

## Keeping on Schedule in

# 2009

PART 1

by David Elam

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Birthdays and the new year provide an opportunity for reflection and planning, allowing us to check off completed goals, revise existing goals, and add new goals. Although I do make progress, keeping projects on schedule remains a challenge. As a result, establishing realistic schedules and achieving them continually appears on my New Year's list of goals. Fortunately, there are several tools for developing and managing schedules, and we'll examine some of them in this column and the next.

A Gantt chart, illustrated in Figure 1, is a specialized bar chart that allows a project manager to visually present project schedule and status information in an easy-to-understand format. Henry Laurence Gantt, based on his work in the early 1900s, is credited with the development and use of this technique for information presentation. Today, the American Society of Mechanical Engineers (ASME) each year awards the Henry Laurence Gantt Medal in honor of Gantt's contributions to management science. Although other schedule presentation and management tools have been developed since, the Gantt chart remains a popular tool and is particularly useful for small- and medium-sized projects.

Preparation of a Gantt chart is actually a five-step process, as described below:

1. Identify the tasks needed to complete the project.
2. Identify key project milestones.

3. Identify the time required for each task.
4. Establish the sequence of operations, giving consideration to simultaneous operations.
5. Construct the Gantt chart.
  - a. Establish the overall timeline as a horizontal axis at the top or bottom of the page.
  - b. List the tasks and milestones in a column along the left side of the page.
  - c. For each task, draw an open bar that corresponds to the timeline for the task. Use an open diamond to symbolize a task that occurs at a point in time.

Use the Gantt chart by placing a vertical marker at the current point on the project schedule and fill in open bars and diamonds to indicate completion of the task. (Source: Tague, N.R., *The Quality Toolbox, Second Edition*; ASQ, Quality Press, 2005.)

Figure 1 presents a simplified Gantt chart for a facility wishing to add a water reclamation loop to an existing wastewater treatment system that discharges to a publicly-owned treatment works (POTW). As a significant water user in the community, the facility can achieve water savings with the reclamation loop; however, addition of the loop will change wastewater discharge characteristics and potentially affect operations at the POTW. Accordingly, the facility wants to use a phased approach to explore construction and permitting of the water reclamation system. If the POTW deems the project acceptable, the facility would like to complete construction of the water reclaim loop before late summer and thus avoid the curtailment of water supply associated with past droughts.

A review of the schedule on January 31, 2009, indicates that preparation of the final design documents are behind schedule and may potentially affect the target date for obtaining a permit to construct. Using this information, the project manager may attempt to bring the design task back on track, try to compress the permit application schedule, or may inquire about a phased submittal of the application and design drawings to the POTW.

Gantt charts offer many advantages. First and foremost, they are easy to prepare, understand, and maintain. Although there are number of charting and project management applications that simplify the preparation of attractive Gantt charts (Figure 1 was prepared using a template in Microsoft Visio), they can be easily prepared using the built-in charting feature of Microsoft Excel.

Although Gantt charts are useful, they do have limitations. For example, Gantt charts don't readily communicate the effort associated with a given task. This is painfully clear when there are two tasks, one requiring 1000 total hours of effort and the second requiring 20

total hours of effort, each of which are 90% complete, and both of which require completion in one week to meet the schedule. Only two hours are required to finish one task, but 100 hours are required to complete the other. The visual image created by a Gantt chart does not readily communicate this important gap.

Another limitation of Gantt charts is that to be visually effective, they must present only a few tasks and milestones. The project used to develop Figure 1 actually involves subtasks for each task—in some cases, dozens of subtasks. Presenting the all tasks and subtasks in a single Gantt chart would diminish effectiveness of the chart and increase the effort required to update it.

Next time, we'll examine Critical Path Method (CPM) and Program/Project Evaluation and Review (PERT) scheduling approaches. In the meantime, consider using Gantt charts to schedule tasks on individual projects or roll-up scheduling information for the projects you manage. You'll find that you are better able to communicate schedules and manage your workload, both of which can help keep your projects on schedule in 2009. **em**

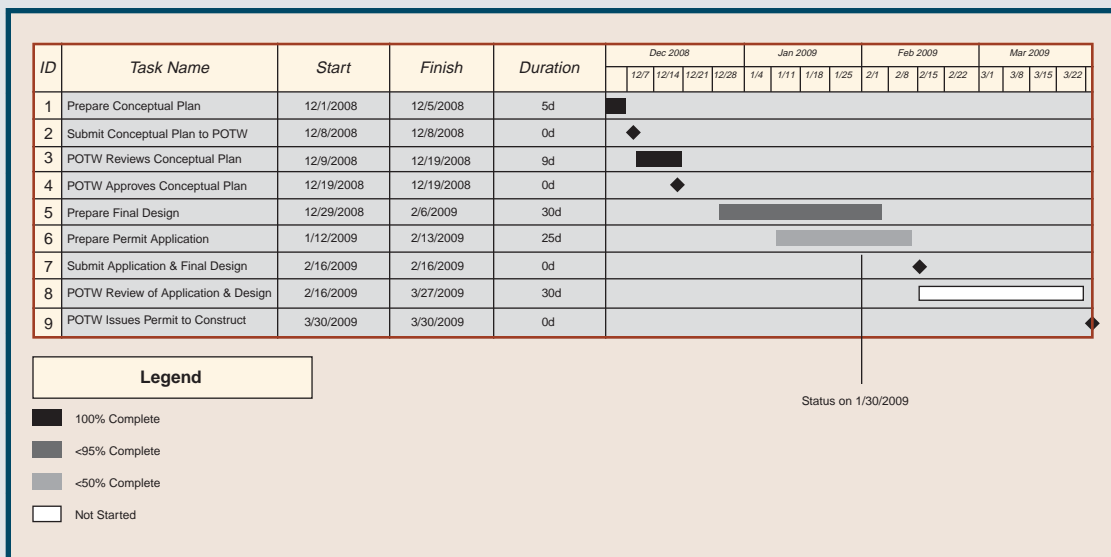


Figure 1. Example Gantt chart for water reclamation system permitting.