4.2 SCHEDULE ANALYSIS AND MONITORING

Matters relating to the project schedule were presented briefly in the last chapter in discussing the project plan. Every project plan must have a schedule, although such a schedule is generally an overview of the project, with a detailed schedule included perhaps as an appendix. In this chapter, we examine some of the "nuts and bolts" of project scheduling, exploring particularly the characteristics of the PERT (program evaluation and review technique) approach.

PERT is the preferred scheduling procedure for a large-scale system in which there are large numbers of events and activities that must be identified and tracked. This technique, in distinction to Gantt charting, deals explicitly with dependencies between the various tasks and activities. A PERT network is normally devised by starting with known "end" events and milestones and asking the question: What activities need to be accomplished before this event or milestone can be achieved? By working backward in this fashion, eventually an entire network is developed.

The PERT procedure leads to a network of serial and parallel paths of events and activities. A simple example of such a network was shown in Figure 3.3 of the previous chapter. We use this example here to examine the network itself as well as some of the data that are required to formulate the network.

We first work backward from the end event (number 8) and redraw the network so as to identify the critical path, which is the longest path through the network. This path, by definition, has no slack in it, and slippage along this path leads to slippage in the project end date unless corrections are made. The redrawn network, based on Figure 3.3, is shown here as Figure 4.1. We note that the critical path now consists of the following sequence of events:

$$\text{Critical Path} = 0\text{–}1\text{–}4\text{–}5\text{–}7\text{–}8$$

In this example, this path is 8 weeks long. We note that slack exists in various subpaths:

Subpath 0–3–4 has slack of 1 week
Subpath 0–2–4 has slack of 1 week
Subpath 4–7 has slack of 1 week
Subpath 5–6–7 has slack of 1 week

Using the convention that, where slack exists, all activities start as late as possible, we have the network in Figure 4.1. If we used the convention that, where slack exists, all activities will start as early as possible, the network would change by events 2, 3, and 6, all moved to 1 week earlier. If we compare Figures 3.3 and 4.1, we see that in the latter, event 6 has been moved

SOURCE: HOWARD EISNER, Essentials of Project and Systems Engineering Management 2nd ed., WILEY, 2002.

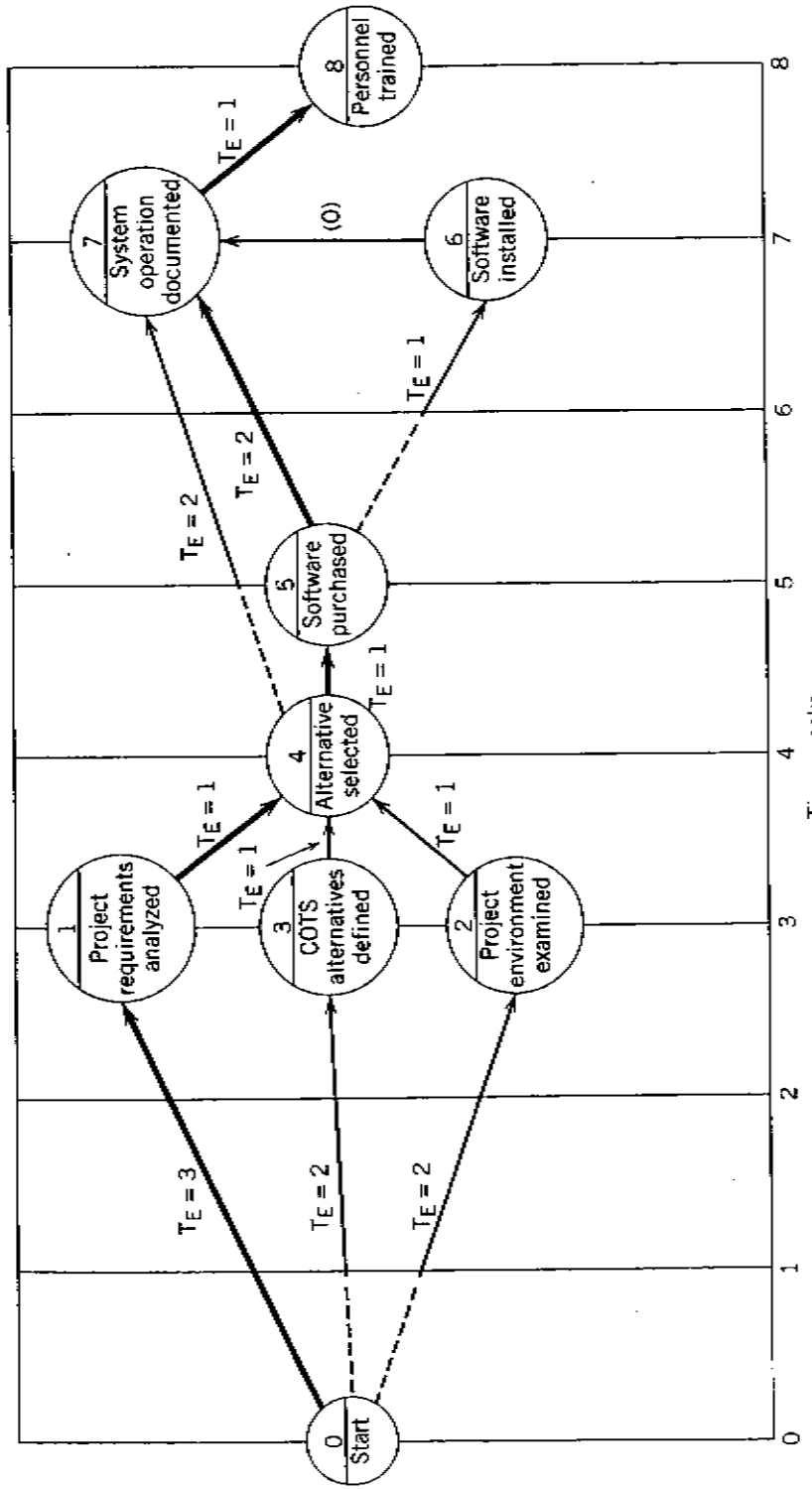

Figure 4.1 Illustrative project PERT chart.