Integrated Consulting Article

Values of Scheduling

All projects regardless of size or complexity have a specific sequence for completing the component tasks. Most sequences require that certain activities be started, and in some cases, completed before other tasks may begin. This method of sequencing is defined as interdependence between two or more related tasks and is commonly referred to in the scheduling industry as activity relationships (predecessors and successors). Since the first and most important question with regard to schedule is "When do you need it", it is these relationships which provide the roadmap for completion of the project and the time it will take to get there. The most common method of scheduling in today's industry is the Critical Path Method (CPM). This method uses a network of activity relationships working in unison to determine the single longest path to project completion. Since some of these networks can number in the tens of thousands of activities with infinitely more relationships, scheduling software such as Primavera Project Planner™ and Microsoft Project™ have become popular within organizations to produce graphical representations (in the form of bars or Gantt charts) for review. It is these tools that provide the necessary capacity to make sense of these networks, regardless of size and complexity. However, it is important to first understand the characteristics of a critical path.

Most of us have used a roadmap at one point or another to plan a trip. Planning a project with regard to building the schedule is very similar. In comparison, think of tasks or activities within a schedule as roads on a map, the durations as mileage from one city or town to another, and milestones as the cities or towns themselves. As you mark the roads you plan to follow during the trip, there are certain paths that must be taken in order to reach your destination, and these paths are determined by distance, time, ease of travel, or some combination of all three. Once the preferred path has been chosen, the mileage between each is summarized and the total distance is divided by a rate of speed to arrive at an anticipated travel time. Each city along the route can be used to determine progress of the trip by comparing actual travel time against anticipated travel time for each intermediate point. This is exactly how a schedule is used to determine the anticipated length of a project.

While this example is rather simplistic, and would most likely represent only one sequence in a schedule, it serves to show how the activities rely on each other to ensure arrival at the desired location which, in the case of a project, is completion. In order to truly understand the CPM method on a project level, you need to add a few more paths to the network. Using the previous example, now assume that the first route was for a truck to leave one city carrying one piece of equipment to stop in another city a specified distance away to receive a second piece of equipment arriving by ship before carrying both pieces of equipment to a project site where they were to be installed on a specified date. In this scenario, the truck and ship act as two paths coming together at a specified point to combine into one path to completion of the project. Assuming the two methods of transportation were started simultaneously (project start), whichever method of transportation takes the longest to get to the specified city will decide the overall duration of the project. This longest path is considered the critical path for the project, thus completing the CPM method of schedule development. A few items critical to developing an adequate schedule with proper sequence is as follows:

1. A clearly defined scope of work typically provided within a detailed Work Breakdown Structure (WBS).
2. Accurate knowledge of organization's internal productivity and capability (crew skills, internal versus external capability, resource productivity rates, fabrication durations, and delivery lead times, etc).

3. Identification of risk impacts relative to the project schedule.
4. An accurate knowledge of how the tasks required for the scope of work should be performed, including the sequence and interdependency (predecessors and successors).
5. A solid understanding of the time and resources required to complete the scope of work.

Once these items have been addressed, then the schedule development can begin by utilizing the following list of common steps:

1. Review project WBS and consult with Project Team or necessary Subject Matter Experts (SMEs) for task detail.
2. Utilizing scheduling software, develop tasks with descriptive names (verb and noun to accurately define scope covered) in adequate detail to reflect progress.
3. Develop task durations (consistent with the project estimate or based on historical data) with anticipated start and finish dates.
4. Identify and create necessary task interdependencies (relationships) based on requisite sequencing. There should be only two tasks without both a predecessor and successor. These are typically the project start (will only have successors) and project complete (will only have predecessors). All other tasks should have at least one predecessor and one successor each. Relationship types include:
    a. Start to Start (SS) -
5. Identify and implement necessary constraints. Types of constraints include:
    a.
6. With the scheduling software, calculate the schedule to determine the project duration.
7. Analyze the longest path (critical path) and other parallel paths to confirm validity. Adjust where necessary and correct any errors such as open ends (no predecessors and/or successors) on activities.
8. Identify areas of concern within the schedule such as open gaps (period of inactivity) between tasks, task durations greater than one reporting period, and errors in task sequencing. Adjust where necessary and recalculate the schedule.
9. Review the schedule with the Project Team and management to obtain approval.
10. Save a copy of the approved schedule as a basis for comparison (target/baseline) and management of change control.
11. Develop and maintain Basis of Schedule Document and Change Control Log.

When developed properly, Project Schedules can be used to determine the validity and increase accuracy of an estimate and as a tool to confirm the entire scope has been captured and sequenced properly. Additionally, the schedule can be used to measure productivity and progress toward project completion. The graphical depictions available through scheduling software make looking at the whole project relative to duration and sequencing much easier. This also provides for capability to quickly distribute the information to the Project Team and facilitates the ability to perform “what-if” analyses for alternate project execution methods. By scheduling the project scope, and where necessary loading the tasks with resources, the Project Team and Management are kept up to date with where they have been and where they plan to be for completing the project.

In conclusion, with the unrealistic pressure to complete projects faster, cheaper and more efficiently, project schedules are becoming more important as a powerful, useful tool for planning and tracking project execution.