

## chapter-1

### construction management (introduction)

❖ **CONSTRUCTION MANAGEMENT:-** An art of planning, co-ordinating and controlling various constructional activities of a project to produce qualitative and economical product with the available resources.

❖ **SIGNIFICANCE OF CONSTRUCTION MANAGEMENT:-**

- It helps to complete the desired task within the given time span i.e. it helps to avoid unnecessary delays.
- It helps to properly utilize the available limited resources i.e. it helps to achieve the desired economy.
- It helps to reduce the wastage of material and labour, by making available the right type of material and labour, as and when required.
- It helps to improve the quality of work, by effectively planning and using, the latest constructional machinery equipment.
- It helps to co-ordinate between persons or group of persons within the management.
- It helps to reduce cost of construction and achieve maximum benefit in terms of construction output.
- It helps to develop family environment at the construction site.

❖ **MAIN OBJECTIVES OF CONSTRUCTION MANAGEMENT:-**

- The construction work should be well planned, systematised and properly organised.
- The project work should be completed within the stipulated time.
- The whole cost of the project should not exceed beyond the estimated cost.
- All the constructional activities of the project should be executed, as per the written guidelines and standard specifications.
- There should be a collective effort to achieve construction economy.
- There should be a proper co-ordination between various persons and groups within the organization to achieve the common goal.
- The project should be supervised by well trained staff.

❖ **FUNCTIONS OF CONSTRUCTION MANAGEMENT:-** The various functions and activities of construction management are as the following.

1. Planning
2. Organizing
3. Staffing
4. Directing
5. Controlling
6. Co-ordinating

**1. Planning:** It is usually done in office. "in this process which is carried at the topmost level to decide about the policy". It lays down various details related to construction techniques and use of modern construction

➤ **the planning on the following aspects is necessary:-**

- The requirement of financial aid, its extent and the sources from which it can be recovered.
- Time needed to complete the whole construction project.
- Type, quantity and exact time for delivery of materials of construction.
- Type, number and duration of use of different machines and equipment.

**2. Organizing:-** it is a process of fixing the responsibilities of individual members or group of members within the organization and co-ordinating their work to achieve a common goal.

➤ **the following points should be noted:-**

- An organization structure should be simple and balanced.
- Right man should be given right type of job at the construction site.
- Each employee of the organization should have only one boss.
- Organizational responsibility of each and every member should be well defined.

**3. Staffing:-** it is a process of appointing the required member of employees (managers, skilled and unskilled workers).

➤ **The function and process of staffing should be:-**

- Simple and transparent.
- Right person should be offered right type of job.
- Only minimum number of required employees should be recruited to achieve economy.
- Due regards should be given to the senior and experienced staff members in the organization.

Reyes

**4. Directing:-** It is the process of issuing instructions, guidelines and broad outlines, related to project for achieving the desired objectives, from the planning authority to the supervisory and working staff". Simply, it can be defined as, "a process of transferring all information, data and available matter from the top level to the lower level".

➤ **Directing helps:-**

- To develop inter departmental relationship.
- To enable the working staff to perform construction activities as per the standard guidelines, specifications and detailed drawings
- To enable the supervisory staff to become familiar with their authoritative duties of commanding workforce.
- To develop effective communication between various types of employees within the organization for effective implementation of planned objectives.
- To encourage, guide and motivate the worker through an effective communication.

**5. Controlling:-** The process of comparing and checking the progress of work achieved in the field to the estimated or planned work at regular intervals.

➤ **Controlling includes:**

- Control of expenditure i.e. finances.
- Control of labour output.
- Control of use of machines and equipment.
- Control of quality of work.
- Control of use of materials.
- Control of supervising staff.

**6. Co-ordinating:-** It is the process of developing perfect harmony between various employees or group of employees for the smooth and efficient functioning of organization.

➤ **Co-ordinating helps:-**

- To complete the planned work in time.
- To sort out difference of opinion amongst individual members or groups.
- To ensure quality of work.
- To share information, decisions and results with each other.
- To achieve progress of work.

❖ **CLASSIFICATION OF CONSTRUCTION INDUSTRY:-**

1. Light construction , 2. Heavy construction , 3. Industrial construction

**1. Light construction:-** The type of construction which involves little planning, use of lighter machinery, lesser expenditure and small consumption of construction materials.

**For example:-** Residential building, Office building, Light industrial shed, Recreational centre, Community hall, School etc.

**2. Heavy construction:-** The type of construction which involves extensive planning, heavy expenditure, heavy machinery and large consumption of construction materials.

**For example:-** Construction of bridge, highway, railway and tunnel , Dams, Hotels and factories.

**3. Industrial construction:-** The type of heavy construction, which is specifically associated with industrial processing or manufacture of commercial products and services.

**For example:-** Sugar mills, Oil refineries, Thermal power stations.

❖ **STAGES IN CONSTRUCTION:-**

1. Conception , 2. Site investigations , 3. Design  
4. Detailed drawings, specifications and estimation , 5. Contract  
6. Construction and supervision , 7. Completion work or Realization.

**1. Conception:-** The development of a thought, plan or an idea in mind about the construction.

**2. Site investigations:-** In this process we should soil testing, determination of water table, drainage conditions etc.

**3. Design:-** The design of the project is made by the engineer, who is appointed by the owner. It is most duty of the engineer to design the project in such a way that it satisfies the needs of the.



4. **Detailed drawings, specifications and estimation:-** After design, the next stage of construction is the preparation of detailed drawing and specifications. The estimate of the project is calculated from these drawings.
5. **Contract:-** Contract is an agreement or bond on fixed terms between owner and professional builder for constructing the designed project. It requires the contractor to furnish all raw materials, equipment, labour and supervision.
6. **Construction and supervision:-** After awarding contract, the next stage is to construct the project as per the design, drawings and specifications. The project is constructed by the contractor and supervised by the engineer
7. **complete work:-** it is the last stage of construction, when the contractor after completion of work, hand over the project to the owner.

❖ **THE CONSTRUCTION TEAM:-** The construction team refers to individual members or group of members which are required to co-ordinate with each other to complete the construction project as per the specifications, drawings and design details at the lowest practical cost.

➤ **The construction team of a project consists of:-** 1. Owner , 2. Engineer , 3. Contractor

1. **Owner:-** Owner of a construction team refers to any individual, firm or public body, who recognizes need for building project, conceives the idea and arranges finances for completion.

➤ **Functions of owner:-**

- To provide land or site for construction.
- To arrange finances for the project and supply the funds at regular periods.
- To engage competent engineer for preparing design, detailed drawings, specifications and estimates of the project at the lowest practical cost to his entire satisfaction.
- To occupy the services of an experienced contractor for building the project.
- To co-ordinate the activities of engineer and contractor properly without any dispute towards common objective.

2. **Engineer:-** Engineer is a professional man having a qualified degree, who designs the project for the owner.

➤ **Function of engineer:-**

- To prepare design, drawings and specifications for the construction project.
- To work out quantities of materials, required to prepare detailed estimates of the project.
- To suggest site investigations, to check the bearing capacity of soil and other details as required.
- To bring overall constructional economy.
- To supervise the construction of project work and act as quality control engineer.
- To act as an agent of the owner in dealing with contractor regarding construction work.

3. **Contractor:-** Contractor is a professional builder who gives concrete shape to the concept of owner and paper proposal of the engineer. The contractor is in fact a person or a firm who submits bid to the owner, indicating the price for which it will execute the project.

➤ **Functions of contractor:-**

- To build a strong and durable house for the owner as per design and specifications.
- To ensure quality of workmanship to the utmost satisfaction of owner and engineer.
- To make optimum utilization of available resources and labour force.
- To carry out the planning regarding constructional activities, so that the project is completed within the specified time.
- To use latest equipment and follow modern methods of construction practices to achieve economy.

❖ **INTER-RELATIONSHIP BETWEEN OWNER, ENGINEER AND CONTRACTOR:-** The perfect harmony and inter-relationship between owner, engineer and contractor is a must for the successful completion of any project.

1. **Inter-relationship between the owner and an engineer:-** The owner is the person who finances the project and an engineer is the technical advisor appointed by him for successful completion of the project. Thus, it is the utmost duty of an engineer, not only to prepare design and drawings for him, but to guide him properly in all matters related to construction of project in the interests of his client.

2. **Inter-relationship between the owner and the contractor:-** Like an engineer, a contractor is also appointed by the owner to construct the project for him. He is actually the person, who gives concrete shape to the design presented by the engineer. Once the project begins, the owner has to deal more with the contractor than an engineer. The relationship between the owner and the contractor is seldom peaceful or cordial as some degree of dissatisfaction exists always over certain issues such as changes in plans, quality of materials and methods of

construction. But the owner must realise that work of a contractor is his business and he has to make certain profit out of it. On the other hand, the contractor should understand that the project can be completed with a satisfactory profit only, if he keeps himself informed on new equipment and methods of construction

**3. Inter-relationship between an engineer and a contractor:-** The relationship between an engineer and a contractor related to the same project is more of a professional type as both are the employees of the owner. But a good rapport between the two is necessary to achieve the common objective.

❖ **RESOURCES FOR CONSTRUCTION INDUSTRY (THE FIVE M'S):-** 1. Manpower , 2. Machines , 3. Materials , 4. Money , 5. Management.



## chapter-2

### CONSTRUCTION PLANNING

- ❖ **CONSTRUCTION PLANNING:-** It is defined as systematic arrangement or orderly establishment of all the construction activities before starting actual construction work on a project. The main aim of construction planning is to complete the project economically, in a satisfactory manner and within the stipulated time.
- ❖ **ADVANTAGES/IMPORTANCE OF CONSTRUCTION PLANNING:-**
  - The main objective of construction planning is to execute the project at lowest practical cost and within the scheduled time.
  - Prior construction planning is essential for a contractor for successful bidding, as it helps to estimate the probable cost of project before hand. In the absence of any planning, the construction job would be a "big gamble".
  - Construction planning helps the contractor to determine the quantity, type and exact time for delivery of materials. Absence of planning will lead to unwanted stacking of material at the site, which may likely get damaged or stolen.
  - It helps to determine the type, number and duration of different types of construction equipment required at the site. By successful planning related to equipment selection, an experienced contractor tries to reduce the cost of project.
  - It helps to predetermine number of skilled and unskilled workers required for the construction project, such as, number of masons, number of labourers, number of bar benders etc.
- **STAGES OF CONSTRUCTION PLANNING:-** 1. Pre-tender stage , 2. Contract stage or Post-tender stage.
- 1. **Pre-tender stage:-** The planning of various construction activities required between the notification inviting tenders and the submission of bid by the contractor.
  - In pre-tender planning, the following data is collected or estimated by the contractor:-
    - Information about the nature of site.
    - Type of construction equipment required at the site or hire/cutting of soft cutting machinery.
    - Study of water table conditions and soil profile.
    - Time period to complete the project.
    - Type of specialist staff required at the site.
    - Preparation of rough estimates for the project.
    - Availability of construction material and cheap labour near the site.
    - assessment of construction problems likely to occur at the site, such as, shortage of materials, labour, weather conditions, water shortage etc.
    - Other facilities available at the site.
- 2. **Contract stage:-** The planning required by the contractor after the acceptance of his tender by the concerned authority and award of contract to him.
  - **Contract stage planning is done effectively:-**
    - To divide the entire project into different events or phases.
    - To prepare a master plan for executing work conveniently and smoothly.
    - To prepare bar charts, showing activities of construction for evaluating progress of work.
    - To prepare material chart for the project, indicating the type and quantity of materials and the exact time for their requirement.
    - To prepare labour chart statement.
    - To appoint supervisors of project and to fix their responsibility for a particular task or phase of project.
    - To finalise details of work or activities to be allotted to sub-contractors for speedy work.
    - To make arrangements for the security against any theft or untoward incidence.
    - To make necessary arrangements for repair, servicing and maintenance of plants, equipment and machinery.
    - To make cost comparative study of materials from available sources including transportation charges.
- ❖ **SCHEDULING:-** A process of programming or setting up of various construction activities in order, by proposing the starting and finishing dates to each activity of the project, so that the entire work is completed in time and in convenient and systematic manner.
- ❖ **RESCHEDULING:-** The rearrangement or subsequent setting up of various planned activities of project work, by fixing new dates of operations in such a manner, that the total time to complete the project does not change".



### ➤ ADVANTAGES OF SCHEDULING:-

- Scheduling helps to find out actual progress of the work. From the progress bar charts.
- It helps to analyse inter-dependency of certain activities.
- It helps in utilising the available resources properly.
- The scheduled charts give the clear picture about the type, quantity and duration of construction materials required at different stages of construction work along with the time for delivering them.
- One of the main advantage of scheduling is to find out the most economical and suitable method of construction.
- It helps to arrange in advance skilled and unskilled labourers needed for construction project.

### ➤ CLASSIFICATION OF SCHEDULES:-

1. Construction schedule
2. Equipment schedule
3. Material schedule
4. Labour schedule
5. Financial schedule
6. Progress schedule or Control schedule
7. Organizational schedule

**2. Equipment schedule:-** A schedule which indicates the number of machines and equipment to be used in construction project during different periods of time, along with the duration of use. The equipment schedule is prepared with the aid of construction schedule and such a schedule should assure that, equipment will be used properly and efficiently to prevent financial losses.

**3. Material schedule:-** A schedule which gives information about the type and quantities of different construction materials required at the site, along with the delivery dates for each type of material.

**4. Labour schedule or Employment schedule:-** A schedule which indicates the classification and number of labourers required for the construction of each operation in a project is termed as labour schedule. It is also known as employment schedule. It also gives information about the periods (time) during which they will be needed.

**5. Financial schedule:-** It is also prepared from the construction schedule. A schedule which specifies, "The probable total expenditure to occur during construction of each operation and the estimated receipts, through any desired date."

➤ **METHODS OF SCHEDULING:-** There are various methods of planning, scheduling and controlling constructional activities in a project. Some of the important methods are given below.

1. Bar charts or Gantt charts
2. Milestone charts
3. PERT (Program Evaluation and Review Technique)
4. CPM (Critical Path Method).

**3. PERT AND CPM NETWORKS (INTRODUCTION TO NETWORK TECHNIQUE):-** The network approach to planning and scheduling of activities is a major advancement in construction management. The method or technique through which large complex projects can be broken down into smaller, but individual specific events and arranged in a logical sequence of events is termed as a network technique.

➤ **The two important management techniques are:-**

- I. PERT (Program Evaluation and Review Technique)
- II. CPM (Critical Path Method).

**I. PERT:-** PERT is an event oriented network technique of management science. PERT stands for Program Evaluation and Review Technique. In this network technique, the main emphasis is laid upon the beginning or completion of events, rather than on activities or jobs. The main drawback of this system is that the activities taking place in-between events are not specified.

➤ **For example:-** Site clearance started → Site clearance completed → Digging foundation started → Pouring concrete started → Pouring concrete completed → Digging foundation completed.

**II. CPM:-** CPM is an activity based network technique used to analyse management problems. CPM stands for Critical Path Method. This network technique is built on the basis of activities or jobs involved, whereas PERT puts emphasis on events.

### ❖ DIFFERENCES BETWEEN PERT AND CPM:-

#### ➤ PERT:-

- It is an event oriented network.
- It uses three time estimates for each activity i.e. optimistic time, pessimistic time and most likely time estimates. Thus, it fairly considers the uncertainties involved in time estimation.
- In this network, times are not related to costs.



- It is less deterministic model system than CPM.

➤ **CPM:-**

- It is an activity oriented network.
- It uses only one time estimate for different activities i.e. it does not take into account the uncertainties involved in the estimation of time for the execution of a job.
- In this network, times are related to costs.
- It is more deterministic model, as no uncertainties are taken into consideration.

### chapter-3 organization

❖ **ORGANIZATION:-** The proper arrangement between individuals or groups within the same company, so that they work together in perfect harmony as a single unit, to achieve common goal.  
For example, in construction company, there should be good relationship between project-in-charge, site engineer, foreman and workers.

❖ **PURPOSE OF AN ORGANIZATION:-**

- To develop good and harmonious relationship among employees.
- To clearly define and publish in writing the responsibility of every individual.
- To encourage and motivate the employees for achieving higher efficiency.
- To avoid duplicacy of work.
- To provide better facilities and service conditions to the employees.
- to stop labour migration and prevent their unrest.
- To achieve maximum output by optimum utilization of resources of construction.
- To accommodate right person in right place within the company and to prepare him for common goal.

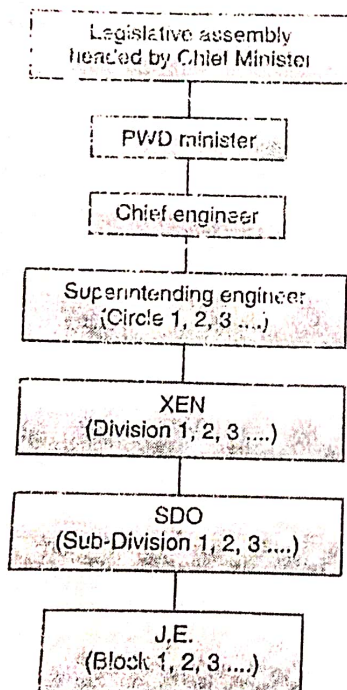
❖ **REQUIREMENTS OF A GOOD ORGANIZATION (CHARACTERISTICS OF AN ORGANIZATION):-**

- It should have well defined vision and common goal.
- Its structure should be simple and clearly understood.
- It should consist of a set of individuals in different departments, properly managed and supervised.
- It should clearly mention the responsibilities and duties of every individual or group.
- All the members on the key posts should be selected purely on the basis of merit only.
- It should work in a unique pattern and there should be proper co-ordination between different departments.

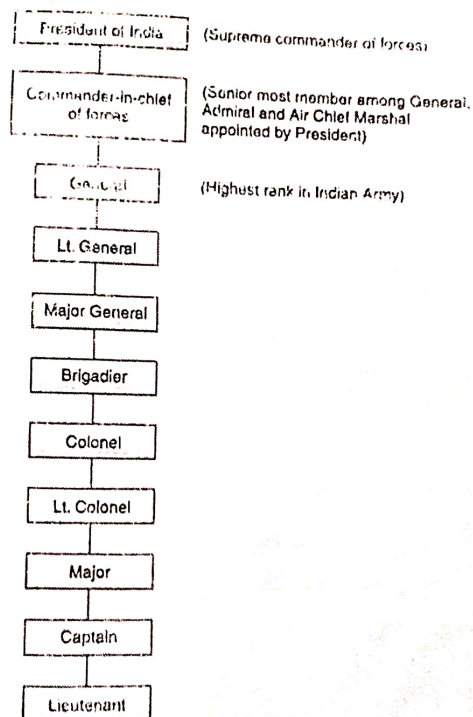
➤ **TYPE OF ORGANIZATIONS:-** The three main types of organizations are:

1. Line organization
2. Line and staff
3. Functional organization.

1. **Line organization:-** It is the most commonly used pattern of organizational structure based on the military model. It is also known as military organization.



Line organization (Public works department)



Line organization : Hierarchy pattern of Indian Army.

➤ **Advantages of line organization:-**

- It is the simplest organizational network.

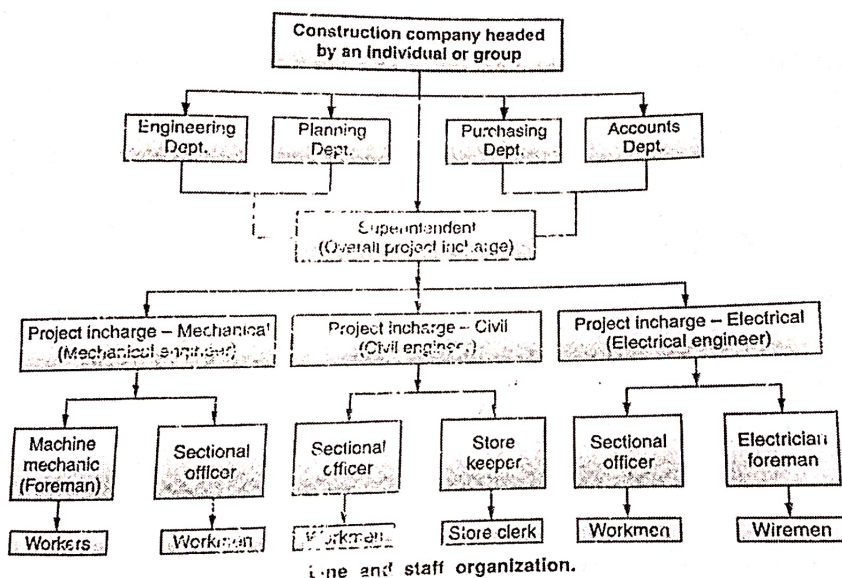


- It is convenient, effective and economical model
- It defines and fixes the responsibility upon individuals in a perfect manner.
- there is a perfect co-ordination between various departments to achieve higher efficiency
- the authority is perfectly delegated in line to maintain strict control and discipline.
- It allows quick decisions to be taken in the interest of organization.

➤ **Disadvantages of line organization:-**

- few key executives are highly overloaded
- The overall responsibility rests chiefly on top management.
- The supervisors are required to perform their jobs in the absence of technical specialists.
- The control on progress of work and its improvement is lacking, due to overloading of key numbers.
- Although simple in structure, the organization is rigid and inflexible in nature.
- This type of organization is most suitable for very large projects.

2. **Line and staff organization:-** The organization in which specialists are appointed as staff officers to assist the line authority in the execution of their basic duties more efficiently and smoothly, without interfering in the routine work activities. The 'line' is responsible for discipline and stability whereas the 'staff' is responsible for technical advice on planning, control and research.



Line and staff organization.

➤ **Advantages of line and staff organization:-**

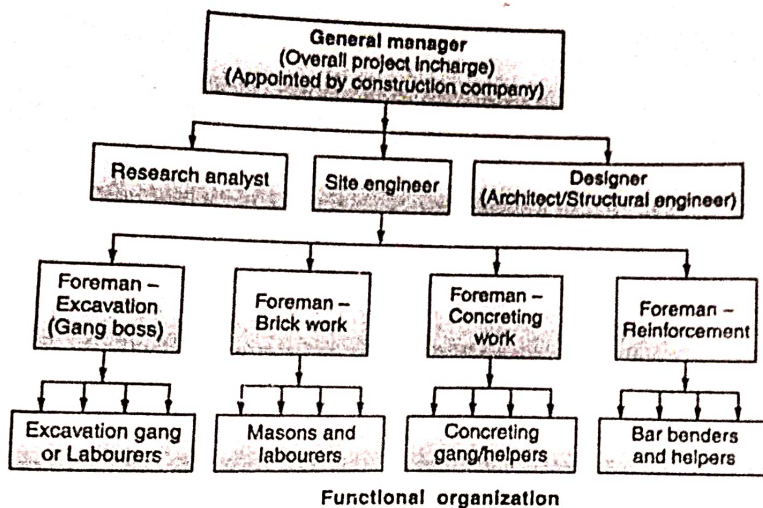
- Overloading work of key executives is reduced.
- Expert guidance through 'staff' is available on all matters related to planning, designing and execution of project.
- This type of organizational network is highly suitable for large scale construction works.
- As the 'staff' is available for specialist work, the line officers are free to organize, control and supervise other constructional activities.

➤ **Disadvantages of line and staff organization:-**

- The cost of recruiting additional staff is a burden on the company.
- 'Staff officers are appointed only to assist the 'line' officers and have no direct control over lower level officers to implement their ideas and guidelines.
- The 'line officers' sometimes ignore the advice of staff officers.
- Poor co-ordination between line and staff officers, affects the smooth functioning of projects and lowers their efficiency.

3. **Functional organization:-** The type of organization in which most of the routine activities of a project are performed through functional relationships only.





#### ➤ Advantages of functional organization:-

- There is proper sub-division of work.
- As experts are also available, technical guidance is possible through them.
- It maintains and checks the functional and administrative ability of each member to control his fellowmen.
- The manual work is completely separated from the mental or intellectual work.
- Specialist training to employees for a special functional task is possible.

#### ➤ Disadvantages of functional organization:-

- There is a confusion in the working set up due to more than one "bosses".
- There is overlapping and duplication of responsibility, which creates friction between the employees.
- It is very difficult to fix responsibility on any one boss in this functional system.
- There is lack of co-ordination between different departments, which affects the overall efficiency.
- The system is too complicated in structure and is not preferred in industrial set up.

❖ **PRINCIPLES OF ORGANIZATION:-** The essential regulations or certain moral principles, which an organization must follow to become an efficient and effective organization are called principles of organization.

#### ➤ The principles of organization are:-

1. Span control
  2. Delegation of authority
  3. Ultimate responsibility
  4. Unity of command
  5. Job definition
1. **Span control:-** It refers to minimum number of individuals (workers), which can be effectively controlled by one supervisor (or foreman) to maintain efficiency standards. In factory workshops, a foreman can control easily 10 to 20 workers under him, but top boss or management officials (Managers) should only control 4 to 5 supervisors under him.
  2. **Delegation of authority:-** its means, "Allocation of duty and responsibility to each and every individual along with necessary authority to discharge his routine functions effectively and conveniently".
  3. **Ultimate responsibility** It is the usual tendency of Indian officers to put their blame or failures upon their subordinates. Thus in each case, the 'workers' or lower rank 'officers' are made the 'scape goat' for serious lapses. This practice is not in the interest of a good organization.
- Thus, 'ultimate responsibility' for a particular task should rest with the authority, who delegates his functions to his subordinates
4. **Unity of command:-** The principle of organization in which an employee receives command from only one superior person (Boss) to avoid any confusion is termed as unity of command.
  5. **Job definition:-** Job definition refers to clear-cut description of a particular job to be designed and fabricated giving the minute details about it.

#### ➤ it is essential to define the 'Job':-

- |                               |                            |                             |
|-------------------------------|----------------------------|-----------------------------|
| I. Official name of the job   | , II. Grade or Code if any | , III. Materials to be used |
| IV. Dimensions of the job     | , V. scope of job          | , VI. limitations of job    |
| VII. difficulties to overcome | , VIII. job relationship   |                             |



## chapter:- 4

### site organization

- ❖ **SITE ORGANIZATION:-** Construction site may be defined as a temporary factory employing resources of men, machines, materials and money.
- ❖ **PRINCIPLE OF STORING AND STACKING MATERIALS AT SITE:-** The basic principle of material storage is that, "It should be handled in such a manner that there is a minimum wastage and loss due to deterioration, theft or mixing of foreign matter"..
  - Materials stored at construction site should be protected from weathering agencies like heat, rain, wind and moisture to prevent their deterioration.
  - The materials to be used in bulk should be stored near the working site, to reduce lift and lead.
  - The materials liable to catch fire, such as, petroleum products, LPG and explosives etc. should be properly protected and stored in bins to prevent fire hazards.
  - The materials should be stacked in a systematic way to facilitate their easy counting and inspection by the site incharge. It should be kept moving, on the basis of 'first come first use'
  - There should be only one gate for entry and one gate for exit of stores, where costly and small items are kept such as taps, valves, tools, pipes, sanitary fittings etc. Proper security arrangements should be provided for checking.
  - Bricks and tiles should be properly stacked on a level ground in convenient heights to facilitate their counting. The height of stack for bricks is limited to 1.5 metres and for tiles upto 1 metre.
  - Fine and coarse aggregate should be stacked separately on a levelled hard surface in such a manner, that there is no possibility of foreign matter, intermixing with the loose material.
  - The location of crane or hoist should be kept at the site in such a way, that its boom, commands the entire area used for storage of heavy material.
- ❖ **location of equipment:-**
  - The equipment should be placed near the construction site in such a way, that there is no obstruction to the routine operations.
  - The hired equipment should be located separately from the owned equipment. All equipment, when idle, should be placed in sheds and properly guarded.
  - All equipment should be properly maintained and checked in routine. The oiling and greasing of parts should be done periodically.
  - For repair of machines and equipment, a separate construction plant should be located at the camp site.
  - The spare parts of standard equipment should be available in the stores.
  - Heavy machines should not be located on soft and compressible soils.
  - Noisy and polluting machines should be kept away from general offices and staff accommodation.
- ❖ **PREPARATION OF ACTUAL JOB LAYOUT FOR A BUILDING:-** As discussed in Article 4.3, job layout is prepared by the project engineer, before starting actual construction work to show the location of offices, godowns, workshops, stores, accommodation etc.
  - **For preparing actual job layout, the following points should be ensured:-**
    - The materials should be stored at such a place so that the minimum time is consumed in carrying it to the site of work.
    - Equipment should be located at a proper position without causing disturbance to the routine operations.
    - The godown should be located either close to the office or just adjoining it to have a closer watch of materials issued from the warehouse.
    - Canteen and kitchen should be on a clean place and kept away from the toilets and lavatories.
    - Security check posts should be installed both at entry and exit points.
    - Labour huts and staff accommodation should be separate, but away from the main working area.
    - for large projects, provision for guest house and dispensary should be provided.
  - **Details required for preparing job layout:-** 1. Site plan , 2. Working drawings.
  - 1. **Site plan:-** It is a map showing the shape and dimensions of a site, its orientation and position in relation to the neighbouring areas.
    - **It indicates:-**



- The boundaries of the construction site.
- The boundaries of adjoining areas to the site on all sides.
- The width and name of adjacent streets, which are to provide the access to the proposed building.
- The location and size of any existing room or structure built at the site.
- The position of building or group of buildings, which the owner intends to erect upon this site.
- The location of existing water, sewer and power lines if any.
- Any other physical feature such as wells, drains, pond, orchard etc.
- The north direction.
- Any other suitable information that may be considered necessary.
- **2. Working drawings:-** These include plan, elevation and sections of different buildings and other works proposed to be constructed at the site.
  - **It consists of:-**
    - Floor plans of different buildings, showing sizes of rooms, sizes of openings, positions of walls, staircases, doors, windows and other essential services.
    - Elevations of each building work from all open sides, showing position of ground level, heights and depths at different points.
    - Sectional drawings, showing sections passing through walls, staircases and other components, showing detail of footings, walls, columns, floors, slabs, parapets etc.
    - Terrace plans, showing the drainage and slope of the roof.
    - Service plans, indicating water supply lines, sewage disposal plans and other essential services intended to be provided.
- **the factors which are kept in view while organizing labour at site:-**
  - There should be continuous and uninterrupted supply of labour as per the requirement.
  - The labour should never remain idle at site. For this, there should be no dearth of material and tools at the camp site.
  - For getting maximum output from the labour, it should be ensured that material is stacked in such a way, that lead is minimum.
  - For special type of tasks, the labourers should be given special training, before they are asked to perform, to avoid any accident.
  - A successful contractor always keeps some permanent labour. The new labour recruited every time has to be trained as per the requirement, which lowers down the efficiency standards.
  - The tools, equipment or other fittings, required for a particular operation should be taken once from the store for the whole day's work, to avoid frequent movement of workers to the store or warehouse.