

# CONSTRUCTION MANAGEMENT AND TECHNOLOGY

Course code: PC 801 CE

## Syllabus:

**Unit-I:** Introduction: objectives of planning, Construction stages, sequence of events in general civil Engineering projects, construction schedule. Development of management techniques, Bar charts, Gantt charts, CPM and PERT techniques, Network analysis examples.

**Unit-II:** Introduction to cost analysis: cost reduction in construction Management. cost time Analysis crashing the network, optimization, Resource levelling and smoothing.

## UNIT-1

### Introduction to construction Management and technology

Construction is the second largest economic activity in India, next to agriculture. The amount of money invested in and the jobs provided by construction industry are much larger than any other industry in India.

Construction Management is the process of Planning, coordinating and providing monitoring and controlling of a construction project. Management of construction activities can be well done by better Planning.

#### Planning:

Planning is the most important technique of the management. Planning means "Looking ahead." Planning can be therefore defined as a course of action to achieve the desired results. Planning team for a project is responsible for Past failures, the present needs and future utilities. Planning is necessary to ensure proper utilisation of human and material resources.

## Objectives of Planning:

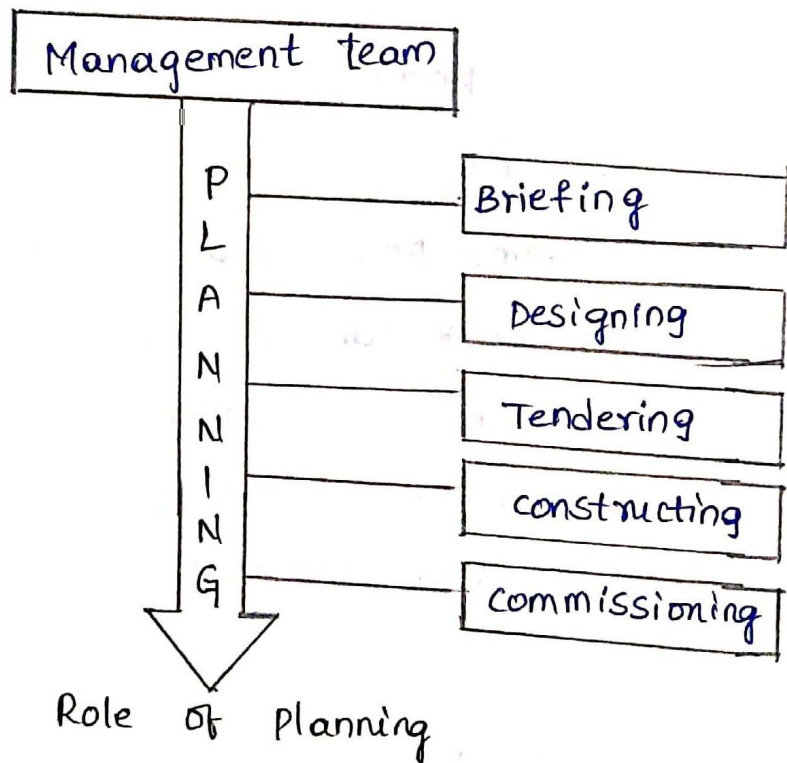
The main objective of planning is to execute the project most economically both in terms of money and time. Effective planning includes the following factors:

- i) Proper design of each element of the project.
- ii) Proper selection of equipment and machinery; in big projects, the use of larger capacity plants are found economical.
- iii) Proper arrangement of repair equipment and machinery near the site of work.
- iv) Procurement of material well in advance.
- v) Employment of trained and experienced staff on the project.
- vi) To provide welfare schemes for the staff and workers such as medical and recreational facilities
- vii) To provide incentive for good workers
- viii) To arrange constant flow of funds for the completion of the project.
- ix) To provide proper safety measures such as proper ventilation, proper arrangement of water and minimum facilities.
- x) Proper arrangement of means of communication etc.,

## Principles of planning:

- i) The plan should provide information in a readily understandable form.
- ii) The plan should be realistic.
- iii) The plan should be flexible
- iv) The plan should serve as a basis for project monitoring and control.
- v) The plan should be comprehensive.

The role of planning in different stages of a project is as shown,



Planning can be advantageous to different personnel in different ways.

### Advantages to the contractors:

1. A properly drawn up programme in addition with cost control can prevent the loss of money and help to relieve financial burden of the contractor.
2. Supply of labour required week by week for each operation can be gauged properly, if a programme has been drawn up earlier.
3. It is easy to produce various schedules for a single programme.
4. The programme provides a standard against which actual work can be measured.
5. When a job has been planned in detail using networks or bar charts, the contractor gets control over several detailed aspects of job.

### Advantages to the clients:

The client will gain the knowledge about the time of completion of project and the time for which his capital will be unproductive, while tied up in construction work.

## Limitations of Planning:

The following may be claimed to be the limitations of planning:

- i) The effectiveness of plan depends upon the correctness of assumptions.
- ii) Too much of planning can be expensive and delays the actual action.
- iii) Planning encourages a false sense of security.

## STAGES OF PLANNING

Various stages in planning process are:

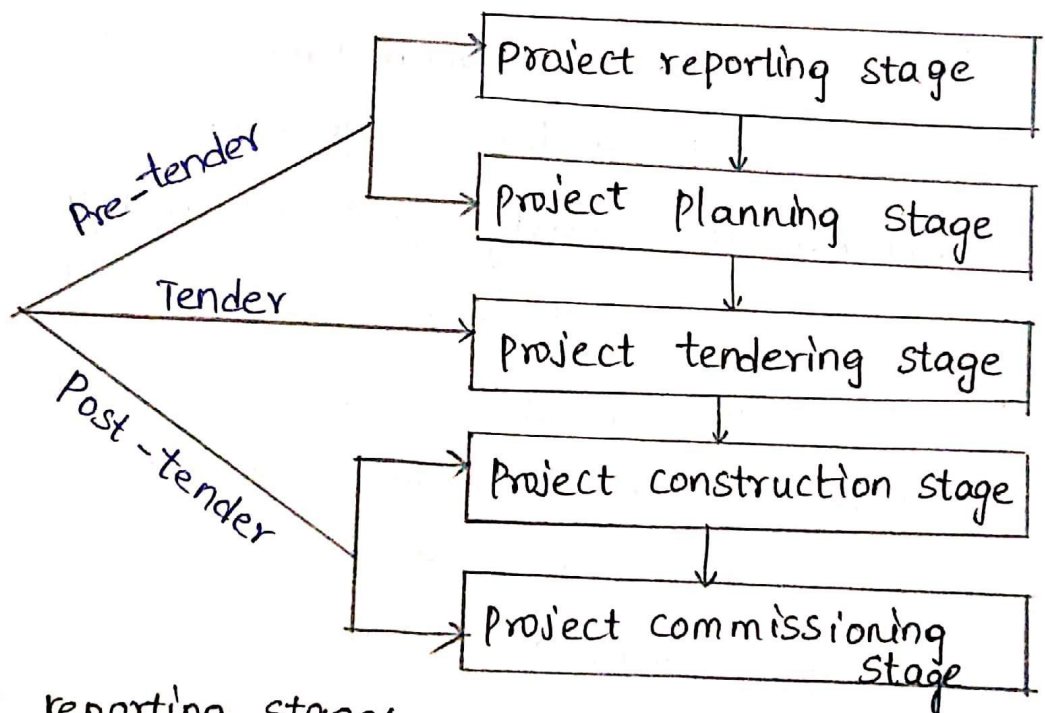
- i) Pre-planning: This is the stage of planning before a decision has been taken to take up the project. During this stage, the objectives of planning are clearly spelt out and a general framework of project is to be formulated.
- ii) Detailed planning: This stage includes the preparation of detailed design, detailed working, drawings, specifications and detailed bill of quantities. Breaking up of entire project into small component jobs and also establishing the sequences of various operations and allocation of time to different activities is done in detailed planning.

### iii) Monitoring and control:

This phase involves monitoring of the progress of the project according to the proposed schedule. This phase includes the updating of the schedule, taking in to account the actual progress and preparing revised forecasting etc.,

## STAGES IN CONSTRUCTION

From a conceptual to realistic situations, a project passes through several stages completely distinct from each other and each stage has its own purposes and functions.



1.

Project reporting stage:

1. It is also called briefing stage where ideas of project are originated from different sources.

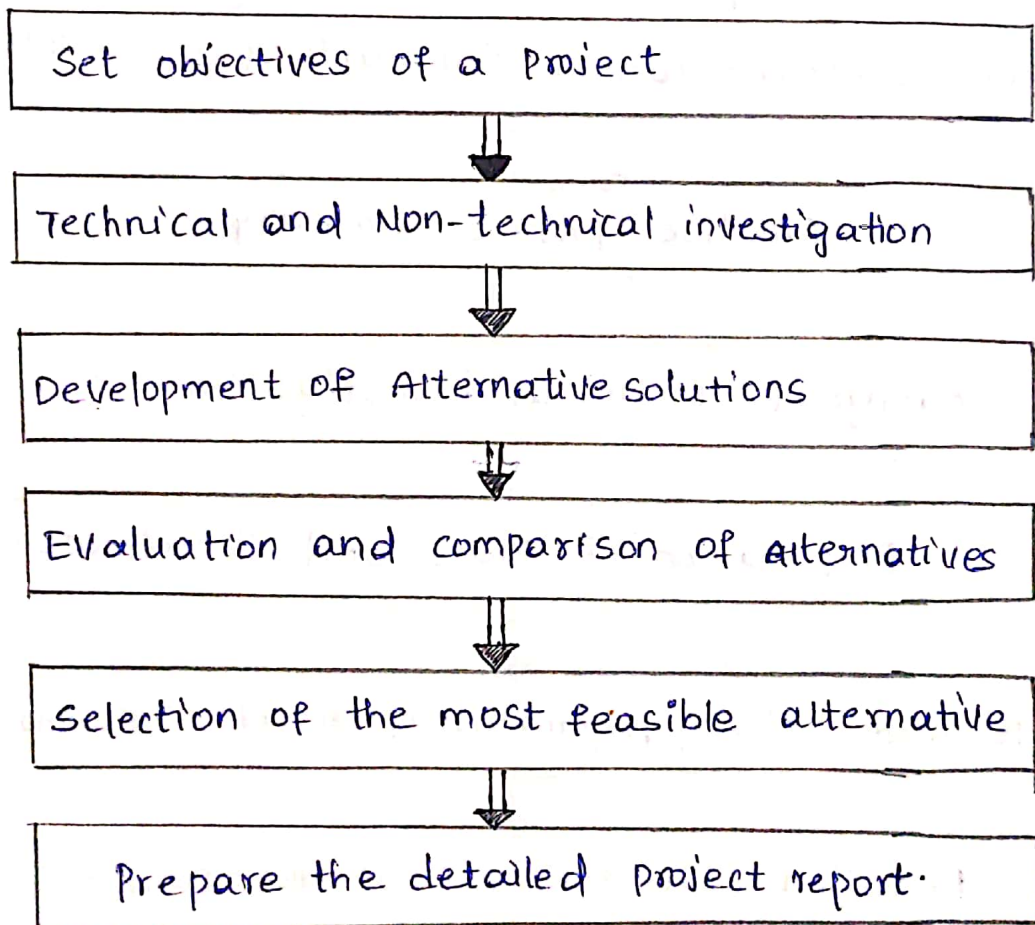
2. Ideas of project are thoroughly studied with regard to cost and benefits so as to establish the economic viability and social utility of project.

Purpose:

i) purpose of this stage is to prepare a reporting or briefing by specifying project functions.

ii) The construction team correctly interprets the owner's wishes and provide an estimated cost.

4. The functions of this stage may be summarized as follows:





2:

## Project planning stage

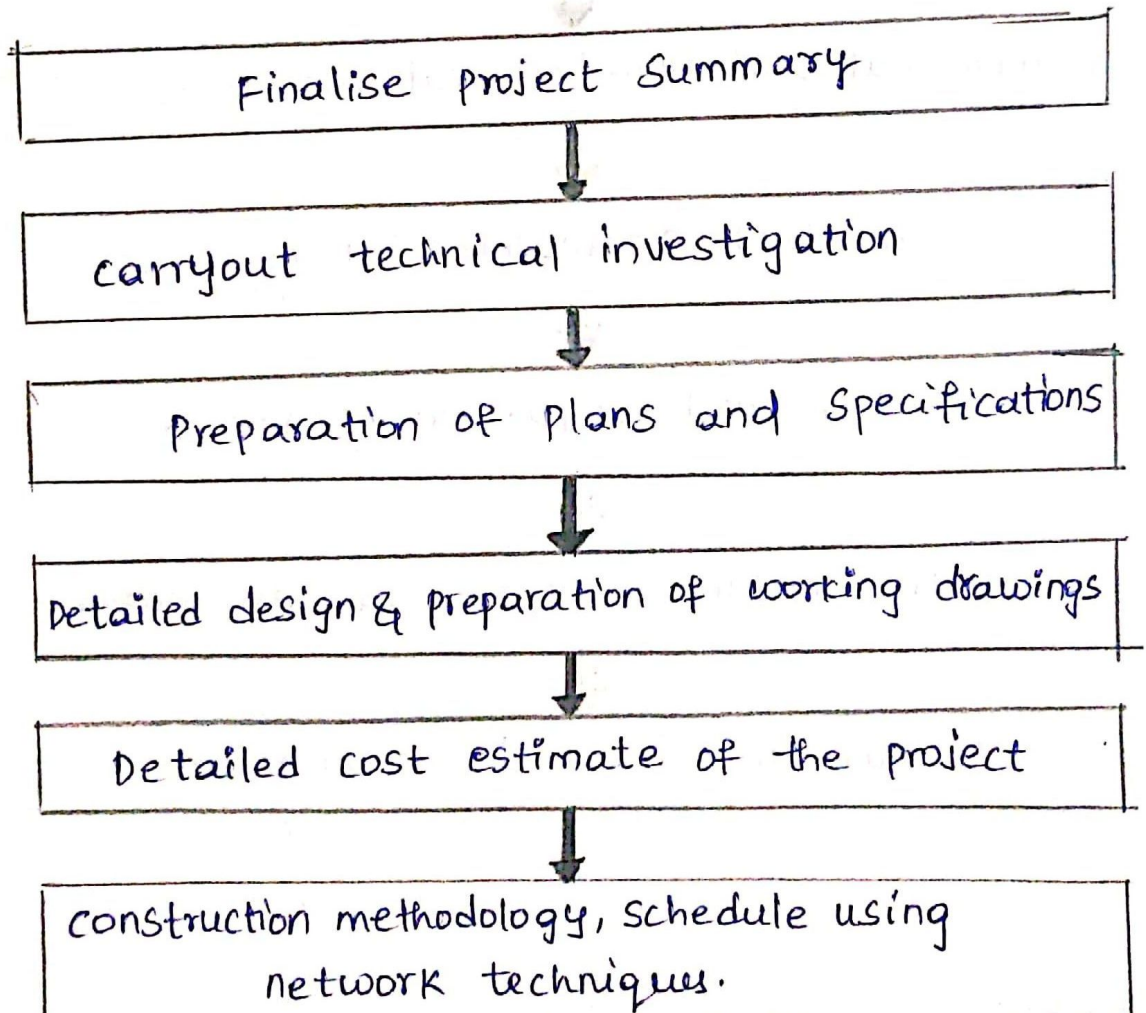
1. Detailed cost estimate of project is made in this stage. Any modifications later on will result or in adding to the project cost.

Purpose:

2. The purpose of this stage is to prepare project summary, detailed drawings and specifications, to make detailed structural design and detailed estimated cost.

3. The type of construction and methodology for network technique is worked out.

4. The functions can be summarised as follows:



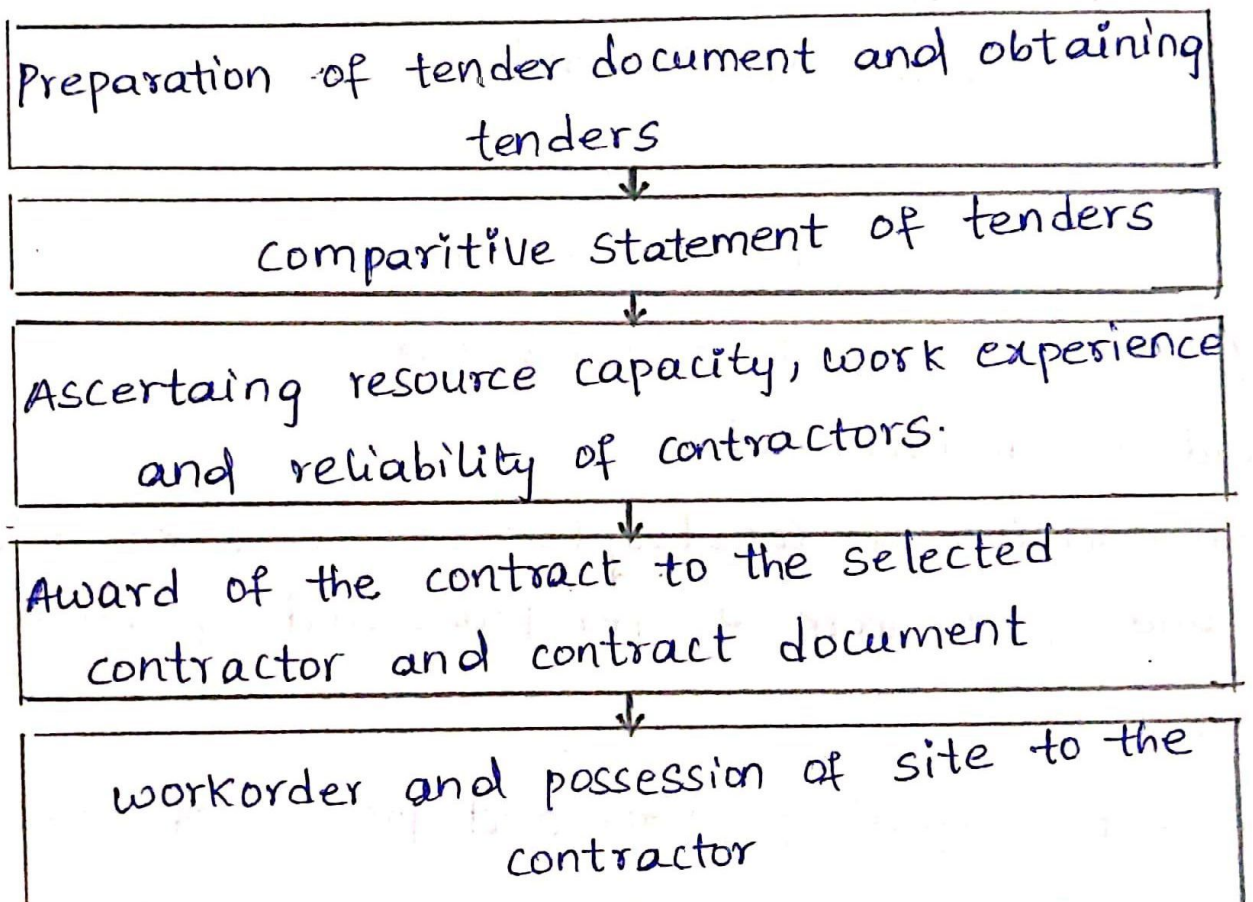
### 3. Project tendering stage:

1. In this stage tenders are invited and the contract is awarded.

Purpose:

2. The purpose of this stage is to award a contract to contractor on suitable terms and conditions.

3. Functions may be summarised as follows:



Functions:

The various activities can be summarised as follows

i) using CPM network, the following construction schedules are prepared

- a) Activity schedule
- b) Material schedule
- c) worker schedule
- d) Fund schedule
- e) Equipment schedule

ii) provision of services and facilities must be provided before starting of project.

iii) A typical layout of plant and service camp should be incorporated

iv) Supervision of construction work and ensuring the quality of work as per plans and specifications made.

v) Inspection, quality control and progress of work are main functions of this stage.

vi) Final payment is made to the contractor after checking the work according to specifications.

5.

Project commissioning stage:

i. The performance of structure is evaluated and nature of maintenance and repair is proposed.

## Scheduling:

Construction scheduling is a graphical representation showing the phasing rate of construction activities with the starting and completion dates and sequential relationship among various activities so that work can be carried out in an orderly and effective manner.

### Advantages of scheduling:

- i) It gives the quantity of work involved, labour, materials and equipment for each stage of work
- ii) The actual progress of work can be checked.
- iii) Project can be carried out in a systematic manner using scheduling.
- iv) Resource utilisation is optimised.

### Methods of scheduling:

Scheduling can be done in different ways depending upon the size of project. The methods are

- i) Bar charts or Gantt charts
- ii) Milestone charts
- iii) Network Analysis.

2.

Purpose: to ensure that construction work has been completed as specified in contract documents.

Functions:

Various functions involved in this stage are

- i) to keep various records of actual work
- ii) to have quality inspection, to remove the defects if found.
- iii) to prepare operating and maintaining manuals.
- iv) to carry out performance test of structure.
- v) to have training and recruitment of staff for commissioning schedule.

Sequence of events in General Civil Engineering

Projects:

