

CONSTRUCTION MANAGEMENT AND SAFETY ENGINEERING¹

CONSTRUCTION MANAGEMENT

2

It is the act of planning ,organising and overseeing the various tasks involved in a construction project performed by project managers.

Construction Management

3

- Construction Management is the overall planning, coordination and control of a project from inception to completion.
- Objectives:
 - Completing the work within estimated budget and specified time.
 - Maintaining high quality workmanship.
 - Providing safe and satisfactory working conditions for all persons and workers in the organisation.
 - Avoiding any negative environmental impact.
 - Taking sound decisions and delegation of authority.
 - Developing an organization that works as a team.

ELEMENTS OF CONSTRUCTION PROJECT

4

- 1) MATERIALS
- 2) MAN POWER
- 3) MACHINERY (PLANT/EQUIPMENT) and POWER
- 4) MONEY (FUNDS)
- 5) SPACE

1) MATERIALS

5

- bricks, Stones, cement, aggregate, steel shuttering, scaffolding, timber, water supply, sanitary and electrical fittings, oil, lubricants etc

2) MAN POWER

6

- Manpower is the form of technical and managerial personnel and work force in various trades is essential to carryout project activities
- Technical and managerial personnel are essential for efficient use of human resources and to achieve project completion within estimated time and budget.
- Technical personnel include engineers, architects, quantity surveyors, supervisors and technicians
- Workforce consists of skilled and unskilled workers.

3) MACHINERY (PLANT/EQUIPMENT) and POWER

7

- Batching plant, mixers trucks, tractors, excavators, dumpers, cranes pumps, generators, workshop equipment etc.
- Power is an essential resource required for lighting, running the plant and equipment and for other facility.

4) MONEY (FUNDS)

8

- Important resource
- Adequate fund should be available for smooth implementation of project
- Financial planning is required for smooth cash inflow and outflow to avoid delays in project activities.
- All other resources are dependant on the availability of funds
- Financial resources are planned and managed with special care

5) SPACE

9

- Storing materials
- Providing yards for bar benders, carpenters, installation of equipment and plant, repair workshop etc
- Site office, labour campsite.

OBJECTIVES OF CONSTRUCTION MANAGEMENT

10

- To complete the work within estimated budget and stipulated time
- To evolve a suitable method for achieving high quality workmanship
- To provide safe and satisfactory working conditions for all persons and workers in the organization

OBJECTIVES OF CONSTRUCTION MANAGEMENT

11

- To make it possible for the lowest practical management level to take sound decisions if required in order to avoid unnecessary delay
- To motivate the people so as to utilise their services to their maximum capacity
- To create team spirit among the people working with different skill levels in the organisation

Need for construction management

12

- To estimate the required man power ,materials,machinery and finance in carrying out different activities of the project
- To select and procure different materials required for the construction especially when there is a limitation on available resources
- To have proper coordination among the various agencies involved in completing the project
- To derive the maximum benefit in terms of construction output under conditions of varying degree of uncertainty.

Need for construction management

13

- To properly sequence the various activities involved in a project to utilise the available resources to maximum extent possible to avoid time delay
- To anticipate the factors that may cause delays resulting in increased cost and to take suitable remedial measures by efficient management
- To provide an efficient programming and to apply improved techniques in scheduling and organising which also provides a means of checking the progress of work and the quality of work

Factors involved in construction management

14

- Planning ,scheduling, oraganising and controlling for arriving at optimum time
- Selection of proper materials their cost including lead charges ,magnitude of man power and equipment
- The appropriate time for using a particular equipment during the construction
- Availability of raw materials future demand and the probability of increase in cost
- Procurement of materials and machinery

Factors involved in construction management

15

- Probable time delays due to natural conditions like floods, famine etc or due to non-availability of men and material
- Skills required in finishing the task as per specifications and quality
- Co-ordination between different organisations involved in construction

Functions of Construction Management

16

Planning
Scheduling
Organising
Staffing
Directing
Controlling
Co-ordinating

1.Planning

17

- Planning is deciding in advance - “what to do” and “how to do”.
- Planning is determination of courses of action to achieve desired goals.
- It is the process of selecting a particular method and the order of work to be adopted for a project from all the possible ways and sequences in which it could be done.
- It bridges the gap from where we are & where we want to be.

2.Scheduling

18

- Scheduling deals with the aspect of “when to do”.
- It is the fitting of the final work plan to a time scale.
- It is a vital tool in both the daily management and reporting of the project progress.
- A schedule shows the duration and the order of various construction activities.

3.Organising

19

- It involves division of the total construction work into departments/sections and systematically managing various operations by giving specific tasks to individuals.
- It involves:
 - Identification of activities.
 - Classification and grouping of activities.
 - Assignment of duties.

4.Staffing

20

- Staffing is to put right man on right job.
- It involves:
 - Manpower Planning
 - Recruitment, Selection & Placement
 - Training & Development
 - Remuneration
 - Performance Appraisal
 - Promotions & Transfer

5.Directing

21

- It deals directly with influencing, guiding, supervising and motivating sub-ordinates for the achievement of organizational goals.
- It involves
 - Supervision
 - Motivation
 - Leadership
 - Communication
- The essence of directing lies in the ability to motivate people individually and as groups to utilise their creative efforts in achieving specified objectives.

6. Controlling

22

- It implies measurement of accomplishment against the standards and correction of deviation if any to ensure achievement of organizational goals
- It involves
 - Establishment of standard performance.
 - Measurement of actual performance.
 - Comparison of actual performance with the standards and finding out deviation if any.
 - Corrective action.

7.Co-ordinating

23

- It involves bringing together and coordinating the work of various departments and sections so as to have good communication.
- It is necessary to create awareness about the role of each section and the assistance to be expected from others.
- Regular meetings of departmental sections with top management are fundamental to proper co-ordination so that plans, problems remedies are discussed for determining the best solution. This will increase the productivity.

Preliminary planning and organisational aspects

24

Planning

- It requires imagination, foresight, sound judgement etc
- Basic function of management
- Planning provides the primary source of co-ordination within the organization and Plans represent the message by which system communicates among organizational units.
- The main features involved in planning of construction projects are the sequence of activities, time, man power and materials required for each one of them and flow of finance.

Planning should facilitate the construction by establish

- Time required for delivering materials
- Types, quantities and duration of equipment needs
- The classification and number of labourers needed and the periods during which they will be needed
- The extend to which financial and if any will be needed
- Time required to complete the project.

The importance of proper planning are

- Helps in anticipating future course of events and to make provisions for it
- Prevents wastage of time, money and material
- Ensures proper utilisation of human and material resources to achieve the predetermined objectives
- Gives direction and attention on objectives

- Helps to offset change and uncertainty which eliminates the risk and losses caused by changing factors
- Lays down procedures, policies, objectives, and operations to achieve economical operations
- Helps to avoid bottlenecks in any constructional industry so as to carryout the works smoothly

Detailed Project Report

28

SITE INVESTIGATIONS

29



Site investigations includes

30

- Detailed survey of area includes longitudinal sectioning, cross sectioning, contour survey depending on the nature of work
- Alignment of roads canals or location of buildings or dam or head works so as to estimate the cost of construction
- Soil exploration to know depth extent nature and variation of soil strata.
- Physical properties of soil encountered depth to underlying rock bed if necessary.
- The seasonal variation in ground water table
- Hydrological particulars
- Information regarding local regulations and ordinance in force

- Location of quarries and quantum of their potentials
- Estimating the number of cross drainage works and cross masonry works for completion of the project
- Local labour conditions, wages, availability of labour the output of the workmen etc
- Existing roads, probable length of approach roads to connect site.

Feasibility Report

32

- Before starting a new project it is important to convince the government and public if required to submitting a brief report by educating people to realize the need for National Development and the locality
- Such report is sent for the approval of administrative authority called feasibility report

Feasibility report includes

33

- Brief history of proposal for the work
- Necessity of proposed work giving reasons for the satisfaction of administrative authorities to accept the necessity and sanction the funds
- Topography and nature of soil with consideration to natural surrounding
- Cost and returns expected
- Stages in which work could be taken up so as to bring the project into use in phases
- Water supply sources availability, possibilities of improvement conveyance storage and use

- Existing roads their condition the improvements and expenditure
- Availability of temporary accommodation for office buildings and storage of materials
- Total cost and how to meet it
- Approximate time to complete the project

PROJECT REPORT

35

- This report is usually given at the beginning of the estimate followed by layout plan designs and calculations, general and detailed specifications ,analysis of rates, materials statement and detailed estimate.

PROJECT REPORT includes

36

- Brief history with reference to proposal
- Object necessity and utility of project with reasons
- Nature of soil, subsoil conditions, topography of land, orientation etc
- Climatic conditions in the locality
- Required equipment to carry out the work
- Approach roads, position of existing roads and availability of other facilities such as power, water sources etc
- Labour available and their skill level

- Availability of construction materials, their location
- Cost benefit ratio
- Method of execution of works and time required to complete the project
- Labour amenities, temporary accommodation for staff.

STAGES IN CONSTRUCTION PROJECT

38

1. BRIEFING STAGE
2. DESIGNING STAGE
3. TENDERING STAGE
4. CONSTRUCTION STAGE
5. COMMISSIONING STAGE

1. BRIEFING STAGE

40

- Also called report stage
- Stage where idea is formulated
- Purpose is to formulate and specify project functions and permissible costs so that architects engineers and other members of the construction team can correctly indicate the type of project and provide likely estimate of costs.
- Non technical investigations include economic and social factors
- technical investigations include land and geological surveys including site investigation

2. DESIGNING or PLANNING STAGE

41

- Important stage in construction
- Any modification after this stage would prove expensive
- A realistic and detailed cost estimate of the project can be prepared during the design stage.

Activities:

42

- To develop the project summary for final adoption of the most suitable alternative
- To carry out technical investigations such as soil investigations topographic survey, material supply and market survey
- To prepare detailed design working drawings, specifications, cost of individual quantities, final cost estimated and preliminary construction programme including time schedule.
- To obtain the approval of concerned authority for the project.

3. TENDERING STAGE

43

- Invite tenders from the contractors for the construction work and to award the contract.
- Procedures of construction carefully defined.
- Contract documents be prepared with utmost care by experienced people - legal document
- The project management exercises control of the work based on terms and condition described in the contract documents.

4.CONSTRUCTION STAGE

44

- Involves the execution work as per the design and within the agreed limits of cost, time and specified quality.
- Construction work has to be carried out in planned manner to prevent wastage of manpower, material and use of machinery and to avoid any disruption of project schedule.

5.COMMISSIONING STAGE

45

- The performance of the structure is evaluated and the proposed nature maintenance repair are considered.
- To ensure the construction work has been completed as specified in the contract documents and all the facilities developed function properly as envisaged in the design
- During this stage records are prepared of the actual construction work finally carried out at site.

- During construction certain difficulties might have arises leading to changes in the original design. These changes are recorded for reasons of technical performance and financial implication
- Commissioning stage is the transition between construction and final taking over of the structure.
- For large and complicated structures it is common practice to do commissioning in several stages.
- The commissioning stage must be planned well in advance so that training and recruitment of staff and deliveries of equipment match the commissioning schedule.

ESTIMATES

47

PRELIMINARY ESTIMATE

DETAILED ESTIMATE



BUDGET PROVISION

ALLOTMENT OF FUNDS

ALLOTMENT OF GRANTS



APPROVAL OR SANCTION

ADMINISTRATIVE
APPROVAL/SANCTION

TECHNICAL APPROVAL/SANCTION

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graph TD; estimate --> Preliminary[Preliminary estimate]; estimate --> Detailed[Detailed estimate];
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estimate

Preliminary
estimate

Detailed
estimate

Preliminary estimate

49

- It is an approximate rough cost estimate
- It is prepared from practical experience from existing work and their rates
- Layout plan or site plan and a brief report of the project accompany the estimate
- It is prepared by
 - ✓ per unit basis
 - ✓ Plinth area basis
 - ✓ Cubic or volume basis

1. Per unit basis

50

- per student rate for schools and hostels
- per bed rate for hospital
- per kilometer length for canals roads railways
- per running metre for bridges
- Per seat rate for cinema theatres

2. Plinth area rate

51

- Cost on the basis of plinth area of the building
- Plinth area is the covered built-up area measured at the floor level
- Area occupied by building including including internal and external walls.
- The rate being deduced from the cost of similar buildings constructed with similar specifications in the same locality.

3. Cubic content Basis

52

- Based on cubic content of the building
- The rate being deduced from the cost of similar buildings constructed with similar specifications in the same locality.
- Over head tanks rate per litre of capacity
- For minor irrigation projects rate per hectare irrigated
- For sanitary works and electrification cost on percentage basis of construction cost of buildings.

Detailed estimate

53

- It is a process of arriving actual cost of project
- It includes estimating the quantities of all items of work
- Prepares standard data with the help of schedule of rates to get the cost of each item of work per unit measurement
- Prepares abstract to find total cost of project
- It is prepared based on detailed drawing with plans sections structural design and drawings

Administrative sanction

54

- Formal acceptance of proposed work by competent authority
- It is given on the basis of approximate estimate and preliminary plans
- After administrative approval engineering department takes up work and prepares detailed estimate

Technical sanction

55

- For every work except petty work, a proper detailed estimate must be presented for sanction by competent authority
- This is known as technical sanction
- After technical sanction the work is taken up for construction

Budget provision

56

- Every state has a finance department at government secretariat level for full powers in all financial matters such as expenditure from funds of state or grants from central government to make grants for required purpose.
- Every department has to obtain sanction from finance department before doing expenditure on works.
- Such financial allotment for anticipated receipts and expenditure known as budget allotment.

- Budget estimates are prepared by various legislature assembly by finance department
- All proposals are voted and a bill to provide necessary funds to various departments is prepared
- The bills should be passes by both houses (Legislative assembly and legislative council) and obtains the approval of governor
- Then the amount is allotted to various departments in budget

Organisations of engineering department

58

1. Central Government Department
2. Bridge wing
3. State government department

Central Govt. Departments includes

59

- Central public works department-deals with construction and maintenance of buildings ,roads, docks and harbours.
- Post and telegraph construction department
- Military engineering Services
- National Thermal Power Corporation Ltd
- National Hydro Electric Power Corporation Ltd
- Indian railways construction wing, maintenance of permanent way ,buildings and other facilities.

Bridge wing

60

- Construction and maintainance of culverts ,bridges tunnels etc

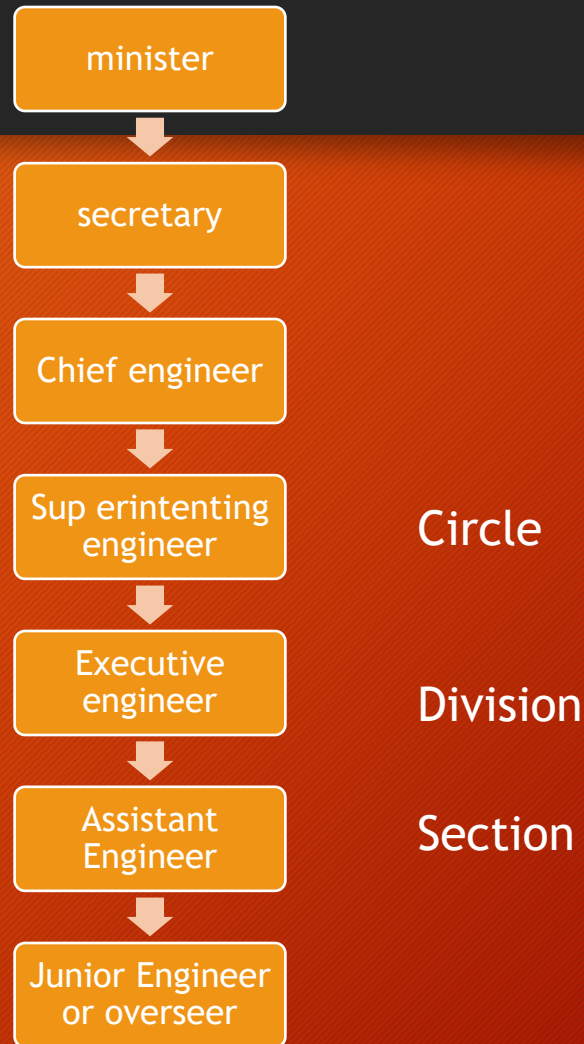
State government department includes

61

- Public Works Department
- Irrigation department- major and minor irrigation development corporation
- Public Health Engineering Department
- Panchayat Raj Department
- Roads and Buildings Department
- State electricity board

Organisational structure of PWD

62



minister

63

- There may be one minister for each engineering department or one minister looking after 2 or more departments

secretary

64

- Every department will have a secretary as IAS officer on behalf of government
- Number of chief engineers to act as head of concerned engineering departments. He is responsible to Government for all works in his jurisdiction.
- Chief engineer general may be appointed by the government as over all incharge of the engineering department.

Chief Engineer

65

- Head of the department
- There may be a number of chief engineers to act as head of concerned engineering departments. He is responsible to government for all the works
- He controls technical in execution of the projects and maintenance works
- Submits budget proposals to the government in respect of all original and maintenance works in his jurisdiction
- Depending on progress of works he initiates demand for additional funds

- Controls employment transfer leave and discipline of the staff
- Watches the progress of works and expenditure against it with a view that no excess is permitted
- Administrative approval of works other than buildings of Rs 25000/-
- Acceptance of tender for works by contract-full powers
- Sanction/approval of estimates for repairs-full powers
- Purchase of tools and plants -Rs30000 at any one time
- To give technical sanction of original work and approved.

- They are responsible for all administrative and establishment matters of all employees of PWD.
- CE is the appointing authority and also conducts transfers officers in the department.
- Makes policy decisions for the department and advises the government on technical matters.
- CE prepares the annual budget of the department and submits to the government.
- The allocation of funds as per the budget of the state to various divisions is done by CE from the lump sum fund.
- The DPR of all major projects are finally approved and submitted to the government through the CE.
- Another major responsibility is the inspection of works and the administration in the department.

- CE is empowered with the unlimited powers of technical sanction(TS).
- Can accord administrative sanction (AS) for works as per his authority.
- Answering the questions raised in the legislative assembly pertaining to the department is the responsibility of the CE.
- Chief Engineer approves the proposal for departmental execution of works.
- CE shall participate in various committees meeting in that capacity.
- Reporting to the government regarding fetching of valuable materials during excavations for archaeological operations or project execution is the responsibility of the CE.

Superintending Engineer

69

- Superintending Engineer is the technical head of a region commonly known as the Circle comprising of a few divisions (districts).
- Administrative and technical control of the circle.
- Exercises financial control and execution of original and repair works
- Inspects the progress of work periodically
- Arrangements of procurement of stores required and transfer or disposal of surplus materials
- Carries out inspection of all divisions under him and checks proper working. A report is given to chief engineer

- Exercises administrative control in respect of recruitment transfer and discipline of sub ordinate staff
- Responsible for finalizing the schedule of rates of works in the region
- Keeps informed about the progress of work in his circle and bottlenecks
- Administrative approval of works upto Rs 10000/-
- Acceptance of tenders by contract upto 5lakhs
- To accord technical sanction of original works upto Rs 100000/-and maintainace and repair work upto 400000/-

- The major responsibility of the SE is supervision and inspection of the activities taking place under various divisions within the circle.
- SE also accords AS and TS as per the financial powers entrusted as per rules.
- inviting tenders, sanctioning the estimates, revised estimates, and supplementary estimates exceeding the monetary limit of EE is another responsibility.
- The standard data and specifications are reviewed and that for the new items of works arising are prepared by SE.
- SE shall also conduct the transfers and postings within the circle.
- All communication to CE on technical matters from lower level offices is routed through SE.

- Circle office provides the data and information required by CE in formulating the budget for the department.
- Conduct technical audit of bills paid under the divisions.
- Representing the department in legal matters, holding the quarterly meeting Executive Engineers under the circle are some other responsibilities of SE.

Executive Engineer

73

- EE is the divisional Engineer. In charge of execution of projects
- He is the king of departmental setup
- Verifies no work is taken up without administrative approval allotment of funds and technical sanction
- Exercises effective quality control and quantity control to see that specifications are laid strictly and progress is done within the time.
- Scrutiny and sanction of estimates ,preparation of revised estimates, and giving completion reports works.

- Verifies contractors accounts are properly maintained and regularly submitted to the financial authority concerned
- He draws money from concerned treasury and makes payment to contractors labours and office establishment under the head of account to do so
- Ensures all tools plants and machinery in subdivisions are properly maintained and utilised
- Verifies material at site tools and plant accounts. executes the power of writing off unserviceable articles

- Maintains work register ,cost wise stock accounts and the register giving the particulars of accounts regarding capital cost or hire charges for equipment
- Checks structural stability of all government buildings in his division and provides for repair and maintenance
- Utilises the power of fixing rents for buildings required for government offices
- Invites tenders and fixes contracting agency or nominates for carrying out the works

- Accepts tender for work by contract upto Rs 50000/-
- Order piece works for works and repairs upto Rs 10000/- as per the current schedule of rates
- To give technical sanction for original works and repair works upto Rs 10000/- at a time

Assistant Executive Engineer

77

- AEE is the sub divisional engineer
- The major responsibilities are the inspection of works executed in various section offices under the jurisdiction of Sub-division and ensuring quality control.
- Another responsibility is conducting the check measurement of works. 25% of the measurements recorded by the AE Should be check measured by the AEE (Currently 50% of all concealed items of work and .10% of items that are not concealed).
- Granting administrative and technical sanctions are other responsibilities discharged by AEE.
- The estimates and bills submitted by the AE is scrutinised at the sub-division.

- AEE also recommends indent for supply of items from department stores.
- Inviting tenders and quotations for execution of works within the monetary limit is also done by AEE.
- The initial levels and material collection exceeding certain limit should be intimated to the chief technical examiner.
- AEE shall comply with the revenue recovery (RR) activities

- The accounts at the sub-division should be forwarded to the division office for consolidation.
- Approval of the benchmark and checking the pre-measurement of reinforcements is done by the AEE.
- Quality control of works, upkeep of government property ensuring progress of projects, submitting the DPR of projects are the routine duties of AEE.

Assistant Engineer

80

- AE is the sectional officer
- It is the responsibility of the AE to see that the construction is done as per the approved plan and in the approved location.
- The safety and security of life and property at project site should be ensured by AE.
- AE is in direct charge of the project site and responsible for, the quality control stipulated in the specification and the work progress.
- AE gives instructions to the contractor regarding the execution of works and assists the contractor in resolving technical problems such as interpretation of drawing and specification, setting out ci building, deviations during construction etc.

- A work spot order book is maintained at site to give written instructions to the contractor by the AE or during the inspection of higher officers.
- The measurements of works, including the premeasurement, are directly entered into the measurement book by the AE.
- The preparation of bills and the arithmetic check etc. are done at the section office itself.
- The demands for department supplies of items are raised by AE through indent.

- AE should prepare the material accounting statement (MAS) with regard to the consumption as per the work progress.
- The maintenance of the tools and plants register and log is done by AE.
- Conducting surveys, soil investigation and furnishing other details required for design in the responsibility of section office.
- AE should keep a close watch over departmental execution of works.
- AE should conduct periodic inspections of government buildings under the section and carry out petty construction and repair(PCR) work to upkeep these buildings in good condition.

- In the case of un-usable or unserviceable items, a survey report (SR) is prepared for disposing of the same through auction. If trees need to be cut for construction, the SR needs to be Prepared before auction.
- Any unclaimed or abandoned item found at project sites or left over by the contractors should be taken into safe Custody by AE.
- The quality of work and the progress as scheduled Should be ensured by AE.

- The proposals for new projects are submitted through AE for obtaining sanction and budget allocation.
- The investigation works and Required field trials like soil investigation required for the design should be conducted by the section office.
- The fitness certificate for government buildings, school buildings and other public buildings are furnished by the AE after due inspection.

- The valuation and fixing of rent of private buildings taken On lease for public use or the government buildings given On rent is assessed by AE for executing the lease agreement.
- The site is handed over to the contractor for executing the project by the AE and after the completion of the project takes back the land and asset from contractor, the completed project will be later handed over to the Concerned department.
- The reply to the LA interpellation regarding the works under the section should be furnished to the CE by the AE
- Overseers assist the AE in discharging the duties.

- Carries out check measurement or measurement recorded by junior engineer in M Books
- Verifies all measurement books in sub division periodically
- Verifies all stores including tools and plants equipment and machinery at least once a year
- Check muster rolls wrt daily engaged labour
- Maintains accounts of all work in charge and submits to divisional engineer
- Maintains all buildings/roads/irrigation works and keep relevant records

- Reports to executive engineer any unusual damage to government assets
- Maintains cash books check estimates data for additional items before submitting to executive engineer
- Collects rent or revenue for land or buildings belonging to the department
- Maintains good relationship with officers of user departments like medical educational etc for attending urgent works

Junior Engineer/Overseer

88

- Overseer is a Supervisor to provide instructions guidance and orders to junior employees
- Overseer is responsible for work and actions of subordinates
- Typically supervise factory construction and other manual labour workers

Third Grade Overseer (TGO)

89

- The post of Third Grade Overseer is mainly confined to the Section office.
- Their duty is mainly at project sites. The major job responsibility is the daily supervision of works and seeing that the work is done as per approved drawing, design and specification, and ensuring quality of work.
- TGO has the responsibility to inform the AE of all major activities at the project site. TGO assists AE in carrying out all technical activities like setting out, collecting data during investigation assisting in taking measurements, preparation of drawings estimates etc.

- TGO should ensure good workmanship and proper curing of cement work, and should check the form work and reinforcement before concreting work.
- TGO should ensure safety at project site. Keeping the records of stock of material, maintain MAS, checking quality of materials supplied, safe custody of items at site, Properly keep the T&P register and list of unserviceable items etc. are done by TGO.
- Preventing encroachment to government land, inspection of avenue trees, mustering of NMR workers are the responsibilities of TGO.

- In the case of roads and bridges section the TGO should inspect the bridges regularly and ensure that the avenue trees do not obstruct traffic.
- In irrigation sections apart from canal maintenance, the TGO should watch the chances for canal breach and the same should be immediately brought to the notice of AE.
- The work spot order book should be properly maintained and should be made available during the inspection by higher officers.

First Grade Overseer (FGO) & Second Grade Overseer (SGO)

92

- In addition to the responsibilities of the third grade overseer, the first grade and second grade overseers have the following responsibilities.
- They are responsible for checking estimates and bills; assisting AE in tendering process, recording measurements, preparation of bills, AS & TS documents etc. They are to also keep office documents like T&P register, office registers, NMR muster roll, M-book, Stock book, MAS etc.
- They should assist in recording and checking measurements, and should ensure that the contractor follows the instructions given in the Work spot order book. They should monitor all the responsibilities discharged by the Third grade Overseer.

- The First grade and Second grade overseers, when posted in the Sub-division or higher offices, are designated as the First Grade Draftsman and Second Grade draftsman respectively. Their main responsibility is checking all the documents, including measurements and arithmetic check, bills, tender documents, AS and TS documents, and MAS, submitted from lower offices. Plotting of survey works such as levels, contour etc. are also done by them.

- Letters on technical matters are drafted by Draftsman
- Tender schedule, tender notice, tender tabulation and agreement documents are prepared by Draftsman. They are to attend all office work related to technical matters.

ESTABLISHMENT

REGULAR
ESTABLISHMENT

WORK CHARGED
ESTABLISHMENT

CONTIGENCIES
ESTABLISHMENT

PERMENENT
ESTABLISHMENT

TEMPORARY
ESTABLISHMENT

REGULAR ESTABLISHMENT

96

- Permanent establishment
 - ✓ An establishment can neither be increased or decreased with increase or decrease of work load in the department is called permanent establishment
 - ✓ Salary is obtained from regular pay bills from treasury

- Regular establishment generally includes supervisory personal that are required for construction.
- They are paid monthly wages and entitled to leave and other benefits.
- The employees may be temporary or permanent.
- Permanent employees have great security of service and may be entitled to more service benefits than the temporary employees.

- Temporary establishment
 - ✓ The establishment is employed on monthly basis to help the regular establishment when there is increase in workload is called temporary establishment
 - ✓ The sanction to employ them on 6months basis is given by competent authority
 - ✓ One month notice on either side is required to leave the job

WORK CHARGED ESTABLISHMENT:

99

- During the construction of a project considerable number of skilled supervisors, work assistance, watch men etc., are employed on temporary basis.
- The salaries of these persons are drawn from the L.S. amount allotted towards the work charged establishment. that is, establishment which is charged directly to work.
- Every payment made to a member of the work charged establishment whether on account of his wages or actual travelling expenses is charged to the work estimate on which they are employed.
- L.S.amount of 1½ to 2% of the estimated cost is provided towards the work charged establishment.

- Work supervisors ,chaukidars, mates, mistries etc are covered in this category
- 10 days notice is required on either side to leave the job

NMR workers

101

- Except for the regular and work charged establishments, all persons engaged departmentally for the execution of works are considered as casual labour. Their wages are drawn on "Muster rolls".
- Muster rolls are prepared in the prescribed form. The Nominal Muster Roll (N.M.R) form consists of two parts.
- NMR or Nominal Muster Roll means any 'daily wage employee' or any person who is employed on the basis of payment of daily wages.
- It may also includes a person employed on consolidated pay either, on full-time or part-time or piece-rate basis or as a work-charged employee

Important instructions regarding the preparation of Muster rolls

102

- Duplicate copies of muster rolls should not be prepared
- Separate muster rolls are prepared for each period of payment. Labour may be paid more than once a month depending upon local conditions and practices.
- The daily record of attendance and times should be recorded in such a way as to leave no possibility of tampering or making unauthorized entries.
- After the muster roll has been passed, payment should be made as early as possible.

- A record of wages that remains unpaid must be kept in a register of unpaid wages.
- Subsequent payment of unpaid wages is recorded in the hand receipt.
- A note of the same is recorded in the register of unpaid wages as well as in the muster roll.
- Wages that remain unpaid for 3 months must be reported to the divisional office.
- Progress of work done by the labour is recorded and is to be compared with departmental rates

- Muster rolls are checked with reference to entries in the Continued measurement book, when the divisional engineer makes payments
- Work may be executed departmentally through employment of daily labours such as mason, coolies, bhisties(റവട്ടർ കാര്യങ്ങൾ), carpenters, etc. The materials required for the construction such as bricks, cement, sand, lime, surki, timber steel etc., and tools and plants required for the operations are got issued from the store by indent or purchase directly chargeable to the work.
- The attendance of the labours is kept in Muster Roll by the overseer or by his authorized agents

MUSTER ROLL

Nature and Location of work

Name and address of the Contractor

Name and address of the Principal Employer

Maintenance repair, Cleaning and Operation Services

M/s Realtech Maintenance Services Pvt. Ltd.
D-22, Defence Colony, New Delhi

Wages Period

APRIL-2014

S.No.	Emp. Code	Employee Name	Father's Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total Paid Days		
1	NCR3-861	Raja Ram	Sri Ram Swaroop	P	w/o	P	P	P	P	P	P	w/o	H	P	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	P	w/o	30		
2	NCR3-860	Nitin Sharma	Sri Viswanath Shorma	P	P	P	w/o	P	P	P	P	P	H	w/o	P	L	L	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	A	A	28		
3	NCR3-1152	Sushil Minz	Johnsan Minz	w/o	P	P	P	P	P	P	w/o	P	H	P	P	P	P	w/o	P	P	P	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	30	
4	NCR3-1697	Lakhan Lal	Bhagirath	P	P	P	P	P	w/o	P	L	P	H	P	P	w/o	A	P	P	P	P	P	w/o	P	P	P	P	P	L	w/o	P	P	P	P	29	
5	NCR3-1702	Shambhu Permani	Gopal Permani	w/o	P	P	L	P	P	P	w/o	P	H	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	P	P	w/o	P	30	
6	NCR3-1892	Sachin	Suresh Chand	P	P	P	P	P	w/o	P	P	P	H	P	P	w/o	P	P	P	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	30	
7	NCR3-1960	Rajoo Kujur	Anthres Kujur	w/o	P	L	P	P	P	P	w/o	P	H	P	P	P	P	w/o	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	15	
8	NCR3-1974	Rajesh Sharma	Dinesh Sharma	P	P	P	P	P	P	w/o	P	P	H	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	P	P	w/o	P	P	30	
9	NCR3-110	Ram Kishore Sharma	Shushil Kumar	P	P	P	P	P	w/o	P	P	P	H	P	P	w/o	P	P	L	L	A	A	w/o	P	P	P	P	P	P	P	w/o	P	P	P	28	
10	NCR3-1651	Ashish Kumar Sharma	Anil Kumar Sharma	P	P	P	P	P	w/o	P	P	P	H	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	30	
11	NCR3-1875	Mukesh Tiwari	Sheetala Prasad Tiwari	w/o	P	P	P	P	P	P	w/o	P	H	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	P	P	w/o	P	30	
12	COP-138	Bijendra Mohan	Naresh Dutt Sharma	P	P	P	P	P	w/o	P	P	P	H	L	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	P	P	w/o	P	P	P	30	
13	COP-045	Jagveer	Nake Pal	L	L	A	A	w/o	P	P	P	P	H	P	w/o	P	P	P	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	28	
14	SDM-004	Vishal Kumar	Ram Sah	P	P	P	P	P	w/o	P	P	P	H	P	P	w/o	P	P	P	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	30	
15	VFM-947	Anup kumar	Lt Surendra Prasad	P	P	P	P	P	w/o	P	P	P	H	P	P	w/o	P	P	P	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	30	
16	COP-056	Manoj Kumar Srivastav	Suraj Srivastav	P	P	P	P	P	w/o	P	P	P	H	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	P	P	w/o	P	P	P	30	
17	COP-064	Anjlush Ekka	Marshal Ekka	P	P	P	P	P	w/o	P	P	P	H	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	P	P	w/o	P	P	P	30	
18	COP-066	Mahatab Singh	Bhopal Singh	P	w/o	P	P	P	P	P	P	w/o	H	P	P	P	P	P	w/o	L	L	A	P	P	P	w/o	P	P	P	P	P	P	P	w/o	29	
19	COP-073	Rajesh Maurya	Vijay Maurya	w/o	P	P	P	P	P	P	w/o	P	H	P	HD	P	P	w/o	L	P	A	A	A	A	A	A	A	A	A	A	A	A	A	P	17.5	
20	COP-083	Mani Mohan	Mekhan Mandal	P	w/o	P	P	P	P	P	P	w/o	H	P	P	P	P	w/o	P	P	P	P	P	P	P	w/o	P	L	P	P	P	P	P	w/o	30	
21	COP-096	Samim Ahmed	Sayed Ahmed	P	P	P	w/o	P	P	P	P	P	H	w/o	L	P	P	P	P	P	w/o	P	L	A	P	P	P	w/o	P	P	P	P	P	P	29	
22	SM-127	Mukesh Kumar	Bamar Pal	P	P	P	P	w/o	P	P	P	P	H	P	w/o	P	P	P	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	30	
23	COP-100	Upender Nath Tiwari	Raj Kishore Tiwari	P	P	P	L	w/o	P	P	P	P	H	P	w/o	P	P	L	P	P	P	w/o	P	P	P	A	P	P	w/o	P	P	P	P	P	29	
24	COP-102	Livnus Kerketta	Joachim Kerketta	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	w/o	P	P	L	P	P	P	w/o	P	P	P	P	P	P	P	P	30	
25	COP-110	Ajeet Ekka	Bicktor Ekka	P	P	P	P	P	w/o	P	P	P	H	P	P	w/o	P	P	P	P	P	P	P	w/o	L	L	A	A	A	A	A	A	A	P	24	
26	COP-112	Tapen Haldar	Suneel Haldar	P	w/o	P	P	P	P	P	P	w/o	H	P	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	P	P	P	w/o	30
27	COP-120	Rajesh	Shri Siya Ram	P	P	P	P	P	P	w/o	P	P	H	P	P	P	w/o	L	L	A	A	A	P	w/o	P	P	P	P	P	P	w/o	P	P	P	27	
28	COP-123	Subroto Mukherjee	Lt Gopal Govindo Mukherjee	P	P	P	P	L	w/o	P	P	P	H	A	L	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	A	A	A	A	A	A	24	
29	RM-074	Shripat Shrivastava	Bhagole	P	w/o	P	P	P	P	P	P	w/o	H	P	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	P	P	w/o	30	
30	RM-076	Arun Kumar Mishra	Krishna Raksha Mishra	P	P	P	P	w/o	P	P	P	P	P	P	w/o	P	P	P	P	P	P	P	P	w/o	P	P	P	P	P	w/o	P	P	P	P	P	30
31	SM-046	Shriprakash Shukla	Ramashish Shukla	P	w/o	P	P	P	P	P	P	w/o	H	P	P	P	P	P	w/o	P	P	P	P	P	P	P	w/o	P	P	P	P	P	P	P	w/o	30

Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998

FORM XVI

[See Rule 241(1)(a)]

Muster-Roll

Name and permanent address of the establishment

Name and address of establishment where building or other construction work is carried on/is to be carried on

Nature of building or other construction work
Name and address of Employer

For the month of					
Sl. No.	Name of the building worker	Father's/ Husband's name	Sex	Dates	Remarks
(1)	(2)	(3)	(4)	(5)	(6)

The Contract Labour (Regulation and Abolition) Central Rules, 1971

FORM XVI

[See Rule 78(1)(a)(i)]

Muster Roll

Name and address of Contractor

.....

Name and address of establishment in/under which contract is carried on

.....

Name and address of Principal Employer

.....

Nature and location of work.

.....

For the month of.

For the month of.									
Sl. No.	Name of workman	Father's/ Husband's name	Sex	Dates					Remarks
				1	2	3	4	5	

Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Central Rules, 1980

FORM XVII

[See Rule 52(2)(a)]

Muster-roll

Name and Address of Contractor.

Nature and Location of work.

Name and Address of Establishment in/ under which migrant workmen are employed
.....

Name and Address of Principal Employer.

For the month of

Sl. No.	Name of migrant workman	Father's/ Husband's name	Sex	Dates					Remarks
				1	2	3	4	5	
1	2	3	4	5					6

- Casual labour is employed as and when required for the execution of work, payment is made on the basis of the number of days the labour works. There is no provision of leave, except the weekly holidays. This is also known as daily labour

FORM 22—CASUAL LABOUR ROLL

[See CHAP. XIV, PARAGRAPH 439 (H)]

Cash-book Voucher no.

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198

Casual Labour Roll of labour employed on

from the



19

[illegible]