

DOCUMENTATION

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THE ROLE OF DOCUMENTATION

Introduction:

At the very outset, let's disavow the myth that documentation is a dirty word, simply taking filling out some forms or daily reports which takes away from the critical task of getting the work done. In fact, if it is not understood for what it is: essential tools for improving productivity and profit, it is indeed a wasteful exercise. But that is not a problem of the documents; rather it is a problem of management which does not fully understand the role of documentation, fails to develop effective tools which are then communicated to all personnel, and monitored to assure not only usage but effective usage.

Purposes of Documentation.

- A. **Effective Tools to Manage Companies and Projects versus "Paper work".** Effective documentation is required to manage all company operations. "Paper work" is either documentation which has no value in managing the project, or which is simply not used by management for that purpose. For example, daily reports which are not read by project managers, or labor cost reports based on inaccurate time sheets and coding are

“paper work”. They are just “dead trees”. “Landfill”. The focus of this article is “Effective Management Tools”.

- B. **To Communicate and Act Upon the Communication.** In general, the purposes of documentation are to **communicate and to activate**. To *communicate* is to *inform*; to *inform* is clear, *accurate, reliable, useful* and *timely* data. A request for a time extension at the end of the project doesn't meet the criteria of *timely*. To *activate* is to provide data which *causes* or *can cause* another person to *take action*. A schedule should cause a contractor to plan to meet the milestones set forth; if the schedule is flawed or not current, it does not meet the purpose of documentation as it cannot effectively activate performance against a lousy schedule. A daily report which does not set forth the interferences or disruptions that occurred that day cannot activate or motivate home office to take action to, has not been fulfilled. A mission statement tells our inside and outside customers who we are and should activate our actions to assure we meet the goals and principles enunciated in that statement. Communication means:

... To *communicate*

... To *communicate* **clearly** in such a manner that the communicator and the communicatee *understand the terms and the meaning of the message*. This applies to how one writes an RFI so that the designer fully understands the issue and the action required. And it applies to the specification writer who, in the event of an ambiguity, tries to dodge the bullet by saying: “Well, what I intended by that was . . .” If he intended it, then spell it out, as *mind reading* is not a prerequisite for a contractor's license.

,...To **Listen**. Communication is a two bladed sword. It also involves *listening* to truly get what the other person is trying to say or convey.

...To **memorialize** or *record* that which has been communicated. Saying: “well, their project manager told me to do it; I just didn't write it down” and a nickel get you a five cent cigar. Remember this: **IF IT IS NOT DOCUMENTED, WRITTEN DOWN, RECORDED, MEMORIALIZED. (Whatever term you wish to use), then it didn't happen. A comet can hit the project and obliterate it but if you didn't record that event, guess what? It never happened.**

...To have **retrievability of the documents**. It would be nice to have an effective filing system and one which can be sorted by activity or event. For example, if there is a request for a time extension, then all germane documents (letters, daily reports, pertinent meeting minutes, schedule updates and planning meetings) can be identified under one code or copied into one file folder or at least indexed to that event.

... To **actually use in a meaningful way** in the project management process. **This is the activation part of documentation**. Documents which are not used are what we call landfill . . . they are *trash*. When field personnel complain about all the paper work they are required to fill out, it is usually because they have not

been informed of the vital purpose of those documents and even more so, because they do not see the *benefit to the field* in doing the documentation. And this is because often project managers do not read the daily reports and take appropriate action even when they do. In a recent claim, I was looking through the dailies and saw that for over two months, the superintendent was pleading for additional manpower and saying so in bold letters on each daily report. There was never a response by the project manager who later told me: “Well, you know how field people are; they are always clamoring for more manpower!” When the daily report indicates such a problem, there should be no further ones because the project manager and the superintendent should get together before the sun sets and work together to determine what resources are needed . . . or not. And then move forward.

... To ***establish targets and monitor, and be an early warning signal for trends and to be a report card***. The schedule and look ahead plans establish targets which should be monitored daily. Labor budgets (especially those which establish performance targets instead of just man-hours for activities) and weekly labor cost reports are the report cards. The contract documents themselves establish quality targets and inspection reports are the report cards. So these documents are all *communication instruments* as well as *activation instruments – meaning to use to get things done* - if properly used.

...To be a ***melting pot for sharing and using knowledge of the various parties***. Schedules and look-ahead plans should be melting pots for the parties to share they thoughts on the best way to build the project, to look ahead for potential problems and figure out how in advance to deal with or mitigate them. The concept of built-in-quality in the Preparatory-Interim-Final approach is for the key players to get together in advance of new work activities and discuss the quality requirements, tolerances, means&methods, materials and other resources required, durations, et al . . .again, it is a melting pot. Planning meetings are skull sessions in which input should be enthusiastically sought after, respectfully discussed and pragmatically acted upon, instead simply an exercise in the dictatorial authority of the project manager to tell the troops where to go. Further these *skull sessions* should be an opportunity for the craft contractors to educate the general contractor on such issues as “*work flow*”; *the impact of variances, crew overload, and unnecessary overtime*. *Project Managers and supervisory personnel will say that they do not have time for such discussions; yet the essence of productivity is thinking things out, collaborating on how best to get things done, getting input from others. And it just maybe that on the more complex jobs, that management needs to provide an assistant to the field to help it keep up with its documentation and contract management functions.*

- When the leader of a meeting is simply dictating, or bullying, the results are often counterproductive. Meetings should be open and participative by all the parties, not simply yelling matches or dictatorial edicts by the project

manager or superintendent. *By the way, this is an industry of bullying and it is flat wrong and counterproductive.*

- Companies and projects function best in fear free environments. There is a role for a healthy fear – “I am afraid or concerned that I will not do a good job, so I will try harder to make sure that I do” is a healthy fear, the same as I am afraid to cross a busy freeway with my eyes closed. But bullying and yelling which intimidates personnel is humiliating and reduces the effectiveness of the person in not only the function being performed, but being and expressing creative ideas and thoughts.

...To be a **snitch**. That is to let the appropriate people know what is going on so that action can be taken to correct any issues as early on as possible. A labor cost report should be a *tattle tale*, that is, letting supervisors and managers know early on that there is an unfavorable trend so that something positive can be done to correct it.

The Documents TALK.

A. It is important to understand that documentation, for the most part, is **a verb. And an active verb at that.** It is an invaluable project management tool to be used in all phases of planning and decision making, from the development of the design documents through completion and the warranty phase. It may be a “paperless” society but it is not a “documentation-less” society or a “communication-less” society. As construction becomes more complex, schedules tighter and general contractors less managerially competent, the need for effective documentation increases intensely. Like petroglyphs (pictures by our ancestors on the caves of generations past), documentation talks, it asks questions and gives answers. Such as: **(NOTE: With digital technology, documents are now electronic and with AI documents can also analyze and predict. A separate section and article will address digital technology in the construction industry.)**

...The labor budget is supposed to say: “Here are your performance targets. What are you going to do to make them?” And the labor cost reports says: “Here are the trends we are experiencing. What can we do to improve upon them?”

...The RFI log should be saying: “The decision-making process is not going well. What can we do to help expedite it, and what is the impact it is having on the project? Are we preserving our rights? Are we updating the schedule to show the impact?”

...The change order log should be saying: “We are having a cash flow problem because we are not getting these changes approved and billed on a timely basis. What are we doing to overcome this issue?”

...The daily report is saying: “Look at these variances from our planned production flow and scheduled milestones. What are we doing to give timely written notice so we can preserve our rights under the contract, and what are we doing to document our additional impact cost?”

- ... The submittal log is saying: “Hey, the AHU is on the critical path and the submittal has not yet been approved. What needs to be done to expedite it?” Or, “My gosh, we haven’t bought out all the equipment yet and there is no way we are going to make the schedule unless we get those purchase agreements out and signed.”
- ...The inspection reports are saying: “It is obvious we are not planning and executing our quality requirements. Let’s have a meeting with our field personnel and see what we must do to improve this situation. These piping leaks are just unacceptable and this must stop!”
- ...The minutes of progress meetings are saying: “We are getting hammered by virtue of precedent trades that continue to slip. We need to have a higher level meeting to see what can be done to overcome this issue and further, we must make sure we are protecting our rights and adequately documenting the effect on our work.”
- ... The project photos are say: “Look, we are coming into the rainy season and the building has not been dried in, which was to have been accomplished two months ago. How are we going to handle this situation?”
- ... And so on and so on.

BUT IT IS NOT ENOUGH TO HAVE DOCUMENTATION WHICH PROVIDES SUCH INFORMATION. SUPERVISORS AND MANAGERS MUST **ACT ON THE INFORMATION.**

Some *Unseen Issues* That *TALK*

- A. The contract documents may also have clauses which are telling you something about the character of the parties with whom you are dealing. For example:
 - ...The *No Damages for Delay* Clause which basically is saying that the owner or general contractor, as the case may be, is telling you that it is not willing to accept responsibility for its actions or inactions. These clauses would seem to relieve the party inserting such clauses into the contract of any liability for delay damages, and in some cases, even for labor impact. Productivity follows accountability and when a party is unwilling contractually to accept accountability or responsibility for its actions, even though they can have devastating financial impact on the damaged party, one must be extra cautious in dealing with such an entity.
 - ... “*As Directed* ” or clauses that say that even though there is a schedule, that the general contractor can direct the sequence as his discretion, accelerate your performance, and otherwise control your work flow without additional compensation

(This clause is saying: “I as the general contractor am not particularly skilled at project management, scheduling, and coordination, so I am going to contractually relieve myself of the consequences of my ineptitude.” Again, be cautious.)

... “Exculpatory and Disclaimer Clauses”; for example where the Government may include a soils report and then says: “oh, by the way, don’t rely on it and if you do it is at your peril.”

In all the foregoing and more, please consult your attorney BEFORE you execute a contract, not in the middle of a project when you are getting hammered! That is the best use of your excellent construction attorney... review and evaluate your risks under the contract BEFORE YOU EXECUTE IT.

Documentation as Hearsay

- A. **The Hearsay Rule:** Basically any statement that is not made under oath and subject to cross-examination is *hearsay* and not admissible in court. This rule is subject to a number of exceptions, including the *business entry or business record* exception. As construction documentation is not made under oath and not subject to cross examination, it is only potentially admissible in court if it meets the requirements of that exception.
- B. **The Business Records Rule.** A “business entry” is a document that is maintained in the normal course of running one’s business, and such documents are exceptions to the hearsay rule, meaning that they can be admitted into court, even a daily report’s scribbled contents. **However, business entries, to have credibility, must indeed be used for managing the company’s operations and not just for the purpose of putting together a claim.** (Seek advice from your attorney). If a company uses documents for the purpose of effective management, then it is presumed that these documents will be accurate and credible, for how can you run a company successfully by using false or unreliable information?
- C. **What Documents Are Needed for a Claim?** My answer to that is ***exactly the same information that is needed to run your company, to manage your projects.*** No more, no less. But that means to assiduously to comply with your contract documents, both the performance and the administrative requirements. Warning: it becomes obvious when a company is getting trouble on a project – suddenly the daily reports and letters become very legalese. However, often such documents prepared for litigation instead of managing the job may not be admissible. Be consistent in preparing documents that are used for management of the project, not for trial. The same goes for the updates to the schedule, with consultants playing with logic to make their case. *Credibility remains the name of the game.*
- D. **The Company’s Policy Regarding Documentation.** **All companies should have a *written policy* regarding documentation requirements, and how that documentation is used and maintained.** . A person should be designated as responsible for communicating that policy and enforcing that policy. And the policies *should be consistently implemented.* (For example, if the company’s accounting policy is to charge project managers as home

office overhead, then to change horses in the middle of the stream—for claim purposes—to direct job site overhead would probably not be allowed as a diversion from the company’s routine method of accounting for its project managers). So, what should the company’s documentation policy consist of:

... Obviously, it should be *written*

... *It must be **communicated** to all who will implement it.*

... It should require that all information be *accurate and complete*. *Labor cost must be properly charged. Mischarging is wrong on so many different levels from simply being either negligent or unethical, to not having accurate cost information of effective job site management, to screwing up what could possibly be a valid claim, because guess what: competent attorneys and claims consultants will almost always detect miscodings, the same as they will almost always determine when schedules are being manipulated.*

... It should require that the information be *objective and not self-serving*. If daily reports are to be used to truly manage a project, then they must provide honest and accurate information about what is happening on the project.

...It should require *timeliness*. If the contract requires a specific time for giving notice of a claim or a delay, then adhere to the contractual requirement. If the contract requires a given time and method for schedule updating, or deliverables, then follow the contract. *The policy should make it loud and clear that the contract shall be followed regarding all notifications.*

...*It should require that when the contract dictates certain documentation is provided for schedule extensions, pricing, as-built drawings or whatever, that the contract be followed. It is recommended that at pre-con a summary of all contractual notification and documentation requirements be provided the project staff.*

...It should require that the documentation be *effectively used for managing the project*. A project schedule should not be a wall ornament, and daily reports should not be simply an obligatory “make work” exercise for a field staff already overburdened. Remember, the business records rule is based on the fact that these records are important for the company to *manage its business*.

...it should address *specific issues, such as:*

...*Photographs* which should always contain a date stamp and an entry as to the area being photographed.

...*e-mails* which tend to be voluminous and often unnecessary. *Correspondence should address issues, be respectful and never attack people. Remember, e-mails are discoverable so stick to the facts.*

...*meeting minutes* to assure that they are reviewed and exception taken when they are inaccurate or omit important matters you brought up there.

...If the minutes of the meeting omit significant facts or misstate them, and you fail to raise an objection, then your silence may in effect be “documentation” that you agree with those minutes

Documentation and Checklists

- A. ***What is a Checklist and Why Have Them?*** All functions in a construction project involve a *process*, that is, a series of steps to perform a function. For example, a simple bar graph schedule may show “Pour Footing”, but there are a number of activities (that is, there is a process) to get to the final point of pouring that footing. The process may be to review the plans and specs, get purchase orders to the suppliers of the materials, get approval of submittals, do site engineering, layout footing locations and elevations, excavate, formwork if necessary, receive material, place and cure and so on. This is a process. A detailed schedule will set forth each of these functions. We don’t call it a process, or a checklist, but that is what it is. A three step quality program is a process, or a series of defined steps getting to the final product which meets contract requirements. And when everyone involved understands the process, the steps involved in getting to those final steps, and how each step is essential to the end game, the probability of performing the function on schedule and on budget is necessarily enhanced. A *company procedure* is nothing more than a checklist, or a process for how it performs various functions.
- In football, each play is diagrammed so that all players know what to do, and when to do it.
 - In aviation (small aircraft to spacecraft), checklists are followed to assure nothing is missed and that all essential tasks are performed.
 - But in football, aviation, and construction, sometimes things go awry or circumstances change (*as Sully, the pilot of the Miracle on the Hudson, came to know*), and you have to figure out a different approach, a more creative solution or plan. With checklists, you at least have a baseline from which to make a change.
- B. Checklists, then, do not replace *thinking, creativity, innovativity*. They are tools to *assist* that process, for the construction industry is about the most *thinking* driven industry there is. A schedule is called a guess what – a *logic diagram*. And the logic is defined as “correct reasoning” and the term in early Greece meant “discourse”. So, a checklist should reflect the thought processes of people who talk about them, not just read them or have them posted on the trailer wall. A checklist does not do layout, or install AHUs, or pull wire, or do compaction around the building. It is a tool for project people to review, to think about how best to perform a given function, develop the steps to do so, and then do so. In lean management, it is said that planning and coordination is just a series of conversations and promises among the trades. I like that. The point is: it takes people who know what to do, to think about how to do it and even do it better, who get the input of others and the buy-in of others (commitment).
- No two projects, like no two fingerprints, are exactly the same.

- **No two days are alike on a project. Someone once said that you can never put your foot in the same river twice, as it is forever changing . . . and so are you. The same is true of a construction project, which changes from morning to afternoon, day to day. They are like flowing rivers. Checklists are processes for performing our functions, help us to maintain focus; they are GPS systems to continue to guide you through the rapids and eddies alike, reminding us what has been done, what is to be done. How to handle the routine, how to handle variances from the routine.**
 - **Checklists are not some blocks on a multiple choice test, to be checked off mindlessly. They should show the important tasks to be performed in every task to achieve the highest probability of success, and they must be *used as planning tools*. A quarterback like Manning and most of the NFL quarterbacks have IQs over 125-135, so they are pretty smart guys, nevertheless looks at the plays on his wristband before the next down. Sully looked at his checklist as soon as he sat in the cockpit, and then when he hit a flock of geese, he looked at his checklist for how to handle hitting a flock of geese and set his plane down in the Hudson with no loss of life..**
- C. Checklists should be used as *tools for improvement*. “Hey, what if we do this instead of that” and for *focus meetings* where the team discusses (discourses, as the Greeks would say) some issue that is causing difficulty on the project and how to handle that challenge, and for *benchmarking* (“once we started pre-planning instead of just rushing out and starting the project, our projects are running more smoothly with fewer challenges and greater profit”; “once we started the three step Preparatory-Interim-Final quality program, our workmanship improved, less punch list and greater productivity”).**
- D. Checklists are *planning tools* then, but also are the twin brother of *execution*. They are a good device for assuring to make sure that what has been planned has been executed and implemented. And for *evaluation*. The checklists or processes, as indicated, are simply *logic diagrams* or a listing of steps of each activity which needs to be achieved, and if that process is executed, if the logic diagram is followed, then the end result should normally be attained. So, *plan it, do it, check to make sure that you did it, and then see if you might do it better*.**
- **Minoru Yamasaki who designed the World Trade Center once asked me how to write a contract that would totally protect him from litigation. I said that no one was that smart, certainly myself. So he wanted to know from a practical point of view how to avoid these endless litigations. My answer was: “*KNOW what to do. Make sure EVERYONE involved KNOW what to do; DO it; MAKE SURE that you did it RIGHT; DOCUMENT that you did. And then keep pushing the goal line out, keep getting better.*” *Checklists which describe the process of an activity and are used for planning is the first step – KNOW WHAT TO DO AND MAKE SURE EVERYONE ELSE KNOWS WHAT TO DO ALSO.***
 - **If you are a SUBCONTRACTOR, then it is incumbent upon you to communicate to the general contractor the process necessary for you to perform your work, through your input of workflow to the overall schedule and its updates and in planning meetings, and through coordination with other trades. A subcontractor is not in a vacuum and other**

trades and the general contractor are often not aware of its needs and it is therefore incumbent upon each subcontract to communicate those needs to the other affected parties. A schedule is a checklist, a process – a logic diagram- and should be the subject of discussion (discourse) aimed at developing the most effective method of performing the work. And when circumstances change (like geese hitting the engine), the team needs to get together, using the schedule as a baseline for the discussion, and figure out the best approach for a soft landing.

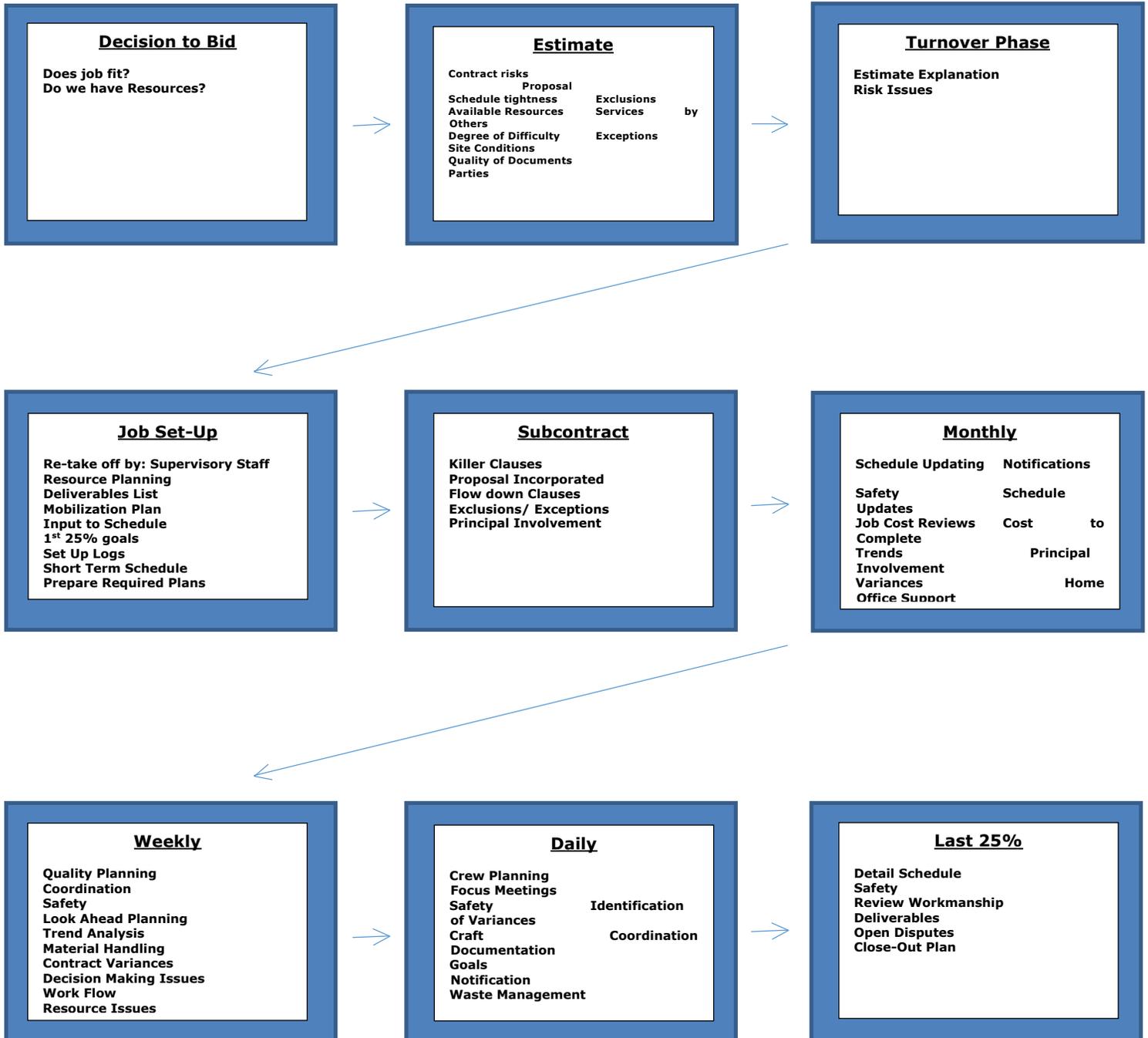
- E. Checklists (or processes or procedures), have functions other than collecting dust and consuming space in a file cabinet. They should be discussed with affected team players should have input regarding their value and effectiveness. (For example, earned value is a great tool, but it can be carried to an extreme which destroys its usefulness. So, develop with the team systems which are practical and which will be implemented because the team sees the cost/benefit ratio). Remember, no NFL coach hands his team the play book and then heads out to play 18 holes. A checklist is like the game plan for each activity (from how to manage the company, to project acquisition, to job set-up, to performance, to variance management and job closeout).
- It too needs to be discussed routinely with the team to assure it is understood and there is buy-in. There is normally buy-in when team members are given the respect and courtesy of making input, and when their ideas are respected.
 - Along the way, the procedures may need to be revised, updated, improved, and maybe some parts need to be rejected entirely. But it is the baseline for evaluating how you perform and how you can perform better, and to be able to deal with changing circumstances.
 - When a plane is in an emergency situation, the pilots first aviate (that is, continue to fly), then navigate (meaning looking for alternative approaches to the changed circumstances), and then communicate (that is the last one because they often have no time to call back to the tower). In construction, we believe that *communicate* is the first priority when there are changes in circumstances. The fundamentals remain the same: PLAN. EXECUTE. EVALUATE. DO BETTER NEXT TIME.
 - ❖ LEARNING CURVE. Through repetition, theoretically the unit cost of labor for installing a task decreases. However, if the task is not properly planned, if material is not handled efficiently, if there is an inadequate quality plan, if safety is an issue, then the more the task is performed the most costly it may become. It is the Frisby Learning Curve: in the construction industry we have learned to repeat our mistakes. Successful companies may make mistakes but generally only once. They learn from them, correct, improve.
- F .Checklists must be *customized to your company and to the specific project*. For example, the approach to a design-bid-build project is different from a design-build or a design assist-build; a hospital project has differences from a commercial office building and so on. These *differences* must be understood and managed accordingly. There is no one size fits all, and this goes for the material which follows. It is not intended to be a

prescription for how one runs its construction company, but a guideline, a tool for discussion, and a challenge for how you are indeed running your company and how many there are improvements out there for you to consider.

- G. Construction is a *high risk* industry, in fact one of the highest risk industries in our country, with a turnover rate of around 20% annually among its 800,000 contractors (and the big boys are not immune). Below is a generic *risk management flow chart* identifying a time line of risks and issues that must be managed along the way. It makes sense that all personnel know what the issues and risks are, how to most effectively perform each function along the way. How to manage when things go right, and how to handle things, like geese that hit the engine, or the bad snap on the first play of the Super Bowl, when things go wrong.
- Each function shown in the flow chart shown in Figure II calls out for *planning* - “*correct reasoning*” which is a function of “*discourse*” or “*discussion*”.
 - In fact, maybe we should move away from the term “planning” and substitute the term “*thinking*”. A weekly meeting to figure out the tasks ahead could be called a “*think tank*”, or a “*skull session*” (*football games are sometimes won in the locker room at halftime when the coaches and payers have skull or think sessions to figure out what they might do better to stop the opposing team’s offense.*) to get across the idea of figuring things out (which is what correct reasoning is all about). Figuring out the steps to be taken, what is to be done, how it is to be done, what we need to get it done, what others must do to make it happen, what are our goals. What happens when a goose flies into the engine? What happens when you realize that the building will not be dried in on time, or that the premature installation of the fusion pads in the equipment room will have a real impact on how the mechanical contractor performs its overhead work.
 - Of course, top management needs to have skull sessions about market trends, how best to prepare for changing demographics or technological changes. There is not a function that goes on that will not benefit from “correct reasoning” and “discourse”.

FIGURE II

**Risk Management
Flow Chart**



SECTION II

The Acquisition Phase and Job Set-up Phases

1.Introduction:

The greatest risk to most construction companies is their ability to perform given projects, and how they manage their growth. The SWOT (Strengths, Weaknesses, Opportunities, Threat) approach used in Strategic Planning Meetings will assist a company in developing an approach for sustainability, that is, to have a long life and not join the “happy hunting grounds” of construction contractors whose longevity is often less than five years. Construction is a high risk industry and to succeed, one must plan to succeed, and then execute the plan, and then continue to re-plan, continue to improve.

When a construction company truly commits to the concept of performance for each customer in such a manner to increase the probability that the customer will be one for life, and then executes in accordance with that commitment, invariably the performance elevates along with customer satisfaction . . .and so does the morale of all the employees. Employees are like players on an NFL football team: they want to win, go to the super bowl and win the ring. Having high standards and expectations and performance against those standards is generally motivational to the employees.

There are few companies which have made it a century, but there are some. And the key attributes of those companies as indicated at the outset is just this simple: **PLANNING** to succeed, **EXECUTING** the **PLAN**, being **CONTINUOUSLY BETTER**, and **LIVING** their **MISSION STATEMENTS** (Character, Value Systems), and having the **BEST PEOPLE** who are adequately **REWARDED**.

And indeed often today contractors for capital projects are selected on the basis of prior performance: how well they did on other similar projects, and not just the lowest price. Some are selected on a two step approach, a design build or design and assist delivery system. Contractors are selected, then, on whether they have lived up to the promise in the mission statement or whether it is just a public relations tactic.

It would be helpful to document projects as they are complete so that a history of previous experience is readily available. For instance, a company could tailor the following form, Figure III, for this purpose:

Figure III

EXPERIENCE ABSTRACT

- 1. **PROJECT TITLE::** _____
- 2. **LOCATION:** _____
- 3. **OWNER:** _____
- 4. **DESIGNER(S) (LIST)** _____

5. CONTRACTOR PERSONNEL

6. KEY SUBCONTRACTORS

7. KEY SUPPLIERS

8. LOCATION: _____

9. NATURE OF PROJECT: _____

10. PROJECT CHALLENGES AND HOW THEY WERE MET:

11. SCHEDULE ATTAINMENT AND CHALLENGES:

12. BUDGET ATTAINMENT AND CHALLENGES:

13. RELATIONSHIP CHALLENGES:

14. IMPROVEMENTS DURING PROJECT:

15. QUALITY ISSUES:

16. SAFETY ISSUES:

17. DISPUTES AND HOW THEY WERE RESOLVED

18. LESSONS LEARNED

Other Risk Considerations

Item

Comments:

Quality of Contract Documents and Completeness

Working Conditions

- Height of Structure
- Working Height
- Floors
- Multiple Structures
- Size
- Labor Pool
- Supervisory Pool
- Owner Reputation
- Designer Representation
- Strength of Key Subs
- Cash Flow Issues

Level of Difficulty

(Based in part on NECA Manual of Labor Units)

SITUATION	NORMAL	DIFFICULT	VERY DIFFICULT
HOURS	40	50	>50
CONTRACT DOCS	Prescription Adequate	Ambiguous will require clarifications and close coordination with designer.	Ambiguous, incomplete will require extensive RFI process: These DWGs are a mess!
WORK	Inside -	Inside -	Inside -
CONDITIONS	LEEDs project (Dried in before finish trades)	-With extensive outside work during potential (in-climate weather)	-But expect to do work before dried in. Potential site access problems.
WORKING HEIGHT	<10 FT.	10-20 FT.	>20FT.
FLOORS	3 or less	4-7	>7
DURATION	Normal for size	Longer for size	Shorter for size
STURCTURES	1	2-3	>3
CONTRACT DISCLAIMERS	None	No Damages for Delay	NDD Incomplete Design
ETCULPATORY CLAUSES		No damages for delay/ impact, GC can direct sub at will.	
MATERIAL HANDLING	Consistent with protection needs.	Limited storage & access.	Poor site conditions. Very limited access and pre-loading iimitations.
LABOR AVAILABILITY	Adequate	Some Limitations	Extensive outsourcing required. Lack of competent supervisors
INSTALLED EQUIPMENT	Reasonable availability	Tight market. Some likelihood of untimely deliveries.	Extremely limited availability. Likelihood of untimely deliveries.
DECISION MAKING	Experience indicates timeliness can be expected.	Experience indicates it will take a real push for decisions to be made timely.	Experience shows the Owner/ Designer team very slow in decision-making.

Job Set-Up Phase

- A. “Planning” and “weather” are the two most talked about and “done less about” subjects on the planet. The role of planning is a continuous process. It is not a document or a piece of paper, but a thoughtful exercise in how best to perform a function or series of functions. If we think that planning begins only after the job starts, we are already in the hole. It begins with the decision to bid, the estimate itself and then the process of transforming the estimate into building the project profitably. Yet, often the field supervision is never acquainted with the estimate process, how the estimator saw the job, its challenges, risks and edges. This would be like the coach of a professional football team failing to share the playbook with the quarterback!
- B. The Role of Pre-Planning. The pre-construction activities then are pre-planning functions, and involve the information turnover process and then the activities which are integral to the job set-up phase itself, before the first shovel enters the earth on the project.
1. Pre-planning refers to the activities leading to the start of the job. Again, it is the game book. No football team waits for the kickoff to figure out its strategy for winning the game. There is a game plan and a play book, and all the players are on board to the activities in each. Planning, then, is really simply an extension of all those activities that are set-forth in the pre-planning checklists together with “checks” at the line of scrimmage (that is, making changes as necessary as the project unfolds).
 2. So, this is the time for development of the “game plan” to managing a successful project, to winning the ball game. Winning is providing the owner with a project which meets the requirements of the contract documents while earning the contractor(s) a reasonable profit for the risk undertaken.
 3. It is a time to bring together the people and processes to identify and then figure out how to meet the challenges of this particular project.
 4. It is also a time when too many construction people say, “We do not have the time to do this.” Although they seem to find the time to meet with their bankers and sureties at the end of a project to explain what went wrong.
 5. Pre-planning is not just another meeting or so. It is indeed an opportunity for “skull sessions” to identify risks and how to manage them, to establish targets and priorities to review lessons learned from previous projects and to learn as much about this upcoming project as possible before wading into it.
 6. It is a time to “think creatively,” large or small projects. (There really are no large projects,” only a series of integrated small ones!) And maybe to go back to the construction of the Empire State Building and “think creatively” as the crews did then when they constructed, at the time the world’s tallest building, in a little over a year,

and

on

budget.

The Information Turnover Phase:

- A. The estimate is a productivity planning document, establishing the goals of the project for labor units, equipment productivity, and general conditions. The estimate is really a reflection of the capability of a game plan for this company to perform this work, and demonstrates the various targets for the field to perform its work. The estimate is the document which should be used in turnover to field management personnel with a n explanation of the basis of the various targets; it ultimately will be a reference document for changes/delay damages/labor impact proposals demonstrating how the job was bid and how it differed from those expectations. It is a document which one day may need to be defended when the owner says, “well, you just underbid the project; you just didn’t understand the degree of difficulty.” Or “the soils report showed a water level above invert elevation; how did you propose to handle that in your estimate?” The estimate file should be able to answer those questions. What an important document is the estimate! And the estimate file!
- B. There must be no disconnecting between the estimator and the field supervisory personnel. For this reason, the estimator should conduct a formal “turnover” when the job is acquired; using the checklist as a model (the turnover document is another “melting pot” opportunity). Another “skull session.” Maybe when I was a child, I was thrown in a pool by my father who “swims.” It worked for me, but a number of kids drowned by the method. The same for projects; throwing a project staff into the battleground without adequate information is a prescription for potential failure.
- C. As will be seen, the 1st 25% of the project is hugely important. Establish goals, mobilize, and meet targets. We want to begin the

momentum with an effective turnover function.

Checklist

1. Estimate File Folder with plans/ specs. / Addenda.
2. Provide pre-bid site investigation and pre-bid meeting minutes.
3. Provide list of deliverables necessary to begin work (mobilizing).
4. Review info relating to negotiations leading to contract.
5. Any special interpretations made by estimator.
6. Building Permit status (other permits such as architectural review board; evidence of financing, etc.)
7. Provide list of deliverables subsequent to mobilizing.
8. Provide list and quotes from subcontractors/suppliers.
9. Discuss risks and challenges
 - a. Contract Clauses
 - b. Deliveries
 - c. Site Conditions
 - d. Relationship Issues
 - e. Labor Pool
10. Review scope letter, if any.
11. Review schedule, and schedule challenges.
12. Review special risks and how estimator approached them. (e.g., material handling, height, access, special technical requirements, etc.)

Job Set-Up Process

In football, games are often won and lost before the first whistle blows. Generally, the best prepared team has the advantage. The function of the job set-up phase: to be as prepared as possible to profitably perform. But planning and preparation is a continuous process throughout the project where the project staff continues to establish targets, figure out how to achieve them, continue to improve, continue to provide the most effective resources to “win the game.”

Supervisory staff should re-take off the project to assure they fully understand how to build it, the risks and the challenges.

The 25/10 Concept Attached.

Checklist

1. Contract Execution (Re-Review)
2. Bonds
3. Insurance Certificates
4. Required Deliverables (List)
5. Required Permits
6. Post Require & Notices
7. Preliminary Schedule with Priorities Established
 - i. Establish key miles for 1st 25% of project.
8. Logs Established
9. Submittal Register
10. Materials Handling Plan
11. Safety Plan
12. Quality Plan
13. Billing Procedures Established
14. Budget Established (Schedule of Earned Values)
15. Project Staff Organized
16. Obtain Clarification of Authority of Owner’s Representatives
17. Material/ Equipment Commitments and Purchase Agreements (List)
18. Submittals for Long Lead and Priority Items Submitted.
19. Finalize Subcontracts
20. Subcontractor Bonds Obtained
21. Subcontractor Insurance Certificates Obtained
22. Tool Kit
23. Establish a plan for contract document review to determine discrepancies, conflicts as early as possible.
24. Establish plan for managing outsource employees.

25. Establish contract administration plan.

26.

The 25/10 Concept

In countless projects, there is a phenomenon known as “profit on target until the end of the project and it seems to take forever to complete it, and the cost overruns are surprise to the contractor and the surety. Often, this is because the front-end activities of the project were delayed or not done well, there is not extension of time and the last 10% of the project becomes 12 or 15% or more, and job conditions place all the contractors on top of each other, and punch lists are coming out of the walls.

For this reason, the 25/10 concept was developed. It has been discovered when the project team establishes and meets the goals of the first 25% the likelihood of the last 10% being just that and no more has largely increased. So planning the key priorities and targets for the first part of the project, establishing the momentum, and maintaining that momentum are major components of project success.

At the outset, it is stressed that a notice to proceed is normally not a full notice to proceed with construction, but to complete design. Complete design through submittals, requests for information, and various deliverables (coordination drawings, commissioning plans, et al.) It is also noted that most contractors require that the contractor “*find problems with the drawings in the office and not in the field,*” so a part of planning by all the contractors is to try to clean up those drawings as quickly as possible to avoid conflicts and interferences during construction. A drawing conflict found in the procurement process may have little impact, if any, on field operations; but even a small conflict or interference found during installation may have significant impact on crew flow, and labor productivity. Find the problem/ discrepancy before it impacts installation!!!

Budget and Re-take Off

Most successful companies do a re-take off by the superintendent or project team of the project for several reasons:

- Building a project is different from estimating it.
- To familiarize the project staff with the details of the project.
- To flush out in advance any issues (material shortages, etc.) early on and try to figure out how to deal with them.
- To determine project risks and challenges.
- To establish targets for production (e.g. earned value)
- To use as a pre-planning exercise for effectively deal with challenges. (See level of Difficulty material attached)
- To use as a tool in building the construction schedule, work flow.

Checklist

1. Review Plans, Specifications, and Addenda.
2. Do a quantity survey.
3. Identify level of difficulty of tasks and how to deal with difficult areas. (See attached) this lists only a few of the areas categories which must be considered.
4. Do check against estimate to determine and resolve variances.
5. Establish productivity units (earned value).

Schedule of Values

The schedule of values should be a product of the re-take off and establishment of the project budget.

The schedule of values is a breakout of the various project activities (the established in the contract or negotiated between the parties.

The contractor should assure that each activity contains adequate funds for its performance.

Overbilling may bring cash in quickly, but contractors often confuse billings with productivity. Actual expenditure 100 man hours for a task budgeted with 200 man hours doesn't mean you are 50% complete- only that you have spent half your labor dollars. And if there is an early on delay, but you are overbilling, how do you justify and impact to your schedule, when you are on track of your schedule of values.

Checklist

Review contract for all payment provisions, as the SV is the instrument for payment in most contracts.

SV should be prepared with as much realism as possible. Avoid unreasonable front-end loading. "Mobilization" account should be a separate element cost and billing. Include item for mobilization costs.

All cost, including labor, material, equipment, and support should be included in each activity in SV.

Update the schedule of values as change orders affect the cost of performing the various activities.

Schedule

Contractors say “time is money” and yet so often the scheduling process is the weakest link of project management.

The schedule should be the product of the thinking of the project management team and not just rubber stamping a consultant’s PM or that of a general contractor submitted to the subcontractor for review.

All schedules must be “procurement schedules” setting forth the full supply chain process from purchase agreements through submittals and deliveries.

The schedule must be supplemented by jobsite coordination and look ahead planning by all team members.

Effective schedules should set forth quality activities (such as the 3 step process, inspections, commissioning, TAB, Punch list durations, etc.)

Early priorities, decision-making, and milestones should be established to assure momentum with be established and maintained.

See schedule flow chart.

Checklist

1. Review contract (including Technical Specifications) for req Review contract for planning, coordination, meeting requirements.
2. Requirements of baseline schedule and updates.
3. Assure all activities are included in schedule, such as:
 - a. Mobilization
 - b. Deliverables
 - c. Submittals & Deliveries
 - d. Access Issues
 - e. Quality Activities
 - f. Inspections
 - g. Commissioners
 - h. TAB
 - i. Close-Out
4. Establish decision needed, access third party inspection, etc. involvement.
5. Evaluate:
 - a. Durations
 - b. Relationship of Activities/ Logic/ Workflow
 - c. Whether weather should be taken into account.
 - d. Adequate Activities
 - e. Adequate breakdown of Activities. “MEP Overhead Rough-in” is combining three distinct trades and should be individually scheduled.
 - f. Material handling issues such as availability of hosts, stairs, when inertia pads will be installed, etc.
6. Resource load schedule to assure workforce is consistent with activity requirement.
7. Workflow-that is sequence of work and crew movement should be clearly set forth in schedule.
8. Establish, monitor, and perform for the key activities, decisions, and access. In the first 25% of the project to establish the necessary momentum. (See the 25/10

Schedule Documentation Flow Chart

(1)

- Bid (Contract) Documents
- Duration
 - Milestones
 - L.D.S
 - Scheduling Spec.
 - Changes Clause
 - Time Extension Clause
 - Exculpatory/ Disclaimer Clause
 - Time Restraints (RFI, Submittal turn around Hmes, eq.)
 - Weather Information
 - Pre-Bid Conference Minutes

(2)

- Estimate
- Pre-Bid site invest
 - Pictures
 - Labor Survey
 - Potential Industry Delivery Problems
 - General Conditions (Job Site Overhead)
 - Sub/Supplier Quotes
 - Consideration for:
 - Tight Schedule
 - Weather
 - Labor Availability
 - Project Close-out
 - Productivity Units

(3)

- Project Schedule
- Input from Subs/ Suppliers
 - with contract requirements.
 - Plan for desktop reviews
 - Solid 90 days schedule
 - ?

(4)

- Schedule Management
- Planning meeting minutes
 - Look ahead schedules
 - RFI logs
 - Submittal Logs
 - Change order logs
 - Daily Reports
 - Correspondence
 - Time ExtensionReque sts
 - Daily Reports
 - Weather Data

(5)

- Schedule Updates
- Schedule Update
 - Scheduler's Monthly Narrative
 - Documents in 4
 - Integrate into Schedule updates

(6)

- Activity Impacting Schedule
- “Event” Folder
- All info regarding unexpected event/ variance
 - Fragnet of Event
 - Daily Reports
 - Pictures
 - Correspondence
 - RFI's
 - Changes
 - Differing Site
 - Delays
 - Acceleration

Project Close-Out Process

(1)	(2)	(3)	(4)	(5)
<p>Begin Close-out at start of job:</p> <ul style="list-style-type: none"> Read contract for close-out requirements What is required for substantial completion What is required for final acceptance Owner should consider commissioning agent on selective 	<p>Include Close-out requirements in subcontract agreements purchase orders.</p>	<p>Meeting with key personnel including designer, owner, subs, suppliers to initiate close-out plan to include:</p> <ul style="list-style-type: none"> Administrative requirements Commissioning TAB Completion of punch list Training Deliverables 	<p>Develop quality plan (P-I-F)</p> <ul style="list-style-type: none"> Insert in schedule dates for preparatory, interim, final inspections for at least key work activities Insert in schedule activities such as testing, training, commissioning, TAB Maintain as-built on a daily basis 	<p>Periodic project meeting dealing with close-out plan</p> <ul style="list-style-type: none"> Identify & resolve restraints to progress
<p>(6) (7) (8) (9) (10)</p> <p>Contractor should always know where he really is based on realistic schedule updates and earned value reports.</p>	<p>Avoid adding work in last 25% of project (retrofit where possible). In fact, clean up those drawings early on to avoid RFI's dribbling out through the project!</p>	<p>At 75% point have major "close-out" meeting. Review close-out plan, intensify daily planning.</p> <ul style="list-style-type: none"> Avoid overtime unless selective & productive Avoid adding manpower unless selective & wise Develop schedule for negotiating all change orders 	<p>Grant reasonable time extensions to avoid "two pounds in a one pound bag" syndrome.</p>	<p>Contractor(s) own its (their own punch lists). Designer is not the inspector- the project should be ready for substantial completion when the designed is asked to run final punch list and issue certificate of substantial completion.</p>

Planning

The Role of Field Personnel

- Schedulers know how to use **software**
- Field Supervisors know how to **build** project. Field supervisors (including subcontractors and key suppliers) should be involved deeply in initial planning process, and continuously throughout the project.

Concepts of the Planning Process

The planning process is about:

- **Thinking** about the best way to build, best way to avoid problems, best way to overcome problems
- A **network** of promises
 - And **promises** fulfilled
 - “My crew will be there Monday” – and it is! “The area will be ready for your crew” – and it was!
- **Conversations, skull sessions**
 - Continuous information, preparation.
- **Creativity and Improvement**
 - How can we build the Empire State Building in 13 months rather than living in status quo?
- **Planning and Execution (PLEX)**
 - Promise to do it! Do it!
- **Mood**
 - Mood of Ambition or Role of Despair

The Role of Real Collaboration at the Field Level

- Flow of Work
- Short Interval Objectives developed by all trades working together.
 - 3 to 6 week look-ahead; daily
 - Another opportunity to “clean up drawings”
- Measureable Performance Goals
- Coordination of Craft Contractors
- See role for coordination drawings
- State of Readiness
- Method of Resolving Conflicts
 - Priority Conversations (such as how to handle congestion and other conflicts
 - Look ahead meetings to figure out how to handle late deliveries, e.g.
- Focus Meetings for Improvement
- Waste Management Goals:
 - Workmanship
 - Back charge Avoidance
 - Finding problems in office, not in field
 - Material handling
 - Maintaining production flow (for all trades)
- Managing Home Office (information, resources, etc.)

Quality

The Three Step Program

The Duke Energy Compact Story

The three step program can be very effective...or not. It is the same as any plan. If there is not adequate preparation and qualified team, and no execution, then it is simply a waste of time. The most effective “three step” was implemented on the Duck Energy Bad Creek Pump Storage Project in South Carolina. It was called a “Compact” and went like this:

Several weeks in advance of a new activity, the project manager, quality representative of the contractor and the Owner, supervisor and perhaps a lead craftsman would meet to prepare for the new work activity. An agenda would be prepared consisting of:

- A review of the plans and specifications required and a check to assure that there will be timely delivery; a material handling plan would be discussed to reduce the time required for pre-loading. Any certifications, installation procedures, and special handling requirements would be checked on.
- A discussion of the best plan for performing the work would include issues concerning coordination, precedent trade work.
- All necessary installation equipment (lulls, cranes, welders, wire pullers, et al) would be developed.
- Formulate crew sizing
- The qualifications of crew members would be established (such as certified welders or other skill levels) and training that might be required would be scheduled.
- Safety is always a major priority as well.
- Productivity targets would be established.
- Best practices would be discussed. How to improve over previous operations would be discussed.
- Any questions involving interpretation of specifications would be clarified with the designer.
- Special operations such as cold or hot weather concrete placement would be identified and adequate preparations would be made.

A detailed plan with assigned responsibilities is developed and monitored. The concept is similar to the Japanese concept of “decision-making” whereby all the parties to be involved in an operation had an opportunity to make input regarding the best way to carry out that operation and to plan in detail all that was required. An integral part of the planning had to do with the qualifications of the personnel who would be responsible for carrying out the work.

The concept of built in quality applies to large and small contractors. A small contractor might say, “Well, I am a little guy, I can’t do all this stuff.” Well, if the little guy wants to become a big guy, he had better do what is necessary to perform in an excellent manner, and that takes detailed planning, competent craftsmen, and above average quality and safe performance.

Checklist

1. Commitment to built-in-quality rather than inspect and correct.
2. Commitment to education, training, evaluating, and rewarding all personnel.
3. Commitment to effective management of outsourced personnel.
4. Commitment to safety.
5. Development of effective procedures for performing all functions.
6. Evaluation of personnel in real time (by coaching) and periodically.
7. Develop an effective three step program: (See attached)
 - a. Preparatory- Field supervisor(s), PM (often with owner's rep) to review plans, means methods, needed resources, lose creativity.
 - b. Interview- Check after execution has started to assure that the plan is being properly executed.
 - c. Final- Review your own inspection. Make any corrections, prior to asking Owner's rep to do an inspection.
8. Cost code rework.
9. Trace ultimate cause of workmanship problem:
 - a. Planning
 - b. Competence of workforce
 - c. Tools/ Equipment
 - d. Work environment
 - e. Decision-making _____
 - f. Precedent or concurrent trade _____
10. At end of task ask, "How could we do it better?"

How to Build In Quality

(1)

P-I-F

Commit to a P (Preparatory)

I (interim) and F (final) Approach

(2)

Include in Construction Schedule the P-I-F for each Key Work Activity Construction Administration

(3)

Preparatory Meeting Attendees:

- Supervisor/ Foreman
- Quality Personnel
- Owner's Representative

(4)

Preparatory Meeting Agenda Review:

- Contract Requirements
- Material Needed
- Tools Needed
- Equipment Submittals
- Requirements of Precedent Work
- Interface with other work/crafts
- Access/Coordination Issues
- Material Handling Plan
- Workforce Requirements
- Environment Requirements
- Potential Restraints
- Safety Issues
- Duration
- Basis of Acceptance
- Testing Requirements
- Documentation Required
- Decisions Needed
- Develop Plan of Action

(5)

Performance to the Points of Interim Inspection:

- Communicate Plan to Crew & Home Office
- Assure Pre-Loading, Material Handling Running Smoothly
- Perform Interim Inspection
- Re-plan as Necessary

(6)

Performance to Final Inspection

- After Interim, make corrections as required
- Quality Representative and Supervisor continue to monitor workmanship
- Testing as required
- Documentation
- Final Inspection By:
 - Supervisor
 - Contractor's Quality Representative
- Final Inspection by Owner's Representative

(7)

Evaluation

Coordination drawings are a deliverable on most construction projects which have any real complexity to them, including industrial, health care and other. Unfortunately, they are too often just that, a deliverable.

A coordination drawing should be more than a pay item in a contract, and is not just the responsibility of one (usually mechanical) contractor. From the beginning, the coordination drawing has been intended as a:

- ❖ Design drawing completion document, meaning that the design drawings often contain conflicts and ambiguities, and are not complete until submittals from other trades (such as the structural drawings). Unfortunately, the Notice to Proceed on most projects is not a notice to begin construction but to complete the design of project. This is very true on design assist projects or where the documents are still in some stage of development at the NTP. So the idea is to “fill in the blanks, remove the conflicts and landmines in the road” through the integrated coordination drawings.
- ❖ A productivity tool. The various trades should not use look at CADs and say, oh, okay, there is a beam in the way of the pipe, but to consider how best to produce the work to improve productivity for all the trades. The real development of coordination drawings is like a “skull session” in football, figuring out how best to run a play and gain maximum yardage without being run into by another, or even your own, player.

The 25/10 concept is that if the team works out its’ problems, set goals and meet them in the first 25% of the project, then the last 10% usually doesn’t grow to 15% or more. The coordination drawings, properly done and used as a management tool as indicated above, help the team find drawing problems in the office and not in the field, and avoid having requests for information continue throughout the entire project, thus improving the ability to plan based on that which is definite and certain and avoid interruptions to work flow.

The designer and owner must accept their own responsibilities in this regard. The idea that one can just keep making changes as you go along and not expect delays and impact claims is not folly, but ridiculous. And preparation and proper use of coordination drawings is not a one person show. It is the zenith of collaboration on a project; with all the affected parties participating and really thinking out how best to build the project as well as how to make the project drawings as complete as possible.

A recently article stated that the preparation and use of effective coordination drawings was the second most important function after the completion of the design drawings. The operative word here is “use” because it is too often the field does not really use these documents. They still just go to the design documents and ignore the coordination drawings. Not all field personnel, of course, but enough that it is a problem in our industry.

And along those lines, how about making sure that the as-built or red line drawings are maintained on a daily basis.

The checklist is in part adopted from Gilbane Building Company’s website:

www.gilbaneco.com/PreInterdisciplinarydocumentcoordination/

which should be a must read for owners, designers, design/build contractors, and _____. Actually, it would also be prudent for designers to follow the ALA Document A200 Checklist as well.

CHECKLIST

Physical – Will it hit? Will it fit?

Functional – Will it work?

Scope – What does it need to work?

Life Safety Review

How can the team improve? How we function? (Productivity review)

What changes are required and when?

For detailed coordination checklist, see [oa.mo.gov/...](http://oa.mo.gov/)

9% 20 Deliverables %20 checklists.

9% 20 Coordination- Which is a pretty thorough sample of a checklist for all the trades.

Management of Others

It is rare that a single contractor performs the entire project in commercial, infrastructure and industrial construction. And there is an interdependence between the various contractors on the project, and overhead rough-in cannot be started until there is an elevated slab, or fireproofing cannot commence until there is something to fireproof. And often more than one craft is working in a given area at the same time; the rough-in of mechanical, electrical, and plumbing involved the same geography at pretty much the same point in time. So, there are precedent trades and concurrent trades, and these activities must be coordinated.

The role of the general contractor is to schedule and manage and theoretically to perform this coordination and yet often the coordination responsibilities are laid off to the craft contractors. Whoever performs the function; there are a number of tools for the coordination of others:

- i. First, of course, are the contract documents themselves. The layouts of the drawings, the specifications which may direct the electrical contractor to hook up the mechanical equipment. Trade congestion is shown by the dimensions and elevations in the drawings. Desk top reviews at the onset of the project for contractors to work together to identify conflicts and problems with the drawings and to get them clarified early on can be a huge factor in a project running smoothly with minor interruption for all the contractors.
- ii. Second, the development of coordination drawings which should be thoroughly reviewed by all the affected contractors to discover conflicts and discrepancies, but also to be used as tools to figure out how best to work together. Coordination drawing evaluation by the various contractors is a melting pot, an opportunity for a real productivity analysis by each an all the affected parties.
- iii. Third, the construction schedule is again the opportunity for discourse among the various contractors, and the updates are as well. Remember, the schedule should include the duties of all the parties, including the decisions and functions of the owner and the design team. (And pre-construction meeting is the gold standard for bringing all the parties together, start the process of reviewing and commenting what needs to be done, what are the challenges ahead, what are some of the potential delays, how best to handle changes and interferences. on the game plan, which is all a construction schedule really is, to begin the process of coordination and working together as a team.)

Checklist

1. Commit to teamwork, working together with other contractors to continue to develop the most productive approaches for a successful project.
2. Review plans and specifications for contractual points of coordination (coordination drawings, schedules and updates, planning meetings and look ahead plans, close out functions, etc.).
3. All such points of coordination shall be prepared for, and reasoned input shall be made. Maintain a tone of professionalism and respect for all the parties, even to those who may not hold themselves to this same standard. Set an example of team play. If not you, who?
4. Be an advocate for "reliable promises," meaning that when a contractor promises having work done by a given time, or number of workers on the project, that all the parties can rely on that promise. The pre-con is a good time to discuss this concept and to provide a handout on its value. And then walk the walk: when we make promises, we keep them.
5. In look ahead schedules, use as much 20/20 foresight as possible and encourage others to do the same. If there are going to be delivery delays, let's put that on the table and plan around the problem rather than having our heads in the sand until the problem materializes.
6. Develop at the outset a back charge protocol so that everyone knows what it is, and abides by it. No surprises at the end of the project. When back charges arise, let the other knows in real time and then work together to attempt to avoid future incidents.

A fall out of the schedule to complete is the look ahead schedule which should be the brainchild of those contractors. Look ahead plans should always be a product of all the affected contractors who are looking at the world of reality, what has been done, A look ahead plan which is just taking the next thirty or forty-five days off the construction schedule update is out of date (assuming it was valid to begin with), at the moment it was issued. A project is dynamic and so must be the planning and execution.

- iv. Weekly planning meetings should again be an opportunity for the contractors to work together collaboratively to figure out how best to perform the upcoming duration's installation, to identify honestly problems each may be having, to talk about how to get through those problems. A blame game is not a planning meeting. In professional football, when the players come back to the huddle after a play, they make input on how best to run the next one, how to double team the defensive line backer, how to better protect the passer. Tempers may sometimes flare, but the purpose of the planning meetings is to guess what: plan! And plan means to think out the best approach to performing the work.
- v. Pause for a moment. The various players on the Patriots team are not enemies. They may have their moments of conflict, but to win, they must realize that they are teammates and the only way to win is to think as a team, preform as a team. Project management is like that. The various contractors are not enemies, for if they think that way, they will act that way. And in a war, there are never winners, only varying degrees of losers. So it is on a project. When each party is trying to outdo the other in coming up with back charges, blaming the other for its own problems, and not participating the team events, such as planning, schedule updating, then the project will suffer and so will the cost reports of the contractors.
- vi. Preparatory meetings (the built in quality concept of preparatory, interim, final) is again an opportunity for the contractor to coordinate with the Owner's representative, to discuss how the next activity is to be performed, restraints that need to be dealt with including problems with the drawings or perhaps a precedent trade.
- vii. The development of any plan which affects others is an opportunity for craft coordination. Project safety meetings, TAB, Commissioning, Close-out plans, to name a few. Again the point is that successful projects are team efforts. Team players use each of the foregoing tools, as a minimum, to think about how

best to play the game, how to improve the game. Not the blame but the ball game.

The Tool Kit

1. The Filing System
2. RFI Log
3. Change Order Log
4. Material Status Report
5. Shop Drawing Submittal Log
6. Daily Report
7. Occurrence Report
8. Impact Identification
9. Early Indicator Project Status Checklist
10. Early Indicator Checklist
11. Decision-making Checklist and Sample Letters
12. RFI
13. Variances Checklist
14. Formal Change
15. Constructive Change
16. Disputed Change
17. Differing Site Condition
18. Constructive Acceleration
19. Written Notice Time Limits (Federal)

Decision-Making Checklist

General

Concept

Momentum is the spice of productivity. Timely and objective decision-making is an essential ingredient of the physics of momentum. When work activities are stopped or slowed, productivity is negatively affected and someone ends up paying the bill.

The owner audits representatives have a duty to perform their functions on a timely basis; in fact they have a good faith duty to not interfere with the contractor's prosecution of the work. This duty relates to timeliness of responding to RFI's changed conditions, time extension requests, submittals, and any other request for direction or information.

However, the contractors have a duty to facilitate the decision-making process by providing, in their requests, accurate and complete information upon which the owner is to make a decision or to take a given action.

Contractors have a duty to find drawing problems in the office and not in the field, for example; so contractors have a duty to ask questions or seek direction on a timely basis, and to get those coordination drawings and other submittals to the owner promptly, so as to avoid or minimize field impacts.

Checklist

1. Identify the issue.
2. Research the contract documents relevant to it.
3. Gather all field documentation, including meeting minutes, daily reports, correspondence, schedules & updates.
4. Set forth clearly the:
 - A) Issue
 - B) Contract provisions
 - C) Summary of documentation
 - D) And direction you are seeking
5. Establish from the schedule when you need the respond.
6. Establish clearly and factually the consequence of not receiving the direction on a timely basis.
7. On at least significant issues, make personal contact with decision-maker in advance of submitting request.
8. Track in field records what effect this is having on crew(s), equipment, and time.
9. Add cost code and schedule activity for issues affecting progress and cost.

Request for Information (RFI)

The RFI is used as a tool for contractors to obtain expeditious response to legitimate issues arising out of the contract documents. The contractor is not to use the RFI as an instrument for the designer to do the homework for the contractor.

The contractor team should attempt to review the contract documents early in the project to obtain clarification and authorization prior to having procurement or installation impact.

Remember, a contractor should attempt to find conflicts in the office and not in the field.

- A. Read contract (and/or project manual) for procedure, and timelines of response.
- B. Maintain RFI Log.

- C. Ask questions clearly so the designer understands completely the issue.
 - Do your homework; don't ask questions when the answer is in the documents.
- D. Where issue is complicated, talk to designer in an upfront to assure he fully understands the issue.
- E. Where possible, provide recommendations without becoming the designer. Carry RFI on schedule until resolved with answer and/or change order.
- F. The RFI to CPM activity when requesting return by a certain date.
- G. If late RFI response affects schedule, request justified HME extension, and update CPM.
- H. Carry impact of RFI on daily report, and on schedule update.

Evaluation of Impacts to Schedule

All should be recorded by the contractor- including his own problems.

	Production Flow	Effect on Crew
<u>Owner Caused</u>	<ul style="list-style-type: none"> • Production Flow • Change to crew movement • Compression of Durations • Extension of Durations • Access Issues • Material Handling Impacts • Suspensions of Work • Reduced Work Areas • Increased Scope • Changed Condition • Accelerations 	<ul style="list-style-type: none"> • Increase in crew size • Dilution of Supervision • Learning Curve • Temperature • Safety Issues • Impact of Overtime • Impact of Shift Work • Morale • Congestion of Trades • Over manning • Crew Movement • Learning Curve
<u>Contractor Caused</u>	<ul style="list-style-type: none"> • Absenteeism • Turnover • (Employee) • (Supervisors) • Workmanship • Poorly Planned Work • Waste • Material Handling • Deliveries • Inadequate Coordination • Inadequate Supervision • Precedent contractor delays/ workmanship • Back Charges • Safety • Inadequate tools & equipment • Payment to Subs/ Vendors • Layout problems • Poor Estimate 	

Change- Formal

(A formal change is one which is not in dispute and follows procedures set forth in the changes clause of the contract)

- A. Review changes clause in your contract, subcontract (if applicable). Also review contract clauses related to "time," "schedule," and "delays." Review limitation of costs (such as Eichleay-home office overhead).
- B. Maintain Change Order Log.
- C. Monitor your timely response to requests for proposal.
- D. Set up separate:
 - a. Folder for each change
 - b. Cost code where change order is significant.
 - c. Schedule activity on CPM.
- E. Proposal letter should have three (3) segments:
 - a. Description of scope (set forth what it takes to implement the change. If AHU added, what work activities must be performed to add the unit at this stage of project? See attached checklist).
 - b. Pricing of scope. The better and more detailed the "description," the easier the pricing and evaluation of pricing.
 - i. Note: Attempt to obtain agreement on pricing method at outset of project (NECA, MCA, RS MEANS) or unit prices the parties negotiate.
 - ii. Note: credibility is identified here as "documentation." The overpricing of changes by the contractor and the attempt by the owner to unreasonably "beat down" the contractor's fair price destroys trust and inevitably has a negative impact on the project. This syndrome: overpricing versus "beating down" is a poisonous characteristic of too many projects!
 - iii. Description & effect on schedule. Update on schedule is required. Price effect if possible (see checklist attached, refer to schedule documentation). Otherwise reserve your rights to do so at a later date if it appears schedule or labor will be impacted. At least describe how the change will affect schedule (refer to CPM, attach "fragnet," e.g.) and labor (workflow, crowding, etc.)
 - iv. Where price cannot be agreed upon, refer to changes clause for methods of pricing.
 - 1. Setup separate cost code.
 - 2. Track cost as a T&M.
 - 3. Have labor time sheets signed off on a daily basis.
 - 4. Track on daily report

Changes- (Constructive, Undisputed)

These are directivities by the owner in advance of being able to issue a fully priced, negotiated formal (change). Remember, you generally must comply with an owner directive or be in breach of contract.

- ❖ Review contract requirements
- ❖ Setup log
- ❖ Setup separate cost code
- ❖ Enter activity on CPM pricing proposal
- ❖ Respond to directive that you will comply with directive and submit request for equitable adjustment when full effect understood.
- ❖ Description of work
- ❖ Track on daily reports
- ❖ Have time sheets signed daily
- ❖ Pictures where applicable
- ❖ Update schedule as applicable.
 - Fragnet where applicable

Changes- Disputed

A disputed change occurs where the owner directs performance (without compensation) which the contractor believes to be outside the scope of the contract. Remember, you must generally comply with an owner directive.

- A. Review estimate to see how you handled this issue. Review contract for procedure and timeliness of response. Directive by owner (or GC, if applicable) Enter on log.
- B. Contractor's response to owner's directive (see attached) stating its justification for believing the directive is to do work beyond the scope of the contract, and contractor is performing work under protest and that equitable adjustment will be requested. Cite applicable contract documents, basis of estimate,etal.
- C. Response within time limitations of contract.
- D. Setup
 - a. Cost code to track cost
 - b. Separate CPM activity
- E. Track activities affected on daily reports.
- F. Do fragnet for schedule impact update schedule as required.
- G. Pictures where applicable.

Differing Site Condition

- ❖ Review contract. Check disclaimers/ Exculpatory clauses.
- ❖ Review pre-bid site investigation documents in estimate file.
- ❖ Establish separate file folder. In which to assimilate all info related to this issue, associated with dealing with the changed condition.
- ❖ Take pictures of initial observance and all future activities.
- ❖ Written and verbal notification.
 - Request directions per contract.
- ❖ Bring in independent objective consultant where require.
- ❖ Record all effects of changed condition in daily reports.
- ❖ Establish separate cost code and track.
- ❖ Establish separate activity on CPM schedule and track/ update.
- ❖ Rigidly follow the requirements of the contract.

Changed Condition

A changed condition falls into two categories:

- (1) A physical condition which differs materially from the condition described in the contract documents, or...
- (2) A concealment of the condition that is material.

You have 3 thresholds:

1. To prove you did a pre-bid site investigation as required by the contract.
2. To overcome the disclaimer orretculpatory clause in the contract.
3. That this condition is truly materially different from the contract and not just a more different construction problem than you anticipated.

Proposal contains three sections.

- Description of contractual basis of claim and scope of work associated with it.
- Cost proposal for scope of work associated with changed condition.

Description of:

- Schedule effect and impact on balance of project. Price if possible; otherwise reserves rights.
- Update schedule to show effect on critical path and methods of operation, production flow.
- Quickly justify time extension to avoid a constructive acceleration.

Constructive Acceleration

A “Constructive Acceleration” is one on which:

- There is a delay which is excusable under the contract
- The contractor requests and justifies a request for additional time within the requirements of the contract
- The owner (or general contractor) if applicable denies the time extension request
- The contractor then notifies the owner (or general contractor as the case maybe) that the denial is unjustified and constitutes a constructive acceleration
- The contractor then indeed accelerates
- The contractor maintains field documentation proving its additional cost due to acceleration.

Note: Often a justified delays morphs into a constructive acceleration because the owner denies a justified and timely request for a time extension. And because a constructive acceleration can suck the oxygen out of a project, it is not uncommon to have a claim for both acceleration and delay.

- A. Review contract clause
- B. Valid construction schedule
- C. Record of event causing delay
- D. Letter requesting additional time with justification
 - a. Schedule impact/ Fragnet
 - b. Daily Reports
 - c. Meeting Minutes
- E. Owner’s denial letter
- F. Response to owner stating you are accelerating
- G. Establish separate cost code
- H. Track impact on:
 - a. Schedule
 - b. Daily Reports
 - c. Measured mile
 - d. Performance or earned value measurement
 - e. Overtime
 - f. Pictures
 - g. Dailies should keep track of field conditions and impact (See occurrence report)

Weather

“Foreseeable weather” is normally a risk under taken by the contractor. Foreseeable weather is determined by reference to the contract which may specify how many days per month might constitute. “A weather day,” and/or reference to climatological data published by the U.S. Weather Service.

Obviously, “unforeseeable weather” is not a risk undertaken by the contractor, and for which the contractor may be entitled to an excusable delay.

If owner is responsible for delaying contractor’s working inclement weather, contractor may be entitled to a compensable delay and impact to work conditions.

Checklist

1. Review contract regarding
 - Weather days
 - Notification requirements
 - Obtain 10 years climatological data
 - Reflect in development of construction schedule
2. In estimate, indicate approach for handling weather conditions, such as:
 - Concrete placement protection
 - Temperature sensitive limitations (such as painting, grouting, etc.)
 - Down time (winter, e.g.)
 - Productivity factors, such as start-up of equipment in freezing temperatures); access issues
 - Additional equipment (heater, ice for hot weather concrete pours, etc.)
3. Infield:
 - Record weather/ temperature daily reports
 - Record impact of weather on operations on daily report
 - Take pictures of field conditions
 - Provide written and timely notification of unforeseeable weather resulting in delay and impact to project.
 - Update schedule to show effect on critical path and work activities.
4. If time extension request is denied, evaluate if his constitutes a “constructive acceleration” (See _____).

AIA Notice/ Timeliness Requirements

Pre-Contract

- Clarifications
- Substitutions
- Pre-bid site Investigation
- Pre-bid Meetings
- Referenced Documents
- Certificates/ Proposal

Contract

- Deliverables prior to mobilization
- Submittals time frame
- Response time to RFIs
- Schedule submittals
- Schedule update submittals
- Change Conditions
- Formal Changes
- Constructive Changes
- Suspensions
- Request for Time Extension
- Pay Requests
- Payments
- Claim and Lien Releases
- Direction to Supplement Work Force
- Direction to Correct Work
- Notice of Cure
- Inspections
- Close out Process
 - Inspections
 - Commissioning
 - TAB
 - Punch list by contractor
 - Punch list by Owner
 - Deliverables
 - Substantial Completion
 - Final Completion
- Dispute Process

Contract Reference

- Varies contract by contract complete as a function of job set-up process.

Pricing Checklist- Changed Work

1. “Changed work” is that which is directly affected by the change- the quantity and/or quality revision. If a chandelier is added to the ball room, the changed work is the additional chandelier and the cost of its installation. “Unchanged work” is the effect that the changed work has on other operations. In the case of the chandelier, the impact on unchanged work could be the crowding or congestion or interference that reduces the productivity of the flooring crew or the acoustical ceiling tile crew. **This checklist applies only to the pricing of the changed work assuming there is no unit pricing in the contract.**
2. First step (and this and following steps may be modified by complexity of change) is to develop clearly the quantitative and quality changes to the contract documents. Many pricing disputes arise simply because the contractor and owner’s representative didn’t see eye to eye on basics, such as “how many more” on the real scope of the work involved.

Recommendations:

3. Contractor and owner’s representative top review of drawings to gain full understanding and hopefully agreement regarding quantitative and qualitative changes.
4. Contractor should have available his “take-off” for the project to further demonstrate he is not “double dipping” and getting paid for the same thing twice.
5. Develop clear description of what must be done to perform the changed work (We’re not into throwing dollars on this yet- Just itemizing what has to be done. For example:
 - a. Demolishing previously installed work
 - b. Perform work in a less productive environment
 - i. Congestion
 - ii. Safety Issues
 - iii. Weather Issues
 - c. Add support functions
 - i. Material handling
 - ii. Additional clean-up
 - iii. Additional inspections/ testing
 - d. Affect crew movement
 - i. Stop & Go (Learning Curve)
 - ii. Move to different location and return
 - e. Affect rate of production, such as
 - i. Equipment cycle time
 - ii. Welds per hour
 - iii. Feet/ pounds installed per man hour or other earned value measurement
 - f. Affect method of production
 - i. Overtime
 - ii. Shift work
 - iii. Increase supervision

- iv. Increase tools/ equipment
 - v. Learning curve
 - vi. Crew size
 - vii. Crowding
6. All the foregoing (if not included in a forward pricing change order) must be proved by the contractor. He does this through:
- a. Separate cost code
 - b. Tracking the change and its effect through its daily reports
 - c. The contractor can use productivity impact studies as support for a labor impact claim but the field records showing how he was impacted are absolutely essential.
7. The contractor now enters the change into the **CPM schedule** and track the effect on the contractors cost due to project delay. (Check the contract for “no damage for delay clauses,” limitations on home office overhead) Project delay cost consists of:
- a. General conditions
 - b. Material escalation
 - c. Labor escalation
 - d. Equipment (down time and/ or extended time)
 - e. Perhaps rubber-banding of crews (In the case of an extended durations, it is the carrot and donkey syndrome).
 - f. Support functions (should be included in general conditions but to make sure they have been identified) Some are listed below:
 - i. Additional clean-up
 - ii. Tools & Equipment (welding machines, lulls, on the job longer)
 - iii. Foreman, if not carried as direct labor
 - iv. Safety manager if coded to direct job cost
 - v. Project managers, if coded as direct job cost, may be priced as time sensitive in general conditions.

****Remember, you can't change your accounting system in mid-stream or just to accommodate this one change. If project managers are carried as overhead, then you can't change them as "time sensitive" on this one claim or project. ****