

2nd Biennial  
Movable Bridge Symposium  
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November 10, 11, & 12, 1987  
St. Petersburg Beach, Florida

PLANNING AND SCHEDULING FOR PROJECT CONTROL  
(AND AVOIDANCE OF CLAIMS)

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**PLANNING AND SCHEDULING FOR PROJECT CONTROL  
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Project Planning and Scheduling is the management of resources and time in order to complete a project efficiently, economically and on time. In addition to project control the schedule can be an important tool in the avoidance of claims and disputes, and as a final resort, can be used to prove claims that arise during construction.

Planning and scheduling is basically a detailed communications system. We use it to communicate our work sequencing plan, the time we expect to allocate to the tasks and any deviations from these, as they occur, as far in advance as we can. Information contained in the schedule is vital to the project, particularly since in many projects the schedule is made a part of the contract. Usually, in these situations the schedule must be in the critical path method which uses flow chart logic to present graphically and logically all activities that must be completed on a construction project. This can take the form of a modified bar chart, which is often adequate for short term, small contracts with a minimum of complexity or can require a full logic diagram showing complex activity interrelationships and durations.

It is important to remember, that when a schedule is made a part of the contract, a number of rights, and also obligations, are created by the inclusion of the scheduling process.

Following is a brief definition of the terms and tools used in the scheduling process.

1. Bar Charts - also known as Gantt Charts - are the simplest method of planning and scheduling a construction project. A series of bars representing work activities is plotted on a graph showing time on the horizontal scale and the work items on the vertical scale. Bar charts are useful because they are easy to prepare, easy to read, and easy to understand. They are particularly useful for short term scheduling. They are also an effective means of summarizing information from network diagrammed schedules. It is important to understand that bar charts cannot show interrelationships between activities and therefore their value in analyzing causes of delays is very limited.
2. Network diagrams identify the steps necessary to build a project and graphically depict the relationships between the activities. These diagrams include the estimated times for each task as well as the estimated time between the events. This is known as the Critical Path Method. It allows you to identify the cause of delays and also to measure the impact of delays.

3. Early and Late Dates - Every task in the CPM network has four dates: early start, late start, early finish and late finish. The late start and finish dates represent the latest times an activity can start and finish without delaying completion of the project. Any activity which has the same dates for early and late finish is a critical activity with zero float and is said to be on the critical path.
4. Float is the extra time available in a chain of activities. It is the difference between the early and late start dates. Float can be a significant resource because it may give you the flexibility to shift the execution of activities and compensate for time used up by unexpected problems.

Contract scheduling specifications can be extraordinarily detailed or simply call for the submission of a schedule. Corps of Engineers schedule specifications are a good example. They are usually a very detailed and specific clause requiring a considerable amount of effort to prepare and maintain the schedule. Complex scheduling clauses can be filled with traps for the unsuspecting bidder. You should carefully evaluate the scheduling provisions and compensate for them in your bid. On the other extreme, the American Institute of Architects (AIA) standard form requires that a contractor submit a schedule for the owner and architect for information only and not for approval.

You can choose to use a type of schedule that will meet the minimum contract requirements or one that will meet your management needs even though it exceeds the contract requirements. If you only wish to meet contract requirements then you should choose a method that is least costly and easiest to maintain. Using a schedule that is more sophisticated than you are committed to prepare and maintain can often lead to problems. The best course of action is to use the type of scheduling which you determine to be most suitable for you. Keep in mind that a schedule prepared for your own control purposes does not need to be submitted to the owner unless the contract requires a submission. Also it is important to remember that you usually have an implied obligation to develop a normal and reasonable schedule for your work and for the work of your subcontractors regardless of the contract scheduling requirements. In choosing your scheduling method and technique you should consider the following in addition to the contract requirements.

1. The complexity of the project.
2. The amount of experience you have with similar projects.
3. The ability of your personnel to use scheduling methods.
4. Costs involved with scheduling.

The options available have increased significantly in the past few years. Project management systems for micro computer application have become available at prices well within the means of the majority of contractors. In addition to the affordable cost, the systems have been built in a manner that makes them relatively easy to learn and use. In most cases they require a minimum time involvement on the part of the project manager in return for the valuable information they can provide.

Once you decide to use scheduling techniques you must keep it in its proper perspective. The schedule is a tool. A tool to be used for project management, just as a transit is used as a tool by a surveyor to accomplish his work. The schedule should enable you to manage the timely performance of the work and insure that you avoid delays which could result in assessment of liquidated damages. Regardless of whether our schedule is a hand drawn document or the product of a micro-based full capability system, many of the control techniques are the same. The main differences are the degree of detail information we can effectively manage, and the frequency of our application of the control techniques.

A well prepared and maintained schedule will enable you to identify potential delays, develop alternative actions and minimize the effects of those delays which are unavoidable. In addition, it will enable you to clearly evaluate the impact of compensable delays and will serve as the documentation necessary to recover damages. An original schedule should be well planned, be in sufficient detail to avoid misleading the parties involved and should be based upon reasonably attainable objectives. Once the original schedule is agreed to, by all parties, as part of the contract, it should be retained, without changes, as the original plan. This serves as a reference document for evaluation of progress and changes throughout the term of the contract. You should always be able to compare the current status of the job to the original plan to determine those activities which are behind schedule, the number of days they have slipped and whether or not they are affecting the critical path and the final completion date of the project. If the completion date is delayed you should then be able to identify the specific activities which have slipped, the time and reason for the delay, and the assignment of responsibility. If your performance is delayed for reasons beyond your control you should then closely analyze the situation to determine if you have grounds to request additional time of performance and additional compensation.

You must also be attentive to what your schedule tells you regarding delays caused by your actions, or lack of action. If it becomes apparent that your actions will ultimately delay the project completion you should immediately consider action to mitigate the delays. In some instances acceleration of your work, even if it costs more, may be the least costly final solution.

You can take advantage of planning and scheduling benefits by utilizing systems that are entirely manual or by utilizing state of the art systems that are inexpensive and micro computer based for ease of use. You can utilize a modified bar chart for projects that are not complex or a logic diagram for those that are large and complex. In every case the CPM logic diagram is the most effective tool for control and the most positive evidence in settlement of delays.

We will examine both with some sample slides to illustrate the techniques you can use to manage and control your schedule.

At the outset I mentioned the importance of schedules in the avoidance, or settlement, of claims. This is in no way intended as legal advice but rather as a brief review of some of the legal implications of the schedule.

Time is a critical element in the construction process. Controlling the time factor is essential for owners, contractors and subcontractors if they expect to achieve the goal of on-time completion. In practical application a schedule is a warning device for focusing attention on situations at the stage where trouble is developing, but still able to be avoided. In addition, since it is a device for measuring progress it can also be used to analyze, prove, or refute claims for extra time and cost.

In recent years the importance of the schedule has increased significantly in its legal application to projects. Networking techniques make it possible to demonstrate, with reasonable accuracy, the amount of time impact which can occur as a result of specific project delays. Delays can be identified, isolated, and quantified. In addition, concurrent delays can be segregated. Network techniques do not necessarily constitute proof on their own, but they are valuable evidence in demonstrating cause, effect and liability.

In the area of contract time both parties, the owner and the contractor, have certain rights. The owner, for example, has the right to establish the envelope of time for performance of the contract. He has the right to expect timely performance by the contractor. And he has the right to contract for liquidated damages for delayed completion.

The contractor also has basic rights. He has the right to expect clear access to the work area, timely approvals of drawings and other submittals and timely delivery of any owner furnished materials. He also has the right to finish the project early. He may also have the right to extra time and money for owner caused delays and extra time for force majeure delays.

Owner approval of the schedule is essential, since by granting approval the owner binds himself to the schedule. It also provides the owner with the opportunity to assess the plans and insure that owner related functions outlined in the contract documents are properly incorporated in the schedule.

The specific decisions relative to these conditions will often determine whether or not a contractor is entitled to recover additional costs for failure of the owner to disclose superior knowledge.

A contractor may assert "failure to schedule and coordinate" against an owner as a cause for delay and a basis to recover additional costs. This usually arises in contracts with multiple primes or in contracts wherein the owner coordinates the subcontractors. It is also the basis for claims between subcontractors and the prime.

When the owner assumes the coordination role, he is responsible for providing the overall coordination of all participants and the failure to do so may result in legitimate claims for additional costs due to delays. Remember, the term coordination means "to arrange in proper order, to act together harmoniously." In construction this includes the development and updating of schedules, manpower, equipment and material control.

It is important to understand the principles of concurrent delays. Generally, concurrent delays are described as a situation where two or more delays are occurring at the same time. Whether they are excusable and compensable depends upon contract terms, the timing of the delays, responsibility for the delay and availability of float. There are several common situations in which concurrent delays occur.

1. Both an owner and a contractor delay an activity on the critical path. This usually results in additional time for the contractor but not compensation.
2. Both a contractor and owner delay activities on separate paths of the schedule concurrently. In this case the decision is based upon which path is critical since this delay will govern the decision for overall contract delay responsibility.
3. One party may delay the project in two separate work areas at the same time and both delays, or only one may affect the overall completion of the project. In this case, the controlling delay, and the party liable for that delay will determine if additional time and costs will be granted. If they are, the additional time and money will be based upon the only delay which affects the overall completion date.

One last situation to be considered is the warranty of the completion date as specified in the bid document by the owner. This cannot be construed as a warranty that the work can be accomplished in this time and thus become the basis of a delay claim based upon schedule impossibility. In responding to a bid and signing a contract containing a completion date, a contractor warrants that he can perform all the required work within the due date. It is virtually impossible for a prudent and qualified contractor to prove a claim of schedule impossibility. Situations where unforeseen conditions or ambiguities arise after a

project has started which make it impossible to complete within the scheduled date are usually rectified under the changes and differing site conditions clauses.

In conclusion, networking planning and scheduling techniques can be an important tool in the management of projects in order to complete the work "on time and within budget." In addition it may be the only means available to successfully pursue claims or defend against them. In todays world of complex contract specifications, and high risk projects, it would be folly not to utilize all the means available to insure success.