CONSTRUCTION MANAGEMENT

TH-2

6th SEM CIVIL ENGG.

Under SCTE&VT,Odisha

PREPARED BY:-

Er.BIBHUTI BHUSAN ROUT

LECTURER,Dept of CIVIL, KALINGA NAGAR POLYTECHNIC.

TARAPUR,JAJPUR ROAD

LECTURE NOTE
ON
CONSTRUCTION MANAGEMENT

SEM- 6TH

Date :- 05.04.22

Construction Management:-

It is the application of management principle in planning scheduling, organising, staffing directing controlling and coordinating the construction activity with in the estimated budget and stipulated time.

9. Objectives and functions of construction Management:-

The main objectives of construction management are:-

(i) Completing the work within estimated budget and specified time.
(ii) Evolving a reputation for high quality workmanship.
(iii) Providing safe and satisfactory working conditions for all personnel and workers.
(iv) Taking sound decisions at the lowest practical management level through delegation of authority.
(v) Motivating people to give of their best within their capacities.
(vi) Creating an organisation that works as a team.

Functions:-

The functions of construction management are:-

(i) Planning and Scheduling:-

Planning involves formulation of a number of alternative realistic work plans for achieving specified objectives and finally selecting a plan which is best suited from the stand-point of available resources and constraints imposed upon the project. It essentially covers the aspects of 'what to do' and 'How to do it'.

(ii) Organising:-

Organising is concerned with division of the total construction works into manageable department/sections and systematically arranging various operations by delegating specific tasks to individuals

(iii) Staffing:-

Organising involves the division of project works into sections

and staffing is the provision of people to fill the positions so created. Recruiting the right people, arranging staff training courses and carrying out proper staff assessement are all part of the staffing function.

(iv) Directing :—

The directing function is concerned with training sub-ordinates to carry out assigned tasks supervising their work and guiding their efforts.

(v) Controlling :—

Controlling is necessary for ensuring effective and efficient working. It involves a constant review of the work plan to check on actual achievement and to discover and rectify deviations through appropriated corrective measures.

(vi) Co-ordinating :—

Since authority converges to the top of the organisational pyramid it is necessary to bring together and co-ordinate the work of various departments and sections.

B. Behera 06/04/22

Resources for Construction Management

→ One has to plan, estimate, execute and manage the works correlates the various construction activities. Modern construction management involves a complex process of site layout, equipment and plant location to facilitate flow of raw and manufactured materials so that handling and transportation of material is optimal and free from interference.

→ The success of the construction business largely depends upon the proper organization and integration of four "M"s, Namely, Manpower, Materials, Money and Machineries. Also, knowledge of labour relations and industrial psychology is also essential for smoorth flow of work.

Aspect of Construction Management:-

Construction business also requires powerful, profit-oriented and professional type of management. For this, engineers and technicians

with managerial qualities are required, which decide mobilization of manpower, material procurement, optimal and proper use of machinery and arrangement of finance. The consultant coordinates between the customer, contractor and departmental agencies.

Date :- 12.04.22

CHAPTER-2

:- CONSTRUCTIONAL PLANNING :-

⇒ The term construction is no longer limited only to the physical activities involving men, materials and machineries but covers the entire gamut of activities from conception to realisation of a construction project.

⇒ The construction industry is an important index of social and economic development of the nation. The major portion of total outlay in any five year plan is utilised for construction activities. Programming of works and effective management in the industry is, therefore the demand of the day.

⇒ Constructional planning is the 1st step of the construction management. The constructional planing of a civil engg project consider the wide range of aspects involved site investigation market survey, bidding the works

post tended negotiation & arrang-
ement - planning for the work
monitering & controlling the
progress of work during the
up to the completation of work
even its maintenance during the
stipulated period, the important
aspects of settlement of cont-
ractual disputed etc. The
entire process is very complex
requires deep knowledged & skil
of construcetional management.

IMP of construction planning:-
Planning helps to minimize the
cost by optimum utilization of
available resource. planning
reduce irrational approach,
duplication of works & inter
department conflicts. Planning
encourages involves & creativity
among the construction managers
planning & civing of construction
activities helps engineers to
complete the project in time &

within the budget. The term construction doesn't only denote physical activities involving men, materials & mechonary but also cover the entire gamut of activities from connection to rehabilation of a construction project. Thus management of resource such as man, materials, mechonary required effective planning & scheduling of each activities.

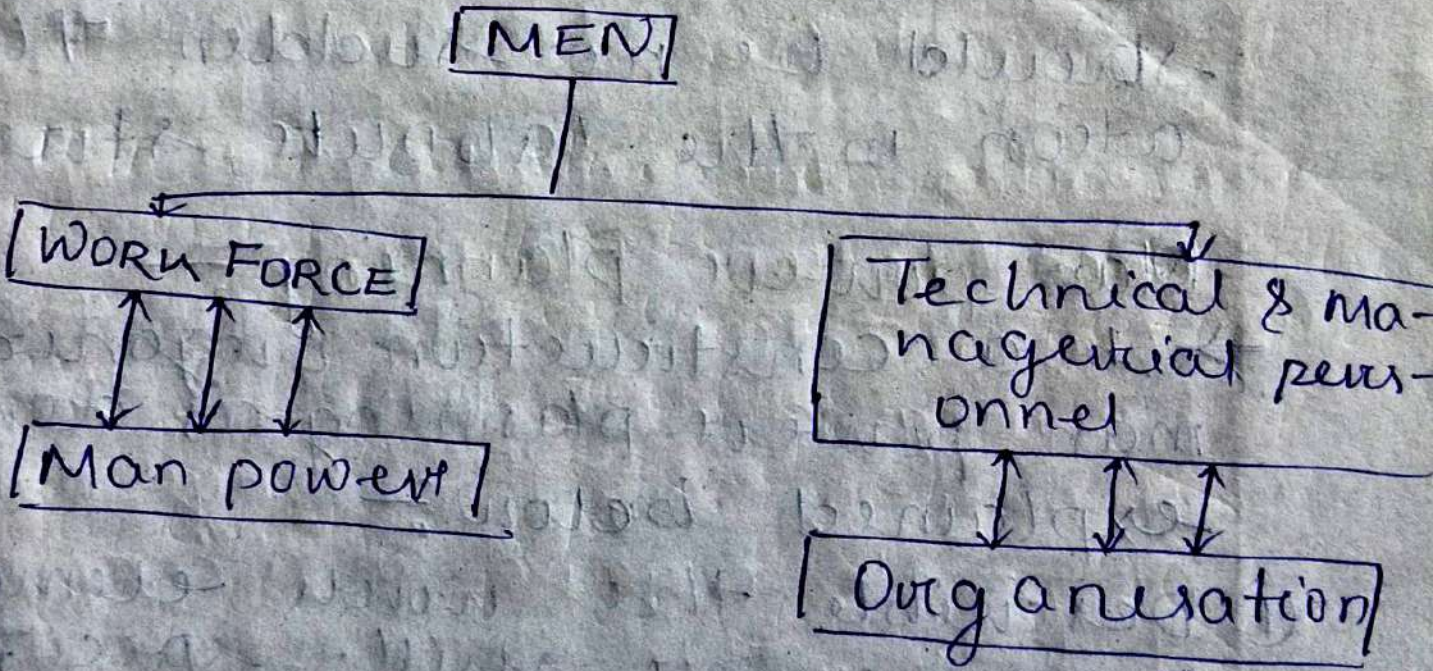
Constructional resource :—

⇒ Constructional i.e. creation in the form of finished product is the direct result of of using various resource in the most effective way. The various resource beginning used in the construction project can be elemented as.

① Man
② Materials
③ Mechonary
④ Money

→ In addition to main resource mensioned above other resource in the form of infrastructure is also necessary for construction project.

(A) Power
(B) Water
(C) space
(D) communication means.



→ Man resource is one of the essential ingredient project activity & it is basically grouped in 2 catagory.

(A) Work force:-

⇒ The work force i.e the man power consist of skilled & unskilled workers. meticulous care has to be taken in man power planning in order to ensure timely deployment of just the required number of work man of the right trade & skill both over manning & under manning are bad. At the same time there should be no sudden fluctuation in the labour strength.

Man power planning:-

⇒ In a construction organization man power planning is done as explained below:-

(1) Describle the work elements & man power skill-specification & access the number of man days of various trades & skills the to be put every week/month.

(2) Draw a chat of man power needed week wise/month wise using a

CPM network.

③ Adjust the schedule & man power requireme avoiding sudden & step fluctuations.

④ As ascertain the availability man of the right trade & skill for requirement.

⑤ Recruit & transfer the scarce catagories inadvance but try to keep idling to the minimum

⑥ Maintain a reasonable ratio between supervisor & workman ensuring effective supervision & ~~workman~~ ~~encouraging~~ high productivity

→ Using CPM technique a man-power chat for earliest start (latest start of the activities (E,S,T & A,S,T) is prepared. comparing those 2 charts. (based on EST & LST), Periodic variation in man power needs become evident & the relevant activities with floats can be delayed or advanced

with out affecting the critical path & project duration.

(B) Technical & Managerial personnel (Organization) :—

⇒ It is use the available human resource in such a way that the project is finished within stipulated time & the budget & it is called Organization of an engineering project on industrial concern. It is a basic frame work of human resource who is responsible for executing the project

Organization Planning :—

⇒ Organization needs effective planning can be defind as the pattern of way in which a large number of people engaged in a complicity of task, relate them selve to each other in systematic establishment & accomplish of mutual agreade purpose.

Indian stated is recommendations four modular planning:-

A set of rules as detailed below have been recommended by is code four the modular planning of a building as well as its compared

Modular Panning of building:-

The planning grid in both directions of the horizental plane shall be.

(i) 3m four residential buildings and
(ii) four industrial building
15m four spans up to 12m
30m four spans between 12m and 18m
60m four spans over 18cm

The planning module in the vertical shall be 1m up to and including a height of 2.8m and above the height of 2.8m it shall be 2m.

The centre line of load bearing walls and columns shall coincide with the grid lines.

Modular Planning of building components:-

The preferred dimensions of prefabricated elements shall be,

follows.

(a) Flooring scheme :—

(i) Length – nominal length shall be in multiple of 3m

(ii) Width – nominal shall be multiple of 1m.

(iii) Overall thickness overall thickness (i.e thickness of structural flooring units plus in the concrete decking) shall be in multiple of M/4.

(b) Beams :—

(i) Length – nominal length multiple of 3m

(ii) Width – nominal width multiple of M/4.

(iii) Thickness – overall thickness multiple of M/4.

(c) Columns :—

(i) Overall height (i.e floor to floor or the clear heights multiple of 1m, up to to 2.8m and 2m above 2.8m.

(ii) Lateral dimensions – overall lateral diamensions or diameter in multiple of M/4.

(d) Walls :—

Thickness – nominal thickness in multiple of M/4.

(e) Staircase :-
Width - nominal width in multiple of 1m.

(f) Lintels :-
(i) Width - multiple of M/4
(ii) Length - multiple of 1m.
(iii) Depth - multiple of M/4.

(g) Sunshades :-
(i) Length - multiple of 1m.
(ii) Projection - multiple of 1m.

Importance of construction Planning:-

- Construction Planning & preparation Play a very important role in construction.
- The effectiveness of planning and preporation lead to the success of a project including the quality & time consumed in completing the project.
- A good and properly plan construction site improve the efficiency & even the safety of the construction project.
- Therefore to construct a good building the step of planning can't be eliminated in order to save the construction time & money.

stages of construction planning

(i) Pre tender stage

(ii) Post tender stage

* Pre-Tender stage :-
The proposal of taking in hand the construction of a particular project is considered and the owner of the concerned authority in consultancy with the architector, engineer & finacial authority Decide for the following item from the project.

⇒ Selection of site for the project & finalisation of alignment of work.

⇒ conducting soil investigation & finalising details design & drawings of the project.

⇒ Preparation of the estimate of the project.

⇒ Arranging for the abtment of funds & resources including man power, store, equipment etc.

⇒ Obtaining necessary administrative approval from concerned authority.

* Post Tender stage :-

⇒ In this stage the item of project to be considered are as follows.

⇒ Supervising the work executed by the contractor with respect to proper quality control.

⇒ Assessment and payment of the work at the construction of project advance

⇒ Preparing network diagram or taking the help of any other method to ensure the completation of the construction work.

⇒ Finalising the accounts on the completation of the project

→ Declaring the project as complicated.

Preparation of schedule :-

The entire planning of the project can be set of the following four stages.

(I) Construction schedule
(II) Material schedule
(III) Equipment use schedule
(IV) Labour schedule.

(I) Construction schedule :-

→ It consist of breaking the project into suitable construction operation & details of each construction are worked out.

→ The construction schedule initially studied carefully & critically.

→ If any changes are desired they are suitable accomodated.

⇒ The progress of each stage of project is estimated & arranged in a chart form

(11) Material schedule :-

⇒ The construction schedule helps in properly ordering the material which are to be deliver at job site well in advance. So that there is no delay in starting the construction operation.

⇒ The material shouldn't be deliver too away as there likely to be loss, damage or destruction.

⇒ The delivery date & quantities of various material are mention in Material schedule so that there is no unnecessary congestion of working space at the site.

(iii) Equipment use schedule:-

⇒ This schedule indicates the numbers of equipment to be used during diff. erent period of construction.

⇒ Such as arrangement ensure the efficient use of the equipment.

⇒ It also contain information such as ownership of equipment rent to be paid for hire equipmentes, condition of working.

(iv) Labour schedule:-

⇒ This schedule indicates the number & type of labour required for each construction operation.

⇒ The labour schedule show the number & period of labour in different claues.

⇒ Labour schedule helps in making arrangement for labour of different

veritiers well in advance,

Construction scheduling by network technique:

There are two major techniques.

→ Program evaluation & review technique (PERT)

→ Critical Path method (CPM)

① Program evaluation & review technique (PERT)

(a) This is a statistical tool use in project management, design to analysis & represent to task involve in completing in a given project.

(b) PERT is suitable for project that are non-repetitive in nature in which there is no pre-size idea about the time required for various activities.

(c) The building construction however determining the time for activities is not a problem

a lot of previous data & experience are available Hence pert is not a preferred technique, planning & scheduling construction work.

(ii) Critical Path method :-

(a) CPM is ideally suited for construction project & it is the most widely used technique.

(b) Project of construction management are presented in detail in this method.

(c) It calculate minimum completation time for a project along with the possible start & finish times for the project activities.

Advantages of CPM :-

→ It help in identifing critical activities so that the management can concentrated on days activities to maintain the construction schedule.

→ It helps in crashing the project completation period by iden-

fitting activities to be crashed.
→ It helps in identifing the best combination of equipment & labour.
→ It helps in identifing slack time for various activities which helps in distributing labour to retain the labour force.
→ If something goes wrong the activities to be speeded up can be identified & necessary action may be initiated.
→ The most economical construction period can be identified & resource scheduling may be prepare to suit that.

Advantages of PERT :-

→ The program evaluation & review technique enable the project manager to schedule the project very easily.
→ The pert method show the critical Path in a clear manner.

⇒ A Project manager view information about the timely completion of a project on time And on a budget by viewing PERT activities.

⇒ This will improve the planning & the decision making capabilities of project team.

Disadvantages of PERT :—

⇒ PERT Technique is labour intensive in nature.

⇒ When two or more project share available resources the technique will not work good.

⇒ Any change in the precedence & sequential relationship of project activities will result in the failure of this method

⇒ Expensive in nature

SSANDHYA 21/05/22 CHECKED

Disadvantages of CPM :—

Estimation of time :-

Earliest event time estimation :-

- It is the time during which an event can be completed at the earliest.
- Naturally it depends upon the completion of its preceding activities
- This is denoted by 'TE'

Latest finish time :-

The latest finish time for an event so as not to allow any delay in the project is to be calculated from the earliest end event time by traning the event in the reversed direction.

Critical Path :-

- Critical Path is the line connecting the activities with zero slack.
- Any delay in the completion of an activity in this Path delay the entire project.
- Management should watch these activities carefully & mobilise the resource the maintain these activities on schedule.

Limitation of bar chart :-

① A Gantt chart

→ It is a vertical chart which is a popular type of chart that represent a project shedule.

→ Gantt chart represent the start & finished date of terminal element & summary element of a project.

following are the limitation of bar chart.

(I) A bar chart doesn't established the control over the various activities of the project.

(II) A bar chart doesn't give at a balance of the overall progress of the project Hence it is not possible to review or revise the programm.

(III) The bar chart doesn't in corporate on uncertainties of tolerance for delay in the estimated duration of activities.

(IV) A bar chart doesn't indicates the inter relationship between various activities.

(v) A bar chart is unable to supply information to the effect that what will happen to the succeeding activities when a preceeding activity is stopped. Hence in case of large construction project there is levely delay ove stopped of a previous activity the gantt chart fail.

(vi) A bar chart require constant attention