

Unit 2 *Critical Path Analysis*

Introduction

Learning objectives

After studying this unit you should

- be able to construct activity networks to represent tasks in a project
- be able to find earliest and latest starting times
- be able to identify the critical path
- be able to schedule workers to complete the project on minimum time.

Notes

A complex project must be well planned, especially if a number of people and processes are involved. It is the task of management to undertake the planning and to ensure that the various tasks required in the project are completed on time.

Operational researchers developed a method of scheduling complex projects shortly after the Second World War. It is sometimes called **network analysis**, but is more usually known as **critical path analysis (CPA)**. Its virtue is that it can be used in a wide variety of projects, and was, for example, employed in such diverse projects as the Apollo moonshot, the development of Concorde, the Polaris missile project and the privatisation of the electricity and water boards. Essentially, CPA can be used for any multi-task complex project to ensure that the complete scheme is completed in the minimum time.

Although its real potential is for helping to schedule complex projects, we will illustrate the use of CPA by applying it to rather simpler problems. You will often be able to solve these problems without using CPA, but it is an understanding of the concepts involved in CPA which is being developed here.

Key points

- The activity network has to model the precedence relationships.
- You first work forwards through the network to find the earliest starting time for each activity.
- After finding the earliest starting time, you work backwards through the network to find the latest starting time for each activity.
- The float for each activity is the difference between the latest and earliest starting time.
- Activities with equal earliest and latest starting times, that is zero float, are on the critical path.