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**SUBJECT-construction management  
(6thSemester )**

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## INTRODUCTION TO CONSTRUCTION MANAGEMENT

Management is an art of getting things done through and with the people in formally organized groups.

It is an art of creating an environment in which people can perform and individuals can co-operate towards attainment of group goal.

Management personnel may be described as the people who design an organization's structure and determine how different aspects of the organization will interact.

Management process is a process of setting goals, planning and/or controlling the organizing and leading the execution of any type of activity, such as: a project. In general an organization's senior management is responsible for carrying out its management process.

### OBJECTIVES OF CONSTRUCTION MANAGEMENT

The main goal of construction management is **to manage and control the progress of construction projects**. The Construction Manager plans, coordinates, budgets, and supervises the project from start to finish. They act on behalf of the owner, overseeing every stage of the project.

It helps in Achieving Group Goals – It arranges the factors of production, assembles and organizes the resources, integrates the resources in effective manner to achieve goals.

It directs group efforts towards achievement of predetermined goals. By defining objective of organization clearly there would be no wastage of time, money and effort.

Management converts disorganized resources of men, machines, money etc. into useful enterprise. These resources are coordinated, directed and controlled in such a manner that enterprise work towards attainment of goals.

. Optimum Utilization of Resources – Management utilizes all the physical & human resources productively. This leads to efficacy in management. Management provides maximum utilization of scarce resources by selecting its best possible alternate use in industry from out of various uses.

It makes use of experts, professional and these services leads to use of their skills, knowledge, and proper utilization and avoids wastage. If employees and machines are producing its maximum there is no under employment of any resources.

Reduces Costs – It gets maximum results through minimum input by proper planning and by using minimum input & getting maximum output. Management uses physical, human and financial resources in such a manner which results in best combination. This helps in cost reduction.

## **Functions of construction management**

### **Planning**

It is the basic function of management.

It deals with chalking out a future course of action & deciding in advance the most appropriate course of actions for achievement of predetermined goals.

According to KOONTZ, “Planning is deciding in advance – what to do, when to do & how to do. It bridges the gap from where we are & where we want to be”.

A plan is a future course of actions. It is an exercise in problem solving & decision making. Planning is determination of courses of action to achieve desired goals.

Thus, planning is a systematic thinking about ways & means for accomplishment of predetermined goals. Planning is necessary to ensure proper utilization of human & nonhuman resources.

### **Organizing**

It is the process of bringing together physical, financial and human resources and developing productive relationship amongst them for achievement of organizational goals

. According to Henry Fayol, “To organize a business is to provide it with everything useful or its functioning i.e. raw material, tools, capital and personnel’s”. To organize a business

involves determining & providing human and non-human resources to the organizational structure.

Organizing as a process involves: → Identification of activities. → Classification of grouping of activities. → Assignment of duties. → Delegation of authority and creation of responsibility. → Coordinating authority and responsibility relationships.

### **Staffing**

It is the function of manning the organization structure and keeping it manned. Staffing has assumed greater importance in the recent years due to advancement of technology, increase in size of business, complexity of human behavior etc.

The main purpose of staffing is to put right man on right job i.e. square pegs in square holes and round pegs in round holes. According to Klotz & O'Donnell, "Managerial function of staffing involves manning the organization structure through proper and effective selection, appraisal & development of personnel to fill the roles designed in the structure".

Staffing involves: → Manpower Planning (estimating man power in terms of searching, choose the person and giving the right place). → Recruitment, Selection & Placement. → Training & Development. → Remuneration. → Performance Appraisal. → Promotions & Transfer.

### **Directing**

It is that part of managerial function which actuates the organizational methods to work efficiently for achievement of organizational purposes.

It is considered life-spirit of the enterprise which sets it in motion the action of people because planning, organizing and staffing are the mere preparations for doing the work.

Direction is that inert personnel aspect of management which deals directly with influencing, guiding, supervising motivating subordinate for the achievement of organizational goals.

Direction has following elements: → Supervision → Motivation → Leadership →

Communication Supervision- implies overseeing the work of subordinates by their superiors.

It is the act of watching & directing work & workers. Motivation- means inspiring, stimulating or encouraging the sub-ordinates with zeal to work. Positive, negative, monetary, non-monetary incentives may be used for this purpose.

Leadership- may be defined as a process by which manager guides and influences the work of subordinates in desired direction. Communications- is the process of passing information, experience, opinion etc from one person to another. It is a bridge of understanding.

## **Controlling**

It implies measurement of accomplishment against the standards and correction of deviation if any to ensure achievement of organizational goals.

The purpose of controlling is to ensure that everything occurs in conformities with the standards. An efficient system of control helps to predict deviations before they actually occur.

According to Theo Haimann, "Controlling is the process of checking whether or not proper progress is being made towards the objectives and goals and acting if necessary, to correct any deviation". According to Koontz & O'Donnell "Controlling is the measurement & correction of performance activities of subordinates in order to make sure that the enterprise objectives and plans desired to obtain them as being accomplished". Therefore controlling has following steps: → Establishment of standard performance. → Measurement of actual performance. → Comparison of actual performance with the standards and finding out deviation if any. → Corrective action.

## **THE CONSTRUCTION TEAM COMPONENTS**

### **OWNER**

In the construction industry, the term 'owner' typically refers to **the person or organisation that owns a built asset (such as a building, bridge, tunnel, etc.) or land**. But it may also refer to ownership of the components of a project.

## **ENGINEER**

A construction engineer is a civil engineer who oversees the design and building process of construction projects. These professionals work to ensure buildings, projects and construction teams are safe. They may also help design infrastructure systems, such as roads, dams, water supply systems and buildings.

## **ARCHITECTURE**

Architecture, the art and technique of designing and building, as distinguished from the skills associated with construction. The practice of architecture is employed to fulfill both practical and expressive requirements, and thus it serves both utilitarian and aesthetic ends.

An architect works with a client to set the parameters of the construction, such as construction objectives, budget and requirements of the structure. Architects often do pre-construction assessments to determine the feasibility of the project and any environmental impact the structure might have.

## **CONTRACTOR**

A contractor – also called a contract worker, independent contractor or freelancer – is **a self-employed worker who operates independently on a contract basis**.

A contractor is **anyone who directly employs or engages construction workers or manages construction work**. Contractors include sub-contractors, any individual self-employed worker or business that carries out, manages or controls construction work.

## RESOURCES OF CONSTRUCTION INDUSTRY

**MATERIAL**–Construction material means an article, material, or supply brought to the construction site by the Contractor or a subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies.

The building material affects the vision of a structure, as it deals with the appearance-related qualities of the structure. It also impacts the durability of the structure. Hence, the character of the architecture is determined by the quality–quantity relationship of the building material used.

Materials such as brick ,stones, cement,aggregate,steel,shuttering,scaffolding,timber,watersupply,sanitary & electrical fitting

### Manpower–

Man power in the form of technical and managerial personnel and work force in various tread is essential to carry out project activities.

Technical and managerial personnel are essential for efficient use of human resources and to achieve project completion within estimated time and budget.

### Machinery–

For any construction work various plant &equipment and tools are required.

Depending on the type and nature of construction job, machinery required at site includes batching plant,mixers,trucks,tractors,excavators,dumpers,cranes,pumps,generators,workshop equipment's etc.

**FUNDS**– Adequate funds should be available for smooth implementation of the project.

Financial planning is essential for smooth cash inflow and outflow to avoid delays in project activities. Fund forms an important resources.

**Space**– for any constructions activities to proceed efficiently, it is essential to plan the available space at site for

Storing materials

Providing yards for bar benders,carpenters,installation of equipment and plant ,repair workshops, casting yards etc.

## QUESTIONS

- 1.What is construction management ?
- 2.what are the objective of construction management ?
- 3.what are the functions of construction management ?
- 4.what are the resources of construction of management ?

Long questions

- 1.Explain resoureces of construction management ?
- 2.Explain resources of construction management ?
- 3.Explain about construction management &its objects ?



# Chapter-2

## Construction planning

### Importance of constructions planning

The objectives of construction planning are the same for all projects: **Builders and owners strive to meet cost, schedule, quality, and safety requirements.** The construction planning process also makes owners' and builders' responsibilities clear, laying the groundwork for strong communication and better teamwork.

#### **General Construction Planning: 6 Elements of a Planning Process**

- Creating the Construction Master Plan Document.
- Setting Concrete Project Goals and Milestones.
- Including Key Participants.
- Executing the Plan.
- Tracking Plan Performance With Tech Tools.
- Project Closeout and Success Evaluation.
- Conclusion.

#### **WORK BREAK DOWN STRUCTURE**

A work breakdown structure (WBS) in construction is **a hierarchical way of organizing a building project.** The WBS is a single document that divides the project deliverables into manageable chunks known as work packages.

For example, you have a project that consists of two global parts or key tasks. These tasks will contain certain subtasks that must be followed strictly one by one. These subtasks can also have a list of activities in a smaller hierarchy. All this makes up a WBS structure.

The phase-based WBS displays the final deliverable on top, with the WBS levels below showing the five phases of a project (**initiation, planning, execution, control and closeout**).

A work breakdown structure (WBS) is a tool that can be used for projects, programs, and even initiatives to understand the work that has to be done to successfully produce a deliverable(s). The benefits of creating a WBS include: it defines and organizes the work required.

## **CONSTRUCTION PLANNING STAGES**

### **PRE TENDER STAGES**

Pre tender planning is board-based and is carried out by the contractor.

It is the stage in which a contractor has the best opportunity of planning his likely method of construction for the future contract and prepare a realistic programme for carrying out the work.

This stage enables the contractors to make a proper bid and prepares him for completing the work in the stipulated time.

During this stage, the contractor's main aim is to see whether the contract under consideration is profitable or not.

Before a contract is undertaken the contractor is required to visit the site of construction work. The visit to the site is in fact the first part of the pre-tender planning.

A pre-tender report is prepared which describes the complete circumstances of the work and the conditions under which the work is likely to be carried out.

### **POST TENDER STAGES**

The contract stage is also called post-tender stage or construction stage.

This stage commences with the acceptance of the tender and extends till completion of the contract.

After the pre-tender stage, the contractor has to undertake detailed planning or organize various activities of construction work so that the project may be completed within the scheduled time.

Post tender planning is used in chalking out specific details for execution of the project.

## **Bar Charts**

A bar chart is formed with a list of activities, specifying the start date, duration of the activity and completion date of each activity, and then plotted on a project timescale. The detailed level of the bar chart depends on your project complexity and the intended use of the schedule.

The bar chart (Gantt chart) is used for the representation of a project in which the activities are represented by horizontal segments, of which the length is proportional to the time necessary to conclude the task in question. The bar chart is an effective tool for the management of work in a project.

The most widely used scheduling technique is the **critical path method (CPM)** for scheduling, often referred to as critical path scheduling. This method calculates the minimum completion time for a project along with the possible start and finish times for the project activities.

**Limitation of a bar chart:** (i) **Lack of degree of detail.** (ii) A bar chart does not show the progress of work and hence it can not be used as a control device. (iii) A bar chart is unable to depict the interdependencies of various activities clearly.

After reading this article you will learn about the bar chart and its limitations.

A pictorial chart, also known as the “Bar Chart” was for the first time developed by Henry Gantt around 1900 and is used to deal with complex activities. The bar chart consists of two coordinates, the horizontal represents the time elapsed and the vertical represents the job or activities performed.

### **Limitations of a Bar Chart.**

A bar chart may appear to be an excellent pictorial representation of the project, but in actual practice, these have serious limitations.

The length of the bar shows the time the job or that activity takes for completion. In every project, some jobs are taken up concurrently and some are to be completed before others can begin. Hence in a bar chart, some of the bars run parallel or overlap each other time-wise and some run serially with one bar beginning after another bar ends.

## **CPM**

The critical path method (CPM) is a **technique where you identify tasks that are necessary for project completion and determine scheduling flexibilities**. A critical path in project management is the longest sequence of activities that must be finished on time in order for the entire project to be complete.

Critical Path Method (CPM) Scheduling is the most widely used scheduling technique in the Transportation market. This scheduling technique is used **to plan and control a project and to calculate the minimum completion time for a project along with the possible start and finish times for the project activities**.

Critical Path Method (CPM) Scheduling is the most widely used scheduling technique in the **Transportation** market. This scheduling technique is used to plan and control a project and to calculate the minimum completion time for a project along with the possible start and finish times for the project activities.

Critical tasks have a ‘zero run-time reserve,’ meaning if the duration of these tasks changes, the terms of the entire project will be shifted, resulting in negative monetary impacts and potential risks. Therefore, critical tasks in project management require special control and timely detection of risk

### **1. Visualizes and presents projects in a clear graphical form, defining the most important and critical activities that need attention.**

In any given project, there may be 2,000+ activities that must be completed. Some tasks have a critical time to leverage to avoid delaying the project. CPM Scheduling allows for clear and transparent management of a project’s critical activities to prevent delay.

## 2. **Saves time and helps in the management of deadlines to save money.**

Early or on-time completed projects have monetary incentives. It is in all parties' best interest to prevent project delays.

## 3. **Manages project risks.**

Risks are uncertain events that have a positive or negative effect on project objectives.

Managing risk attempts to recognize and plan for unforeseen trouble spots that may occur when the project is implemented.

## 4. **Helps to compare the planned with the real status of the project.**

This will help manage time and accurate start and end dates for the project.

## 5. **Helps manage subcontractors on the project.**

There may be many groups working and coordinating on different aspects of a project. CPM Scheduling can help facilitate the management of many subcontractors working and how they come together to complete the bigger project picture .

# PERT

**Program Evaluation and Review Technique (PERT)** is an important tool used in project management. It is used to identify task dependencies and critical paths, plan resources, estimate task duration, and identify potential risks. It also helps to define and sequence activities, coordinate resources, and track progress.

## **What is PERT and examples?**

PERT stands for **program evaluation and review technique**. It provides a visual representation of a project's timeline and breaks down individual tasks. These charts are similar to Gantt charts, but structured differently. This diagram consists of a few steps to get you from a project start date to end date.

## DIFFERENCE BETWEEN CPM &PERT

1.	PERT is that technique of project management which is used to manage uncertain (i.e., time is not known) activities of any project.	CPM is that technique of project management which is used to manage only certain (i.e., time is known) activities of any project.
2.	It is event oriented technique which means that network is constructed on the basis of event.	It is activity oriented technique which means that network is constructed on the basis of activities.
3.	It is a probability model.	It is a deterministic model.
4.	It majorly focuses on time as meeting time target or estimation of percent completion is more important.	It majorly focuses on Time-cost trade off as minimizing cost is more important.
5.	It is appropriate for high precision time estimation.	It is appropriate for reasonable time estimation.
6.	It has Non-repetitive nature of job.	It has repetitive nature of job.
7.	There is no chance of crashing as there is no certainty of time.	There may be crashing because of certain time boundation.
8.	It doesn't use any dummy activities.	It uses dummy activities for representing sequence of activities.
9.	It is suitable for projects which required research and development.	It is suitable for construction projects.

## QUESTIONS

- 1.What is construction planning?
2. write 2 important of construction planning?
- 3.what is work break down structure ?
4. what are the 2 stages of construction planning ?
5. define bar chat?
6. what is CPM?
- 7.what is PERT ?

### LONG QUESTIONS

- 1.Define pretender stages &post tender stages ?
- 2.write different between CPM&PERT ?
3. What is bar chart ?explain it details .

