workman returns the box to the warehouse.

Sometimes tool boxes are controlled in much the same way as hand power tools. With hand power tools, one of the simpler and more practical controls is an equipment location card.

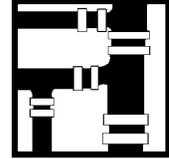
Essential to any adequate system of control is a physical inventory. It may be taken on an annual basis, but more often it occurs continuously throughout the year. When a type of item reaches the minimum inventory figure that has been set for it, and the warehouseman is preparing a requisition to replenish his stock, he makes a physical count of the items on hand. If an adjustment is necessary, he either makes it in his own record or prepares an adjustment memo for the accounting department. Then the only bins to be counted at year's end are those which have not been counted during the year.

Using A Card Index System

Some contractors use a card index system for each tool and piece of equipment, and believe that this system minimizes tool shortages.

In this method, a contractor keeps all equipment, power and measured tools on individual index cards. This card index is kept in the shop superintendent's office where he is in complete control of all outgoing tools and equipment. All hand tools are entered daily as ordered in the various job tool boxes. One person must be responsible for this task at all times, preferably an employee on a permanent basis.

Index card entries should bear the job name and number, the tool being used, the date the equipment is sent out, and finally, who is using it. Return of equipment or power



tools from job to shop is checked off on the index card.

When a job is completed, final check off of the index system will indicate whether there are equipment or tool shortages. The foreman is immediately notified of these shortages by the shop superintendent who is the key person who must keep track of and communicate his awareness of shortages. A reliable shop superintendent often revisits a large job with the foreman or field superintendent after the final job pickup. This can result in the recovery of many hundreds of dollars of lost or misplaced tools at the jobsite. As a further aid to identification and control, it is possible to set up "Gang Boxes". These boxes are painted, numbered, and permanently etched.

Equipment Record Card System

Another method is a record card system. The card is legal size, printed on both sides and divided into four sections: vital statistics (type of article, size, price, age, rental rates, etc.); inventory record; repair record; and a rental income and service record.

Information recorded at the top of the card describes the equipment, its specifications, purchase price, estimated life, depreciation, duration of service and pro-rated daily, weekly and monthly rental rates. Also recorded is information designed to simplify identification of the equipment. "Owner's No." is the number to be painted on the equipment, using any system the owner may employ. "Mfg.'s No." is the serial or model number assigned by the manufacturer. Of added interest is dates of inventory and repair. The inventory record portion of the card shows annual depreciation and inventory value of a particular piece of equipment. The repair record pinpoints date, type and cost of repair.

For those contractors doing time and material or cost-plus work, and for those who desire this information for more detailed cost control systems, operational costing of tools and equipment is required.

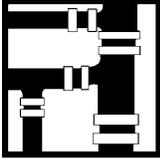
These costs consist primarily of:

1. Cost of transporting to and from the jobsite
2. Cost of connecting and disconnecting
3. Cost of oil, fuel, and electric power
4. Cost of "stand-by" labor.

COMPUTERIZED TOOL CONTROL SYSTEM

Large tool and equipment inventories necessitate the use of a computerized data base to track tool locations and usage history. Many different "over-the-counter" programs exist which can be used to establish a database for tracking the location of tools and equipment, along with whatever other useful information you may wish to compile about a particular piece of equipment, such as its maintenance or usage history.

Each piece of equipment is assigned a control number, using whatever system of numbering is most convenient for the given volume of equipment, and this number is entered in the computer along with relevant data about the item, such as serial #, manufacturer, model, date of purchase, replacement value, etc. A similar list of the active jobs is prepared, and each piece of equipment is associated with the job at which it is located. Shipping memo's are generated in the shop when equipment is sent to a job or is returned from a job, and these are processed on a regular basis. The result is a database which can be used to generate reports on the location of all equipment, or the specific equipment located at a particular job.



SEE EXHIBIT:

#2 Rental Equipment Master List

#3 Rental Picking/Packing list

#4 Rental Days Used Report

#5 Monthly Rental Invoice

#6 Location of Rental Equipment

Aside from the value of being able to locate any piece of equipment from among a large inventory, a computerized database of the equipment inventory is an invaluable tool for keeping maintenance records on time and material jobs, and to help in the accounting process for the generation of revenue from equipment rental. Complex programs can be purchased or written which will not only track the location of the equipment, but will calculate the length of time a particular piece of equipment spent on a job site. This information, coupled with rate information, is used by the program to calculate charges to the jobs, and generate invoices. This information can be generated automatically from the relatively simple entries of the dates that an item leaves and returns to the company shop. Systems are available that will not only help keep maintenance records, but will assist in tracking equipment costs to whatever level of detail is desirable. Work orders for regular maintenance can be generated automatically based upon criteria that can be established in the program. Any number of routine accounting and maintenance record keeping tasks can be made easier by using an efficient and informative database as part of your equipment control procedures.

The development of computer software programs has changed the economics of priced and extended perpetual warehouse inventories. In a typical installation, each item in the inventory is given a stock number. Receiving memoranda, requisitions, ware-

house transfers, and other documents provide data on units received, disbursed, and transferred, together with dates and prices. This information is entered into the computer.

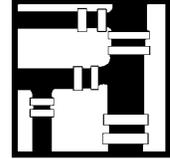
The software can then produce a record of charges and credits for tools and equipment sent to, or returned from jobs. It can also provide, in a matter of minutes, a fully priced and extended warehouse inventory.

Small tools can be handled in a similar manner, but it is better to keep a separate inventory of these items. A practical rule of thumb of charging out small tools to jobs is to charge the jobs and credit the inventory for 90 percent of new value when they are taken out. On their return, credit the jobs and charge the inventory for 50 percent of the same value. New tools are charged to small tools inventory. Any difference between the perpetual inventory kept on this basis and the physical inventory at the year's end would go to an account for unabsorbed small tool cost which would be incorporated into general overhead. If the unabsorbed cost varies too far from actual as determined by an annual inventory, the percentage can be adjusted.

One useful byproduct of computerization is the ability, on large jobs, to furnish the jobsite purchasing agent or warehouseman with tab runs of the central warehouse inventory. With such information at hand, jobsite personnel can tell at a glance whether to buy an item or order it from stock. This prevents duplicate buying and accelerates the turnover of inventory.

The Future Is Now

New computer based systems are now available that can give you the ability to maintain tool and equipment inventories using the universal product code, more commonly



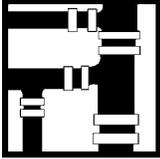
known as the bar code system. This system requires each item to be labeled with a bar code and then scanned with a hand-held scanner, located at all distribution points. Company Inventory, Job Status, Job Rental, Destroyed or Lost Tools, Transfer and Monthly Tool Cost Reports are available with this system.

CONCLUSION

Few mechanical contractors have as much control over their tools and equipment as they would like to have.

There is a constant contest between the expense involved in maintaining control and the savings that can be realized. Also stressed is the urgency of tool control, with the word "control" referring to both physical and accounting methods aimed at protecting and logging tools and equipment.

From the material presented above, we believe that it should be apparent that mechanical contractors who make full use of the control methods available today will gain a considerable competitive advantage.



Tools and Equipment _____

Exhibit #1

 **DEFECTIVE TOOL**

 **Nature of Defect** _____

Missing Parts _____

Date _____

Reported By _____

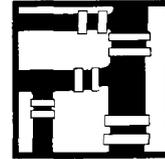


Exhibit #2

Rental Equipment Master List

Page #
Date Last Revised

Rental Equip ID	Equipment Description/ Serial Size /Make /Model	#	On Hand	Rate	Cost Each	Total Cost	Replace Each	Replace Total
A22-004	2 HP Air Compressor	1	0	175	319	319	325	325
A22-014	2.5 HP Air Compressor	1	1	300	400	400	500	500
A22-100	10 HP Elec Air Compr	1	1	300	0	0	2500	2500
B22-045	Gang Box - Cabinet	60	53	70	700	42000	700	42000
B22-059	Work Bench - Rolling	11	0	116	1165	12815	1165	12815
B22-109	Cabinet, Tool	26	0	60	600	15600	600	15600
C62-150	Pipe Carrier, Grasshopr	5	5	150	550	7150	550	7150

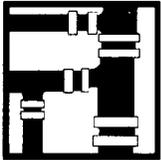


Exhibit #3

Rental Picking/Packing List

Page #

Job #

Customer #

Invoice #

Attn:

Qty	Rental ID	Description	Serial	Make	Model	Rental Date
1	A22-004	2 HP Air Compr	L032595	Speedaire		2/10/96
3	B22-059	Work Bench Rolling	23176	knaack	59	2/10/96
1	P62-093	FSE Tube Squaring Mach	4696			2/10/96
2	P63-024	Tube Partner & Facer	5188	Wachs	4sf	2/10/96
1	P62-154	Tube Partner & Facer	790027	572		2/10/96
1	W42-128	Welder, Ord	73871	3/4" Cap	750	2/10/96
1	W42-201	Welder, Ord	2855	1½" Cap	1500	2/10/96

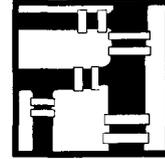


Exhibit #4

Rental Equipment Use

Page #

Days Used Report for Period:
2/01/96 thru 2/29/96

Unit #	Invoice	Description Serial	Date Rented	Actual Return Date	Inv Qty	Days Used	Days Calc	Expected Return Date
A22-100	3442	10 HP Elec Air Compr	2/1/96	2/13/96	2	12	24	
B22-045	3485	Gang Box - Cabinet	1/3/96		2	29	29	4/96
B22-059	3454	Work Bench - Rolling	12/1/95		1	29	29	4/96
B22-109	3448	Cabinet Tool	2/12/96	2/20/96	1	8	8	
C62-150	3472	Pipe Carrier Grasshopr	2/3/96	2/5/96	1	2	2	

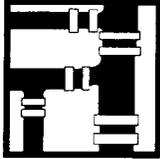


Exhibit #5

Rental Invoice

Page #

Report for Period:
2/01/96 thru 2/29/96

Job #

Discount:

Unit #	Invoice	Description	Monthly Base Rate	Days Used	Rental Date	Return Date	Qty	Net Amount
B22-045	3485	Gang Box - Cabinet	70	29	1/3/96		2	140
H22-100	3453	Rotohamr, small elec	90	29	1/3/96		1	90
F22-050	3468	Desk	35	29	1/3/96		1	35
F22-051	3469	Chair	10	29	1/3/96		2	20
M32-075	3467	Vice, Tripod Chain	35	18	2/5/96	2/23/96	1	21
S22-080	3455	Saw, Portaband	100	18	2/5/96	2/23/96	1	60
V32-005	3531	Vacuum Cleaner - Clean Room	120	3	2/9/96	2/12/96	1	12
Total Net Amount								\$378

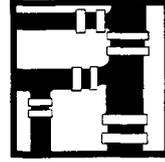


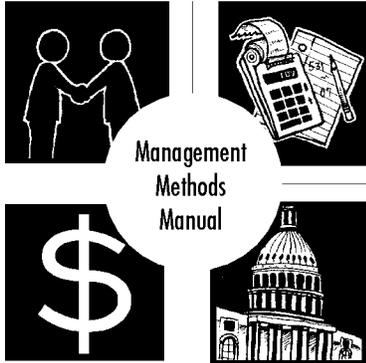
Exhibit #6

Current Location of Rental Equipment

Page #

 Report for Period:
 2/01/96 thru 2/29/96

Job #	Job Name	Rental ID	Qty	Description	Rental Date
4250	IBM Site #2	W42-050	1	Welder, Ord 1/2"	2/8/96
4266	HAL Site #3	W42-051	1	Welder, Ord 1/2"	11/5/95
4267	AT&T Site #42	W42-052	1	Welder, Ord 1/2"	12/3/95
5201	MCI Site #6	W42-053	1	Welder, Ord 1/2"	12/20/95
4191	Baby Bell	W42-054	1	Welder, Ord 1/2"	1/6/96
4250	IBM Site #2	W42-116	1	Welder, Ord 3/4"	2/8/96
4266	HAL Site #3	W42-117	1	Welder, Ord 3/4"	11/5/95
4267	AT&T Site #42	W42-118	1	Welder, Ord 3/4"	12/3/95
4191	Baby Bell	W42-119	1	Welder, Ord 3/4"	1/6/96



Bulletin

How to Cost Corporate-Owned Equipment

Equipment and tools are part of the cost in the day-to-day operation of any business. Too often they are not given the consideration they deserve as a direct job cost. In addition to labor and material expenses, a special effort must be made to recover the expenses of equipment and tools as part of the true-cost picture of each job.

CENTRALIZED EQUIPMENT CONTROL

A system for centrally controlling corporate-owned equipment is based upon collecting and distributing costs via intracompany rental charges to jobs and departments. The charges are determined by the amount of time each piece of equipment is required for completing a job.

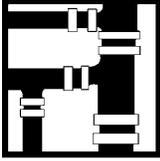
One advantage of a central system is a reduction in the waste associated with idle equipment. By using a central system, this waste is eliminated through a more comprehensive utilization of equipment throughout the company. Depending on the size of the

company, a central system can be set up and administered as a separate department, or it can be administered by an individual with other corporate duties.

By determining the true cost of the day to day use of tools and equipment, additional corporate profits may be realized.

Intracompany rental charges are arrived at by totalling the expense of equipment ownership, which would include depreciation, garage labor, licenses, property taxes, insurance, parts, tires, and administration salaries, as well as other operating costs of the vehicle, machinery or equipment on an annual basis. This total is then broken down into monthly rates for each piece of equipment, and charged as it is used by a job or department. These rates are adjusted annually to compensate for expense changes.

The following are the steps used in establishing a "costing" rental rate and the system for job reporting from which you would accumulate the equipment costs per job:



- I. Asset
 - A. Machinery and Equipment
 - B. Trucks and Autos
- II. Annual Costs
 - A. Maintenance and Repair
 - 1. Service
 - 2. Tune-up
 - 3. Tires
 - 4. Oil
 - B. Interest
 - 1. Based on purchase price—years of life at prevailing interest rate on unpaid balance.
 - C. Insurance
 - D. License and Taxes
 - E. Administration—cost of salaries for purchase, supervision of maintenance, licensing, disposal, and job assignment.
- III. Establishment of Salaries for Purchase, Supervision of Maintenance, Licensing, Disposal, and Job Assignment.
 - A. Asset Purchase Price
 - 1. Add to purchase price a factor for inflation for replacement cost.
 - 2. Deduct from purchase price a factor for salvage.
 - B. Annual Expenses
 - C. Anticipated Life Years
 - D. Expected Months of Use in a Year
- IV. Costing or Intracompany Rental Rate
 - A. Purchase price plus replacement factor, less salvage value.
 - B. Annual expenses multiplied by anticipated years of life.

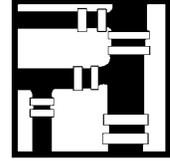
- C. Add adjusted purchase price to total life expenses and divide annual cost by anticipated months of use for average monthly cost.

An example of this system:

- A company purchases a piece of equipment for \$6,000. As its replacement value, to protect against inflation, add 10 percent or \$600. For its salvage value, deduct 15 percent, or \$900. Thus, the adjusted purchase price is \$5,700.
- To figure annual cost: Estimate 10 percent for repairs, or \$600. Interest, at 7 percent, comes to \$420.¹ Figure 4 percent for insurance, at a total of \$240. Add license and taxes, at 2 percent, or another \$120, and the

¹ The interest percentage referred to in the above example is based on the assumption that the unit will be paid off within the equipment's anticipated 6-year life span. Assume interest rate is 12 percent on unpaid balance. A simple computation is as follows:

PURCHASE		
1st Annual	\$6,000	\$ 720 interest @ 12%
Reduction	<u>1,000</u>	on \$6,000
2nd Annual	\$5,000	\$ 600 interest @ 12%
Reduction	<u>1,000</u>	on \$5,000
3rd Annual	\$4,000	\$ 480 interest @ 12%
Reduction	<u>1,000</u>	on \$4,000
4th Annual	\$3,000	\$ 360 interest @ 12%
Reduction	<u>1,000</u>	on \$3,000
5th Annual	\$2,000	\$ 240 interest @ 12%
Reduction	<u>1,000</u>	on \$2,000
6th Annual	\$1,000	\$ 120 interest @ 12%
Reduction	<u>1,000</u>	on \$1,000
	-0-	\$2,520
\$2,520 divided by 6 = \$420 annual interest cost.		



administration cost to do all this at 3 percent, for another \$180.

- The total annual cost is \$1,560. Anticipated life of the equipment is 6 years; figure 6 times \$1,560 equals \$9,360.
- Combining the adjusted purchase price with the annual cost over the next 6 years, add \$5,700 and \$9,360, for a total of \$15,060, as the total cost to recover over that 6-year period.
- This piece of equipment is getting more costly by the moment. Break down this figure: divide \$15,060 by six years, for an annual cost of \$2,510, or a cost of \$280 per month, rounded off.
- Using 4.33 weeks per month, that figures to \$65 per week, or \$13 per day. In an 8-hour day, the cost is \$1.65 per hour for a piece of equipment's use.

V. Job Equipment Costing

A. Assignment from Stock or Yard Storage

1. Job Request

- a. Location
- b. Anticipated use period
- c. Type maintenance & service required

B. Job Reporting

1. By foreman's time sheet

- a. List total equipment on job
- b. Indicate which is in use by showing numbers of hours in use.

C. Accumulation of Cost

1. From weekly personnel time sheets
2. Incorporate equipment cost in monthly progress reports and division Profit and Loss statement.

This method of calculating equipment cost is solely for the purpose of estimating and job costing of job-related expenses. Corporate and any other divisional overhead expense must be added along with profit to the cost rate. The only taxes not accounted for in the costing rate would be a retail sales tax applying to the state in which the equipment is being rented.

A final word on costing of equipment to projects: some mechanical contractors charge equipment to the negotiated contracts but disregard this procedure as a needless formality on "hardmoney" contracts. Thus, true equipment costs remain buried in unabsorbed indirect job costs. The obvious consequence of this practice is understatement of true job costs with possible or likely error in future estimates which ignore real cost of equipment.



Bulletin

Vehicle Maintenance Program

PREVENTIVE MAINTENANCE

Whether you operate a large or small fleet, the equipment in it must be maintained if you are going to get a profitable return on your investment. Probably in smaller fleets preventive maintenance is more critical than in the larger ones. An operation with only a few vehicles depends on these units to keep it in business. Downtime is critical to any operation, but more so when there is not a substitute or replacement unit on hand. The operation that has just enough vehicles to get the job done can be seriously impaired by an extended period of unscheduled downtime.

Contractors find that good maintenance pays in the long run. Vehicles that are kept in peak working condition are available whenever they are needed. Except for unpredictable emergencies, you will not be inconvenienced by lost time as a result of poor maintenance practices.

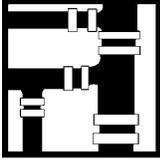
BASIC REQUIREMENTS

For most vehicles, a weekly "walk-around" inspection of the unit with emphasis placed on battery inspection, water level, oil

check, tire inspection and a review of the vehicle's general condition is a good practice. Any problems noted are called to the attention of the proper person who then evaluates their importance and need for repair. (See Exhibits A and B, Vehicle Check/Repair Requests).

Oil and filter changes, lubrication, and all other inspections and/or repairs should be performed in accordance with the manufacturer's prescribed intervals for each vehicle.

Several things in addition to preventive maintenance affect the cost of maintaining and operating your fleet of vehicles. These include: tire inflation, loading and weight distribution, and operator habits. Periodic training sessions can be held with the vehicle operators to remind them what happens when rpm limits are exceeded, an engine is consistently lugged, a clutch is ridden or gauges are ignored. Fuel economy can be improved by reduced idling time on engines, keeping engines tuned, keeping air/fuel filters clean, and avoiding jackrabbit starts.



RECORDKEEPING

A well-designed maintenance record-keeping and report system can be an effective cost-saving tool. It is ideal to keep individual, detailed records on each vehicle. This helps to control the costs involved with repair and maintenance of these vehicles. There is a need to have a grasp on such costs to assure satisfactory performance of a vehicle at the lowest possible cost.

A review of vehicle records will substantiate preventive maintenance jobs on specific components. Most of the data for putting together the start of a preventive maintenance program will be in hand when you start closely examining repair bills or records. A good preventive maintenance program tries to anticipate failure and replace a component “whose number is up”.

Any reporting or recordkeeping system in a maintenance activity can be considered effective only if savings accrue to the company as a result of its existence. Effective and accurate reports can help pinpoint repetitive repairs, provide a historical life of components, identify nonproductive vehicles and provide management with scheduling tools. Put together, these can result in better control of the costs associated with operating and maintaining a large number of vehicles and more accurate evaluation for investment decisions.

A company may have many thousands of dollars invested in its equipment, and expenditures must be made over the life of a vehicle to keep it running efficiently. Dollar costs of equipment have increased over the years, and the contractor must concern himself more and more with his expenses against a unit of equipment. Is the operating cost, in his judgment, outweighing the value of the vehicle? Is the vehicle performing to all levels promised by the

manufacturer? Is the operator abusing the equipment? Are we repairing the unit as efficiently as possible? All these questions and many more are of concern to the management of a company that values the dollars of investment it has made in a fleet of vehicles.

Certainly no piece of paper, no statistical study or report ever maintained a vehicle. It is necessary, however, for those involved in fleet maintenance to understand the importance of this phase of running an operation and to place it in the proper relationship to other management skills.

FIXED COSTS/VARIABLE COSTS

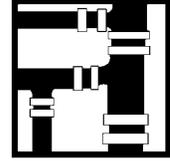
Take a look at your operation. Determine where to devote your greatest attention. First determine which cost items are subject to the greatest improvement and over which you can exercise some significant degree of control.

Such items as vehicle depreciation, interest on investment, taxes, registration fees and permits, administrative salaries, building and office overhead and insurance premiums represent costs of a generally fixed nature. While subject to some movement, they rarely have much effect on changing the bottom line totals.

Those cost items subject to large fluctuations and over which a significant degree of control can be exercised are those usually referred to as vehicle running costs. It is in the cost areas of fuel, shop labor, parts and tires where controls can and must be employed.

REPAIR OR REPLACEMENT

In deciding between repair or replacement, the considerations to be weighed by the management include the following:



1. The length of time the equipment will be used.
2. The job the equipment is expected to do.
3. Will the equipment be worth repairing?
4. Will the equipment perform economically after repair?
5. Resale value of equipment after repair.

6. Should equipment be replaced instead of repaired?

CONCLUSION

A well-balanced preventive maintenance program is far less costly both in time and money than running the risks of breakdowns on the road, which many times involve expensive repairs.

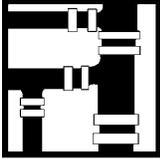


EXHIBIT A

VEHICLE CHECK REPAIR REQUEST

4,000 MILE CHECK

Date: _____

Mileage: _____

Unit #: _____

PART I

() Change engine oil and filters

Qts. added _____

() Check tire tread depth

Depth _____

() Check radiator coolant level

Qts. added _____

() Check anti-freeze to -30°F

Qts. added _____

() Check radiator and heater hoses

() Check drive belts

() Check for fluid leaks

() Check battery

() Check exhaust system

() Check for loose wheel lug nuts

() Note any accident damage

() Note overall condition

() Check for driver suggestions

PART II

() Check brake adjustment

() Check clutch adjustment

() Check accessories and lights

() Grease driveline and suspension

Location: _____

() Check tire inflation pressure

Mechanic: _____

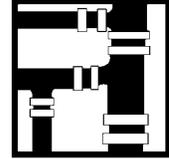


EXHIBIT B

VEHICLE CHECK REPAIR REQUEST

12,000 MILE CHECK

Date: _____ Mileage: _____

Unit #: _____

- () Change engine oil and filters (Oil sample)
- () Chassis lubrication
- () Fluid levels
- () Brake adjustment (check for worn linings)
- () Check for fluid leaks
- () Inspect clutch and clutch adjustment
- () Check for loose components
- () Check steering linkage
- () Check shock absorbers
- () Check tire tread depth
- () Check springs and suspension
- () Check radiator and heater hoses
- () Check drive belts
- () Check exhaust system
- () Clean battery connections
- () Check accessories and gauges
- () Safety equipment mounted and complete
- () Check for engine oil leaks
- () Check fuel pump
- () Check air cleaner for restrictions and vacuum systems for leaks
- () Check alternator with gauge ____amps ____ voltsMechanic: _____
- () Check all lights Location: _____



Bulletin

Contractor's Equipment: A Guide to Better Security

Recent news stories tell a grim story about theft and vandalism in the workplace. Construction sites are no exception.

Security on construction sites should be a major concern for all contractors. The total losses due to theft and vandalism on construction sites continue to be a major concern. Industry wide figures are not available, but CNA losses have been hundreds of millions of dollars over the last decade.

While you may not be able to keep professional thieves from stealing your property, you can make it extremely difficult for them and virtually impossible for amateurs.

The layout of a construction job site and its corresponding security plan often make the difference between controlling losses and suffering costly thefts. A job site without guards, fencing, adequate lighting or controlled exits makes a very easy target.

There is no perfect security program because job sites in different locations require different protective measures.

POOR SECURITY AFFECTS EVERYONE

Remember, when job sites have inadequate security, contractors and their subcontractors are exposed to:

- Theft by employees, and the public resulting in loss of material and time delays to procure replacements.
- Vandalism by employees, former employees, local gangs or children.
- Arson or accidental fires caused by vandals, vagrants or children.
- Injuries or fatalities to children who wander onto an unprotected construction site.

THEFT COSTS YOU IN MANY WAYS

Some contractors ignore job site theft or decide not to take action against it. They simply add stolen property cost to job costs. These direct costs can be substantial - as much as 3-5% of the job cost, according to one estimate. But there are also some significant indirect costs of job site theft:

- When stolen tools aren't available, delays inevitably occur and productivity drops.
- Contractors sometimes buy cheap tools to cut theft losses. These tools may be too shoddy to steal, but they also negatively affect productivity because they work poorly, wear out quickly and break.
- When theft is rampant at a job site, employees' tools are likely to be stolen. Some union contracts hold employers responsible for theft of employees' tools.
- Employer-tolerated theft hurts employee morale. Honest workers don't like working where theft is ignored. Poor morale leads to poor productivity and friction. Management is seen as weak and ineffective.

Even if you are willing to endure the direct costs of theft, you may want to consider the indirect costs.

GENERAL GUIDELINES FOR IMPROVING SECURITY AT YOUR CONSTRUCTION SITE

Make Job Site Security a Joint Venture

Ideally, responsibility for initiation and funding of a good vandalism and theft prevention program should be shared by the general contractor and subcontractors, since each has exposure to substantial loss.

The subcontractor is normally not in a position to stipulate what security safeguards are necessary for the protection of his equipment unless an agreement has been made with the general contractor.

A good program can be developed in the early stages of the construction project which will involve both in sharing the cost and responsibility.

Get Help From Law Enforcement

Well before you break ground or move in your equipment, you should meet with officials of the appropriate law enforcement agency.

You may want to give them the details of your construction project, type of construction, work schedule, project starting time and the expected date of completion. Names and phone numbers of key personnel and contact information during non-working hours are also essential.

Keep the police posted on such things as delivery of critical material and unusual job site activities that might require their special attention. Tell the police how your equipment is specially marked for identification.

Ask the local law enforcement agency to conduct a crime prevention survey of your site. If you are going to use security personnel, it is sometimes good public relations to hire off-duty law enforcement personnel.

Speak Out on Theft!

"Everybody is doing it. The company doesn't seem to mind."

That's likely to be the rationale for theft, even among usually honest employees, when an employer doesn't clearly state opposition to theft and act to prevent it. You may assume employees know you oppose theft, but they may believe you don't care if you don't take specific anti-theft steps. Consider the following:

- Conduct meetings and give handout materials to let employees know you expect honesty on the job site.
- Explain your policy on the "gray areas" – taking scrap lumber or cut-off pipes, personal use of company vehicles or "borrowing" tools for overnight or weekend use.

- Ask employees to report theft to management via a phone number that they can use after hours and on weekends.

Many would-be thieves will be deterred by the knowledge that someone can turn them in anonymously. But before acting on anonymous tips, discuss the case with your lawyer.

Encourage Security Suggestions From Your Employees

Employees can play a vital part in reducing losses of small tools and materials by constant surveillance of your job site. In preventing vandalism and theft, they can work with you as well as work for you.

Many small day-to-day losses must be paid from profits. Don't be afraid to let your workers know that they could be fired if they are caught stealing. Most labor contracts contain a clause listing dishonesty as one of the just causes for which you may fire an employee.

Prosecute those who steal to let other employees know that you mean business.

Involve Neighbors in Watching Your Job Site

Neighbors and their children can become efficient watchdogs of your project during evening hours and on weekends if you solicit their help in a friendly way.

Contact neighbors in the immediate area around your job site. Don't overemphasize your concern about stopping crimes, stress the ways you are promoting safety so their children won't be tempted to play in the area and get hurt.

While they may be sympathetic to your security problems, your neighbors are

also interested in your efforts to ensure their safety.

SUGGESTIONS FOR SAFEGUARDING YOUR JOB SITE

Organize Your Storage Area

A well-organized storage area on the job site should include the following:

- An efficient receiving area that confines material to a specific area.
- A security fence, at least eight feet in height, enclosing the entire storage area.
- Lighting after daylight hours. Watchmen should also be considered.
- Locked enclosures for storing small high-value items.

Mark Equipment

One of the first things thieves do after they steal equipment is to remove the plate on which the manufacturer has listed the model and serial number. Even if you are absolutely certain the machine belongs to you, positive proof is a legal requirement to reclaim it. Keep written records of all vehicle identification numbers on equipment, and keep a color photo of each unit. Maintain an accurate inventory.

Use a hardened steel punch or etching tool to duplicate the serial numbers in at least two places, one obvious and one hidden. Record the locations and the numbers. Post warning notices on machines advising that all VIN's have been recorded. If your equipment is stolen and recovered in another town or state, police can trace ownership back to you and you can make positive identification.

- Consider painting equipment a different color to aid in identification.

- Mark the tops of cabs or ROPS to aid in aerial identification.
- Immobilize equipment by removing the rotor or lowering the blade or bucket. Remove the battery and electric starting system, particularly when equipment is not used daily.
- Install anti-theft devices such as fuel cutoffs, hydraulic bypasses, track locks, hydraulic arm locks etc.

A good inventory control, with a "check in and out" system for tools issued to employees, could save your project from excessive losses. Not all thefts are from the outside. Permanently mark company tools and keep a record to whom they are issued. Lock gang boxes and supply sheds at all times.

Prevent arguments over who owns a tool or piece of equipment by making available inexpensive die stamps or etching tools to employees so they can mark their own identification on personal property.

Use Fences to Control Losses and Prevent Accidents

Pay special attention to the fences on your job site. They can be purchased or, in some areas, leased as needed.

Fencing around the entire site or around storage areas and trailers will help control entrances and exits from the area.

Fencing focuses all access through one or two points, making control easier. Limit the number of gates and keep them guarded or locked when not in use.

Remember, a fence without strands of barbed wire can be easily scaled by thieves and vandals with minimal risk. On highway construction, fencing may be practical only round job site trailers, storage sheds or compounds for

equipment and supplies. Equipment that cannot be fenced should be disabled at night and on weekends. Removing keys is not enough. Switch-jumping is as easy on equipment as it is on automobiles. From a liability and safety standpoint, all hazardous materials (poisons, solvents, flammables and explosives) should always be fenced.

Although some protective fencing, such as that used on a downtown construction site, is made of plywood, it is wise to consider the use of an occasional section of chain-link fencing. This not only provides a better opportunity for surveillance at off-duty hours by security patrols and police, but also offers a view of your construction project to the general public.

Fenced-in areas should be "flushed" at the close of the workday to make sure no unauthorized vehicles remain to be used later for removing tools, equipment or supplies.

Post signs warning outsiders of security guards, watch dogs and alarms. Use signs and decals on equipment to offer rewards for information leading to the arrest of thieves or vandals.

All construction property, whether it is fenced or not, should have adequate signs with lettering large enough to be read at a distance. These should be posted at gates and on all sides of the job site. Signs which give warning or information about any marking of equipment with identification numbers will deter thieves and discourage vandalism.

Secure Tools and Equipment

Make sure storage sheds or fenced areas are used to properly secure all tools and equipment. Keep cabs on all vehicles locked and remove ignition keys when not in use. Use metal shields on equipment windows where practical, and lock oil and gas tank caps. Disable

machines with hidden ignition cutout switches. Most losses are directly traced to carelessness by employees.

RELEASE KEYS TO SUPERVISORY PERSONNEL

Controlling keys is an essential element of limiting access to designated areas. Key issuance must always be based on actual continuing need and not on convenience. Limit the number of persons to whom responsibility of "key control" is given.

Keep up-to-date logs listing the type of keys issued, to whom, on what date and for what purposes. Keep all unissued keys under lock, and keep extra keys to a minimum.

Change your locks periodically. Considering the potential losses involved, this simple act is well worth the time and money. Extra-security locks, such as those having changeable combinations, may be the answer.

To prevent unauthorized duplication, "plug" keys with a rivet through the bow as a means of preventing alignment needed for machined duplication.

Monitor the Receipt of Deliveries

A standard procedure for checking material on and off the job site should be established and followed.

One person should be assigned to maintain a tight inventory control of all materials and tools delivered, signing for each delivery only after carefully checking the invoice for shortages.

Critical material should not be stored on the job site any longer than necessary. Whenever possible, the delivery of high-value material or items known to be in critical demand should be timed on an "as needed" basis in conformance with your construction scheduling.

Spot-check materials and equipment frequently, and do not allow empty cartons to accumulate, since they may be used to take supplies off the project. Supervise all trash removal so that valuable tools or materials cannot be hidden in containers and removed from the job site.

Make Lighting Work For You

Lighting as a crime deterrent is a priority in any plans to combat theft and vandalism. Adequate night lighting is also recognized as a significant deterrent to acts of "casual" or "impulse" crime.

Prior to job start-up, temporary lighting should be in place and plans should be made to expand its coverage as the job progresses. Consider renting lighting systems if company-owned systems are not available. Regardless of the fixtures used, the office trailer, material storage yard and equipment storage area should be illuminated. Critical areas should be visible from the most heavily traveled road bordering the site. A good lighting system can also be spotted during the daytime by would-be thieves who might be casing the area.

The small cost of overnight lighting is smart business since it tells law enforcement agencies that you want to help them protect your property and cut down crime in the area.

Floodlight the perimeter of areas where vehicles and equipment are stored. Direct lights so they do not blind security guards, police or the general public, and use enough lights to eliminate dark spots or shadows.

Report Theft and Vandalism Promptly

No matter how small the loss from theft or vandalism, report all incidents to law enforcement officials. The information you supply to them promptly may save your job from a repeat visit or discourage the vandals or thieves from

striking other construction projects.

Accurate information will accelerate the possible recovery of your equipment or apprehension of vandals. Make sure your company has an effective incident report form and a complete record of model and serial numbers of all equipment assigned to your project. Also, keep in mind that accurate and timely notification of loss must be made to [your insurance company's] claims department.

For your convenience, the form on the following page can be used as a duplication/master form for a self audit of construction equipment and job site security.

CRIME PROOFING YOUR JOB SITE

The most effective crime prevention activities are often the simplest and least expensive. Here are some steps to help reduce theft:

- Follow your company's rules in dealing with employees who steal. Dealing consistently with employee theft will discourage further theft.
- Use an on-time delivery system. Arrange for deliveries when you need the materials, not before. Don't let valuable items sit on your site to tempt thieves.
- Mark all equipment with an identification number and your company name and logo. Urge employees to mark their own tools. Without identification, police cannot prove a tool is stolen and cannot prosecute suspects.
- Advise subcontractors of your schedules. Don't allow them to make deliveries after working hours.

- Don't allow employees to park on the job site or next to a fence where tools can be handed to accomplices. A clear zone should be maintained adjacent to all fencing.

- Use proper locks on tool boxes and trailers. Limit the number of people who have keys, and change locks frequently. Don't use stock padlocks with a widely duplicated key series.

POLICE GIVE ADVICE ON CONSTRUCTION THEFT

Law enforcement officials have identified the following common characteristics in construction equipment theft.

- A buyer for the stolen equipment and/or material is usually identified before a theft is perpetrated. Therefore, the thief sets out to steal a specific piece of equipment or materials that have immediate cash value.
- Thieves will case a job site three or four times, at different hours of the day, before the theft is carried out. This allows them time to determine the contractor's routine and to identify the security measures at the job.
- Most thefts occur in the evenings (usually within 30 - 45 minutes after work is ended for the day) and on weekends.
- Many thieves will not attempt an equipment or material theft if they cannot enter the job site, load the goods and be completely clear of the location within five to ten minutes.

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For more information, please call CNA toll-free at (866) 262-0540 or visit www.cna.com/riskcontrol.

The information and suggestions presented in this document should not be construed as legal advice. Please

consult with your company's attorney before deciding how to proceed in any specific situation.

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CONTRACTOR'S EQUIPMENT SELF-AUDIT

I. EQUIPMENT IDENTIFICATION	Yes	No
• Is a current equipment inventory list maintained?	<input type="checkbox"/>	<input type="checkbox"/>
• Does this inventory list provide:		
- date of purchase?	<input type="checkbox"/>	<input type="checkbox"/>
- serial and model number?	<input type="checkbox"/>	<input type="checkbox"/>
- location of identifying numbers on equipment?	<input type="checkbox"/>	<input type="checkbox"/>
II. JOB SITE PROTECTION		
• Is there a need for a watchman service?	<input type="checkbox"/>	<input type="checkbox"/>
• Are operator cabs locked when not in use?	<input type="checkbox"/>	<input type="checkbox"/>
• Are operator cab windows protected against breakage?	<input type="checkbox"/>	<input type="checkbox"/>
• Are operating control panels covered/secured?	<input type="checkbox"/>	<input type="checkbox"/>
• Are fuel and oil caps locked?	<input type="checkbox"/>	<input type="checkbox"/>
• Are ignition locks provided and used?		
• Are batteries or rotors removed when equipment is left unattended for long periods of time?	<input type="checkbox"/>	<input type="checkbox"/>
• Is equipment corralled overnight?	<input type="checkbox"/>	<input type="checkbox"/>
• Have you notified local law enforcement of your job site location and requested to increase patrol?	<input type="checkbox"/>	<input type="checkbox"/>
• Have the operators been instructed to look for signs of tampering or vandalism?	<input type="checkbox"/>	<input type="checkbox"/>
III. KEY CONTROL		
• Has a competent person been assigned the responsibility of controlling key security?	<input type="checkbox"/>	<input type="checkbox"/>
• Are keys removed from equipment daily?	<input type="checkbox"/>	<input type="checkbox"/>
• Have you identified a secure place for keys to be stored during non-use periods?	<input type="checkbox"/>	<input type="checkbox"/>
• Are all keys accounted for daily?	<input type="checkbox"/>	<input type="checkbox"/>
IV. YARD SECURITY		
• Have you provided fencing for high-valued equipment?		
• Are gates locked and checked each night?		
• Is adequate yard lighting provided?		
• Have you posted signs to discourage vandalism and theft?		
V. GENERAL		
• Have you explained your company's policy on borrowing tools for overnight/weekend use?	<input type="checkbox"/>	<input type="checkbox"/>
• Have you explained your company's policy on taking scrap lumber, copper, piping and wiring home?	<input type="checkbox"/>	<input type="checkbox"/>
• Have you solicited help in a friendly way from nearby neighbors to watch your job during nonworking hours?	<input type="checkbox"/>	<input type="checkbox"/>



Bulletin

Temporary Usage of HVAC Equipment

Introduction

Today's building owners need to understand the risks involved in using permanent HVAC systems to provide temporary heat and/or air conditioning during construction.

Owners should consider using temporary heating, cooling and dehumidification equipment specifically designed to be used for climate control during the construction process.

The construction document should define the requirements for temporary use or permanent equipment. Often, permanent equipment is not designed for early start-up conditions, filter change and equipment cleaning, and the associated costs should be clear in the bid and plan documents.

Consult your builders' risk insurance policy for guidelines regarding temporary usage of HVAC equipment. **Management Methods Bulletin** IN 10 may also provide useful information regarding these policies.

The following provides a summary of requirements of the SMACNA IAQ (Indoor Air Quality) guidelines for an occupied building under construction, 2007, Chapter 3:

- HVAC equipment must be protected from dust and weather.
- The return side of the system is extremely vulnerable since it is under negative pressure during operation. Be sure to protect all intake related parts of the system, whether outdoor air grilles, ceiling plenums, transfer vents, etc. to ensure contaminants are not entering the mechanical system.
- Seal all return system openings with plastic. It is recommended that you photograph the sealed equipment to document your procedures.
- When there is a lot of debris at the site, that portion of the system where work is going on should be dampered off. If the whole site is at risk, the entire system should be shut down and protected.
- It is preferable not to use the permanent mechanical system, but if it is required to be used, temporary filters should be added to all appropriate grilles, intakes, etc. These filters must be maintained throughout their operation and then replaced at the end of the project.
- **DO NOT USE THE MECHANICAL ROOM FOR STORAGE.**

- Increase filter efficiency, if necessary, and use activated filters if there are odor problems.
- When systems are off, all diffusers and outlets should be sealed with plastic and protected.
- On existing duct work, professional duct cleaning is sometimes necessary.
- Source control is an important method to keep contaminants out of a building. For the mechanical contractor, this typically means mandatory use of low volatile organic compound (VOC) caulks, adhesives, sealants, cleaning fluids, etc. This would also include welding, which could be more problematic.
- Pollution sources may be exhausted through local, portable exhaust systems.
- Portable air cleaners may sometimes be required.
- Items that give off VOCs can be controlled by enclosing or sealing.
- Pathway interruption is often used to keep contaminants from spreading through a worksite. This can involve the mechanical contractor when the HVAC system is needed to depressurize the work area. Take care to protect the system when it is used in this way. This might mean extra filter changes and even duct cleaning due to heavier air flow.
- A recommended exhaust rate for negative pressure for this guideline is 10% greater than the supply air rate.
- Whether using positive or negative pressure, always remember to protect the system from

contaminants. Do not forget to rebalance the system, if necessary.

LEED Considerations

As a mechanical contractor on a LEED job, it is important to take time to consider the latest LEED NC version, which provides points for preventing contamination of building systems and materials during the construction process.

LEED requirement impacts the mechanical contractor in at least the following areas:

1. An indoor air quality (IAQ) management plan must be adopted. The contractor should receive a copy of this plan before bidding on the job to determine its responsibilities. As the contractor, you may or may not be asked to sign off on the plan, but have a copy signed and dated by the architect-engineer or the general contractor in case changes are made and you are not notified. In some cases, you may even be asked to provide your own procedures on how you keep the mechanical systems free from contaminants.
2. Credit 3.1 requires you to meet or exceed control measures as recommended by SMACNA's IAQ Guidelines for occupied buildings under construction, 2nd Edition 2007, Chapter 3. The SMACNA Guideline addresses HVAC protection, source control pathway interruption, housekeeping and scheduling.
3. Credit 3.1 states that "If permanently installed air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 shall be used at each return air grille, as determined by ASHRAE 52.2-1999. Replace all filtration media immediately prior to occupancy.

3. **This credit discourages the temporary operation of mechanical systems, if possible.**
4. You may also be responsible for keeping logs, whether you purchase the system or not, of filtration media. You will need to list the manufacturer model number, menu rating and location of all filters and verify they were replaced prior to final occupancy.
5. If duct cleaning is required after use of the systems, two documents that should be reviewed for assistance – (1) The SMACNA publication, ***Duct Cleanliness for New Construction Guidelines***, and (2) Fact Sheet on HVAC Duct Cleaning published by the National Institute of Health (www.ors.od.nih.gov/sr/dohs/Documents/HVACDuctCleaning.pdf) can both be very helpful.

if something goes wrong during temporary HVAC system operation.

- Recommend that mechanical contractor define responsibility for the cost for temporary operation of HVAC systems during construction. This to include labor and utilities.
- Recommend that mechanical contractor exclude responsibility for duct cleaning if required prior to permanent system startup (see item 5 above).

Other Considerations and Recommendations

- Review the bid documents to determine who will be responsible for operation of the equipment during construction. Certain geographical locations might require union tradesmen to operate equipment.
- Operation of the equipment during construction might have an impact on the equipment manufacturer's warranty start date. Clarify this in your bid and/or negotiate this with your equipment manufacturer. Contractor might need to purchase extended warranty depending on length of time that equipment will be used in temporary operation.
- Recommend that mechanical contractor clarify liability for damage