DEVELOPING A BASELINE SCHEDULE

By Rick Cianfaglione, P.S.P.

In a field such as construction, how can a schedule, which depicts one particular scenario, dictate a construction project that contains thousands of variables? As the simple adage "there's more than one way to skin a cat" suggests, in construction there are multiple scenarios that can be utilized to successfully complete a project on time and within budget. Does this mean that it is acceptable to "blow off" the establishment of a reliable and well-thought-out baseline schedule? Absolutely not.

The establishment of a reliable, realistic and accurate baseline schedule is extremely important because the baseline schedule, or information derived from it, is usually a component of the trade subcontractor's contract, which they use to formulate their bid and plan their work. Too often in the world of construction claims, the claim revolves around the construction schedule. The basis upon which damages are measured for delay claims is usually the baseline schedule. Therefore, a baseline schedule's quality is essential.

Visualizing the Construction Process

The Construction Manager's expertise in the coordination and sequencing of projects is paramount when developing a baseline schedule. Normally, the CM is solely responsible for the development of the baseline schedule based on their overarching knowledge and their ability to view a set of drawings and specifications and develop tasks and their sequencing.

The Superintendent, Project Manager and Project Scheduler (Project Coordinator) should work together to incorporate detail into the construction phase of the schedule, where the flow of construction will be established. The means and methods of construction and constructability must be considered in a 'big-picture' scenario to determine sequencing.

Drawings and Specifications should be laid out on the table to begin the brainstorming process. All parties should have suitable time before this meeting to review the documents and site plan. Ample preparation time will allow sufficient understanding of the project and enable smooth schedule development. Schedule development will require several sessions followed by additional input time by the Project Scheduler. Sufficient review time for revision of the final draft should be allotted for all persons involved in schedule creation.

Excellent scheduling practices should be maintained throughout the creation of the schedule. Activity duration is an important component of effective scheduling. It is common practice to limit activity duration to no more than twenty-five days. If more time is needed for an activity, it should be broken out into greater detail. For instance, if a building requires the installation of four elevators with a total duration of eighty days, partition it into four single activities each of twenty-day duration.

Another important scheduling practice is to ensure that only one trade contractor is responsible for a single activity. A typical activity that often departs from this practice is "MEP Overhead Rough In." This activity is generally the responsibility of three trade contractors: the Mechanical contractor, the Electrician and the Plumber. There is no evident manner to tell when each contractor is required to start and finish or how long each contractor has to perform their work involved in this activity. Therefore, if one of these trade contractors delays this activity, it will not be apparent who the responsible contractor is.

Integrating Pre-Construction Processes with Construction

After the overall construction period has been established, the integration of pre-construction activities—such as the issuance of construction documents, the bidding process and submittal process—needs to be incorporated into the project schedule.

The design of the majority of large projects today typically dictates phased construction. The phasing of the construction usually coincides with the multiple-stage issuance of construction documents. Construction documents for Sitework, Concrete and Structural Steel will normally be issued early in order for the project to start quickly. Depending on the project and its time constraints, the number of document packages that follow will vary. Regardless of the phasing of the release of construction documents, it must be illustrated in the baseline schedule. The relationship of the issuance of these documents to the construction of the project must also be included. This allows the owner and the designers to understand the impact of a delay in design, if any, on the completion of construction.

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The bidding process should be included in the schedule as well. Typical bidding activities include issuing bid documents, trade contractors' bid time, scope reviews and contract awards. These activities may occur multiple times—for each phase of construction or for each bid package issued—and must be scheduled accordingly.

A section of the project schedule should be devoted to tracking each trade contractor's submittals. Separate activities for the submission of the data,

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the review and approval of the data, and the fabrication and delivery of the material should be tracked. A detailed schedule of these activities will help both the designers and the contractors identify how much time they have to complete their individual task in order for the material to arrive to the job site on time. This chain of activities must be linked to the construction task that requires the particular material in order to be performed. Furthermore, the project team should identify long-lead items that will be used in the project and illustrate the submittal and fabrication process for these items separately in order to track them more closely.

Review and Approval

After the Construction Manager has completed the development of the baseline schedule with his staff, it will be submitted to the owner who will review it and approve it for use throughout the project.

During a review of the project schedule, the owner, architect and sub-consultants should ask themselves several important questions:

Is there enough detail? – A baseline schedule should include enough activities to accurately monitor the project.

Is there sufficient time for inspections? – Throughout the course of the project, there are numerous inspections required by local officials. Individually, they may not require much time, but collectively the inspection process can be lengthy.

Is there time for the testing and commissioning of equipment? – Major equipment, such as air handling units, must be commissioned. On larger projects, commissioning may require a longer lead time than on smaller ones. Life safety systems must be tested, inspected and approved by local officials prior to the issuance of a Certificate of Occupancy.

Does the schedule consider weather? – Some activities, per the project specifications, may not be able to take place during the wet season or during cold weather. The baseline schedule must address weather-dependent construction activities.

These are just a few of the questions that need to be addressed when reviewing a baseline schedule before it is approved. Of course, different project types will have different needs that should be addressed in the schedule. These project-specific needs should be considered when addressing the validity of a baseline schedule.

A software-generated construction schedule (e.g. Primavera Project Planner or Microsoft Project) contains more than what an individual can see on the printed copy. For example, the schedule can be filled with hundreds of logic ties, depending on the size of the project. Incorrect or unrealistic logic ties can cause a project schedule to illustrate unobtainable completion dates for various activities. This, in turn, can cause havoc on the coordination process throughout the project.

Without proper experience and/or training, it is very difficult for these intricacies to be examined. Bringing a third party to evaluate the baseline schedule can be beneficial to a project team to ensure none of these variables has been overlooked. A reputable scheduling consultant can provide a fresh perspective to go along with the Construction Manager's knowledge and technical skills. The scheduling consultant can examine the finest intricacies of a project schedule to determine if the logic is feasible before the project goes out to bid with the baseline schedule as part of the bid documents.

The approval of a baseline schedule early in the project is extremely important. It allows the trade contractors the ability to develop their bids using a relatively accurate schedule displaying the sequencing of work. This, in turn, is used to properly allocate resources for the project including labor, equipment, and material. In a market riddled by material escalation costs, fuel surcharges, and labor-rate escalations, an inaccurate baseline schedule could end up increasing a trade contractor's price without increasing their scope of work. An accurate, well-designed baseline schedule is critical to ensuring a project is delivered on time and in budget.

About the Author

Rick Cianfaglione, P.S.P. has a decade of extensive field experience as a superintendent on major projects up to $300 million. His primary responsibilities have included the development, updating and analysis of CPM schedules for the design and construction phases of building projects. Since joining PinnacleOne, Mr. Cianfaglione has performed a variety of construction consulting services, including the analysis of construction defects, evaluation of extra work and productivity claims, and assessment of responsibility for project delays. Mr. Cianfaglione received a Bachelor's degree, cum laude, in Construction Management from Wentworth Institute of Technology and is an AACE International Certified Planning and Scheduling Professional. Mr. Cianfaglione is based in PinnacleOne's Middletown, Connecticut office.

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