

23 Network analysis – time analysis

Objectives

1. After studying this chapter you will
 - know that there may be single or multiple time estimates for each activity
 - be able to define the Critical Path
 - understand how to find the Critical path using the forward pass and the backward pass
 - know what is meant by Float and how it is calculated
 - understand how basic time analysis can be extended using multiple time estimates
 - be able to estimate the Standard deviation of the project duration
 - know how to use both Continuous and Discrete probabilities in Networks.

Assessing the time

2. Once the logic has been agreed and the outline network drawn it can be completed by inserting the activity duration times.
 - a) Time estimates. The analysis of project times can be achieved by using:
 - i) single time estimates for each activity. These estimates would be based on the judgement of the individual responsible or by technical calculations using data from similar projects;
 - ii) multiple time estimates for each activity. The most usual multiple time estimates are three estimates for each activity i.e. Optimistic (O), Most Likely (ML), and Pessimistic (P). These three estimates are combined to give an expected time and the accepted formula is:

$$\text{Expected time} = \frac{O + P + 4ML}{6}$$

For example assume that the three estimates for an activity are

Optimistic	11 days
Most likely	15 days
Pessimistic	18 days
Expected time	$= \frac{11 + 18 + 4(15)}{6}$
	$= 14.8 \text{ days}$

- b) Use of time estimates. As the three time estimates are converted to a single time estimate there is no fundamental difference between the two methods as regards the basic time analysis of a network. However, on completion of the basic time analysis, projects with multiple time estimates can be further analysed to give an estimate of the probability of completing the project by a scheduled date. (This is dealt with in detail in para 8).