
# Network Analysis

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# Introduction

- Network Analysis is a system which plans projects both large and small by analysing the project activities.
- Projects are broken down to individual tasks or activities, which are arranged in logical sequence. It is also decided as which tasks will be performed simultaneously and which others sequentially.

# Introduction

- Network Analysis helps designing, planning coordinating, controlling and decision making in order to accomplish the project economically in the minimum available time with the limited available resources.
- Network techniques were developed from the Milestone chart and Bar chart. These the conventional planning method, because of their inherent limitations could not be utilized for planning large and complex projects

# Disadvantage of Milestone and Bar charts

a. A bar chart becomes too cumbersome while dealing with big and complex projects when the activities are to be considered in detail and their interaction or interdependences are to be studied clearly
b. A bar chart does not point out as which tasks should be given priorities as regards the resources (men, money, materials and machinery)

# Disadvantage of Milestone and Bar charts

c. The effects of the changes in schedule cannot be evaluated with the help of a bar chart

d. A bar chart neither satisfactorily tells the times at which the activities begin and end nor it indicates tolerance in activity timing

e. A bar chart does not show the continuing interrelationship of the activities, especially if the number of activities is large and they change in time scale and resources.

# Disadvantage of Milestone and Bar charts

f. A bar chart does not predict satisfactorily, well in advance the effects of inevitable snags and thus a corrective action cannot be taken in time.

g. Bar charting is simply a scheduling operation, whereas network techniques plan as well as schedule.

h. A bar chart does not normally indicate work progress, which is very essential.

# NETWORK TECHNIQUES

- A number of network techniques have been developed and a few of them are named below:
- **P.E.R.T.**: Program Evaluation and Review Technique.
- **C.P.M.**: Critical Path Method
- **R.A.M.S.**: Resource Allocation and Multi-project Scheduling
- **P.E.P.**: Program Evaluation Procedure

# NETWORK TECHNIQUES

- **C.O.P.A.C.**: Critical Operating Production Allocation Control
- **M.A.P**: Manpower Allocation Procedure
- **R.P.S.M**: Resource Planning and Scheduling Method
- **L.C.E.**: Least Cost Scheduling.
- **M.O.S.S**.: Multi-operation Scheduling System.
- **P.C.S.**: Project Control System.
- **G.E.R.T.**: Graphical Evaluation Review Technique

# Terms Related to Network Planning Methods

(a) **Event:** it is a specific instant of time which marks the start and the end of an activity. Event consumes neither time nor resource. It is represented by a circle and the event number is written within the circle.

(b) **Activity:** every project consists of a number of job operations or tasks which are called activities. An activity is an element of project and it is may be a process, a material handling or procurement cycle.

An activity is shown by an arrow and it begins and ends with event. An activity consumes time and resources. An activity may be performed by individual or a group of individuals and is normally given a name like, A, B, C, etc which is marked below the arrow and the estimated time to accomplish the activity is marked above the arrow

# Classification of Activities

(i) **Critical activities**: in a network diagram critical activities are those which if consume more than their estimated time, the project will be delayed. An activity is called critical if its earliest start time plus the time taken by it is equal to the latest finishing time. A critical activity marked either by a thick arrow or two dash lines

# Classification of Activities

(ii) **Non- critical activities**: such activities have provision (float or slack) so that, even if they consume a specified time over and above the estimated time, the project will not be delayed.

(iii) **Dummy activities**: When two activities start at the same instant of time, the head events are joined by a dotted arrow and this is known as dummy activity. Dummy activity does not consume time. It may non-critical or critical.

# Terms Related to Network Planning Methods

(c) **Critical Path:** It is that sequence of activities which decide the total project duration. Critical path is formed by critical activities. A critical path consumes maximum resources. It is the longest path and consumes maximum path. A critical path has zero float.

(d) **Duration:** Duration is the estimated or actual time required to complete a task or activity.

# Terms Related to Network Planning Methods

(e) **Total project time**. It is the time which will be taken to complete a project and is found from the sequence of critical activities. In other world it is the duration of the critical path.

(f) **Earliest start time (EST):** It is the earliest possible time at which an activity can start and is calculated by moving from first to last event in a network diagram.

(g) **Earliest Finish time (EFT):** It is the earliest possible time at which an activity can finish.

# Terms Related to Network Planning Methods

$$EFT = EST + duration\ of\ that\ activity$$

**(h) Latest finish time (LFT):** It is calculated by moving backward, i.e. from last event to first event of the network diagram. It is the last event time of the head event.

**(i) Latest start time (LST):** It is the latest possible time by which an activity can start.

$$LST = LFT - duration\ of\ that\ activity$$

# Network(Arrow) diagram