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# UNIT 1 POSITION OF CONSTRUCTION SUPERVISOR

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## 1.1 INTRODUCTION

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Construction is a field activity where resources like materials, labour, equipment, time and money are utilised to create structure such as a building, road, culvert or a bridge. The resources being very scarce, it is necessary to ensure their optimum utilisation. The structure has to be completed in the stipulated time and cost as well as to the specified quality standard. The most important need to achieve this is effective supervision of the construction activity. This unit focusses on different aspects of construction supervision. We shall study in this unit the role of a construction supervisor and his position in the management team.

### Objectives

This unit will help you understand the position a construction supervisor occupies in a construction team and the important role he plays.

After studying this unit, you will be able to:

- understand role of the construction supervisor and his position in the construction team,
- know the qualification and training required for a construction supervisor,
- explain tasks a construction supervisor has to perform when working on behalf of owner/consultant or a contractor, and
- highlight construction supervisor's responsibilities as regards inspection, testing, certification etc.

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## 1.2 ROLE OF CONSTRUCTION SUPERVISOR

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On a construction site supervisor is responsible for getting the work done from workers. Supervisor constitutes the first line of management. The details of their jobs differ from the others in the construction organisation: The supervisors are the grass roots level representatives of management of the organisation to the non managerial employees viz skilled and unskilled workers. They get the work done through the efforts of the others. The Supervisors' task is very often a difficult one and complex too. They have to channelise the energies of the workers

to accomplish the job entrusted to them. In this effort a supervisor has no doubt, to concentrate on the individual efforts but his focus ought to be the predetermined goals which has been assigned to him. Thus the main responsibility of a construction supervisor can be said to be the realisation of the goals of the organisation—in the form of creation of a structure or services through the efforts of the workers by channelising the energies of the latter in a specific direction.

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### 1.3 POSITION OF THE CONSTRUCTION SUPERVISOR

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Like in most other organisations, in a construction organisation too there are many levels of management which are in effect the levels of authority and responsibility. Generally, three levels of management are identified which are briefly discussed below:

a) **Top Level Management**

This is generally concerned with the formulations of goals and policies of the organisation.

b) **Mid Level Management**

This comprises people who report to the top management. They interpret the policies and objectives laid down by the top management in terms of the areas of their specialisation or operation. A few examples of the areas where the middle level managers operate could be procurement of materials, equipment management, labour management etc. On a construction site middle level management may be concerned with specialisation like concreting work; installation of lifts or air-conditioning systems. On large works spread over wider area middle level management may deal with independent portions of work like head works; spillways, canals etc. in case of the river valley projects or a group of buildings on a building complex comprising a large number of buildings. In some organisation middle level management itself may be made up of more than one levels.

c) **First-line Management**

This is the lowest level of the management and has to deal with non-managerial employees viz. workers. First line managers obtain instructions from and report to the middle level management. First line managers (supervisors) convert the policies and goals of the organisation. In reality organisations employing the supervisors vary widely and workers who obtain instructions from the supervisors carry out tasks which are of varying nature. The nature of the organisation and the nature and magnitude of the work carried out by the organisation determine the nature of work which the supervisor has to get accomplished from the workers.

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### 1.4 RESPONSIBILITIES OF THE CONSTRUCTION SUPERVISOR

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Supervisor has the responsibility of ensuring that the work entrusted to him is completed on schedule; specified quality standards are met and the costs are controlled.

Supervisor's main concern is the individual as well as group productivity of workers he is controlling, environmental protection and safety and health of the employees.

The important activities which a supervisor has to perform are briefly outlined below.

- i) To give instruction to workers under his control by explaining the assignment and rendering necessary assistance in the performance of the work.
- ii) To motivate the workers to contribute their best to the jobs assigned to them.
- iii) To ensure that the workers under his control function as a group with proper team spirit.
- iv) to maintain discipline among the workers.
- v) to resolve the differences or conflicts arising amongst workers, to the satisfaction of all concerned.
- vi) recognising the employees who do good work and make significant contribution towards achievement of the organisation goals. At the same time to take appropriate disciplinary action against the defaulters.

- vii) to maintain good relations with workers, unions if any and also with the general public.
- viii) to plan the work, organise the resources and ensure that the time schedules are met, costs are controlled and the quality requirements are adhered to.
- ix) to develop the employees so that they can do their present work more efficiently and to train them for the new jobs and higher responsibilities which they will have to perform as and when the organisation grows.

## 1.5 QUALIFICATIONS AND TRAINING REQUIREMENT FOR A CONSTRUCTION SUPERVISOR

In view of the position a construction supervisor occupies in the management organisation of a construction project and the responsibilities he has to shoulder, the supervisor must be equipped with the appropriate qualifications and training.

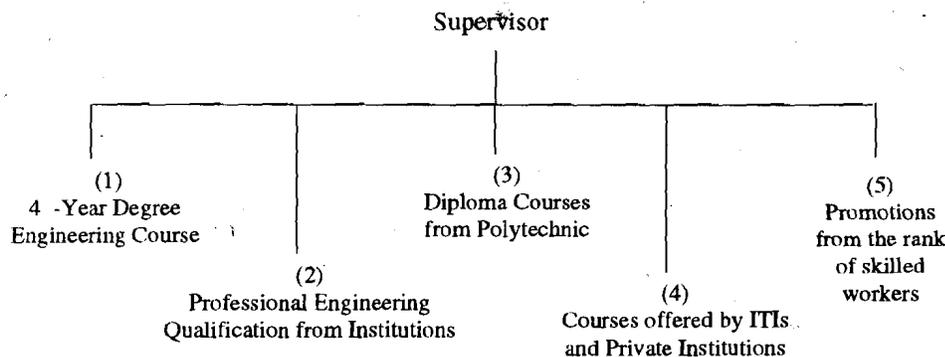
A successful supervisor must have adequate technical knowledge of the tasks he is to supervise and get them accomplished through the workers. Supervisor should therefore have a formal technical qualification. Engineering education in our country is imparted through the training programmes at two levels.

- i) Diploma in Civil/Construction Engineering offered in polytechnics affiliated to the State Board of Technical Examination. These courses are usually of three year duration and students who pass secondary school certificate examination (10th level) are eligible to be admitted for this course of studies.
- ii) Bachelor's degree in Civil Engineering offered through four year courses after Higher Secondary School examination (12th level). The degree courses are offered by
  - a) Engineering colleges affiliated to the various universities, and
  - b) Indian Institutes of Technology (IIT) which are autonomous institutes. There are a few Professional Institutes like Institution of Engineers (India) who conduct qualifying examination for the candidates who study on their own and on passing the examination are qualified as professional engineers.

A first-line Manager or a Supervisor should have any one of the formal qualifications mentioned above.

There is yet another channel available to a person to reach the position of a supervisor. Some Industrial Technical Institutes (ITIs) offer one or two year programmes in various engineering trades. Those who qualify in these courses join the industry and eventually rise to a supervisor's post. Short term courses (with a duration of about six months) are also offered by some private institutions and those who complete these programmes join the industry as supervisors.

Finally, a few enterprising skilled workers also are given supervisory work after they work for long duration in the industry. Thus, the supervisory cadre in the construction industry, at present is built up by persons coming through various streams as shown in the following diagram.



In addition to the technical qualifications, a good supervisor must possess managerial skills in the areas of effective planning, controlling, organising, co-ordinating and directing the work of his employees. Since he is continuously in direct contact with the labour force, he must also have adequate skills in matters related to the human relations such as motivation and effective communication.

As a matter of fact supervision is done at all levels of management. However, supervision done by the first-line management is the most important job. It is demanding and not an easy task. It has many challenges but at the same time it has its rewards. A good effective supervisor must therefore have technical as well as managerial competence. He must also update his knowledge in the relevant fields to be aware of the latest advances.

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## 1.6 CONSTRUCTION SUPERVISOR AND THE PHASES OF CONSTRUCTION PROJECT

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The ultimate goal of a construction project is creation of a structure/service. Construction project usually passes through the following phases.

- i) Concept of the structure on the basis of the need felt by user.
- ii) Preliminary phase where feasibility of the project is established; alternatives are compared and final proposal is selected.
- iii) Detailed surveys, design, drawings and estimates where the proposed structure is created on paper.
- iv) Construction where the proposal created on paper is brought into reality through the field activity by using various resources.

Supervision in the Construction phase is very important. Construction can be done by user/owner himself by creating suitable organisation or he can entrust the construction to a contractor. If the construction is done by the owner/user—method known as departmental method of construction or in-house construction, the construction supervision will be done on behalf of the owner/user. When the construction is done through contractor supervision has to be done on behalf of both the owner who is known as client and also on behalf of the contractor who actually constitute the construction agency. Thus supervision on behalf of construction agency whether it is the owner (in the case of departmental method) or the contractor (in the case of contract method) is of vital importance and it generally follows a common pattern with a few variations due to different methods of execution. Supervision for the client (owner/consultant) and the supervision for contractor are discussed in the following paragraphs.

### SAQ 1

- i) Why is a Construction Supervisor called 'First-Line Manager' ?
- ii) Mention the management levels on a typical construction site.
- iii) Name the phases of a construction phases.
- iv) Describe briefly the methods of execution of a construction project.

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## 1.7 SUPERVISION FOR THE OWNER/CONSULTANT

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When the construction is entrusted to contractor the owner may appoint a supervisor who will ensure that construction is done strictly according to the contract drawings, specifications and conditions of contract. Alternatively, he may have an agreement with a consultant who in turn appoints a supervisor to supervise contractor's construction works. This supervision is done on behalf of the owner. Such a supervisor is not in the true sense of the term first line manager directing and co-ordinating the efforts of the field workers. This is the responsibility of the contractor's supervisor. Owner's supervisor has to mainly ensure that the work is being done according to the conditions of the contract. He has to strictly ensure that:

- i) construction is done according to the contract drawings, specifications,

- ii) contractor adheres to the agreed schedule, and
- iii) quality standards as regards materials, processes and workmanship are adhered to.

Owner's supervisor assists the engineer in execution of work. He has also a few more responsibilities. He should :

- i) ensure that the reports of day to day progress are submitted to the owner's engineer. He should obtain instructions from the engineer and report his problems/difficulties to him,
- ii) deal with responsible member of the contractor's staff,
- iii) explain to the contractor accurately any aspect of the work which the latter may not understand,
- iv) insist on strict adherence to the quality standards so that contractor realises that only high standard of workmanship will be accepted,
- v) be fair but firm in dealing with members of contractor's staff,
- vi) whenever there is any problem, take prompt action in solving it if it is in his jurisdiction or he should promptly report it to the engineer,
- vii) not wait till the contractor completes a job to reject it on the ground that it does not meet the contractual requirements. He should take timely actions to bring to notice any defective work or a departure from specifications,
- viii) report serious matters needing dismantling any portion of work or stopping the work to the engineer,
- ix) generally follow the contract document in their spirit and not in the letter but he should remember the limitations of his authority and always seek guidance from his engineer,
- x) be tactful while dealing with the contractor's staff and other concerned people, avert a state of aggression and see that an atmosphere of cordiality is maintained on the site,
- xi) maintain all work diaries, registers, reports on the materials arriving on site, their consumption in the construction, labour employed, equipment deployed etc.,
- xii) maintain a work order book wherein instructions are given to the contractor by the engineer and other authorities,
- xiii) report stages of work requiring the inspection and approval of the engineer or any other authority to the engineer so as to ensure timely action and avoid any delay,
- xiv) assist the engineer in preparing or scrutinising the periodical bills to be paid to the contractor, and
- xv) he should maintain a set of contract documents as well as a register containing the details of documents (drawings, instructions, specifications) that may be introduced from time to time.

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## 1.8 SUPERVISION FOR THE CONSTRUCTION AGENCY

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As mentioned earlier in section 1.6 the field construction may be organised by the owner himself or a contractor who constitute construction agency. If you have to work as a supervisor for the construction agency, you have a different and more important role to play. Construction agency is responsible for the efficient management of the construction work viz. to ensure that the structure is completed

- i) within the stipulated time,
- ii) within the stipulated cost, and
- iii) to the predetermined quality standards.

And as a supervisor of the construction agency it is your responsibility that the above objectives are met with on the site by supervising the field activities. To accomplish this you must understand your precise role in the overall organisation.

**Functions of a Construction Supervisor**

Before the construction activities are actually commenced in the field, the construction agency for whom you are supervising the work, has

- i) prepared/obtained all the necessary drawings for the structure to be built. These drawings may have to be supplemented by detailed working drawings during the construction.
- ii) a bill of quantities listing the items of construction and their quantities
- iii) details of resources—materials, equipment, labour etc., required for the construction.
- iv) finalised the sources from which these resources are to be obtained viz. dealers/suppliers, labour, contractors, sub-contractors etc.,
- v) prepared a programme of construction indicating the sequence of items of construction, duration required by them, important milestones and the expected dates by which they are to be achieved, and
- vi) appointed engineer to be incharge of the project. He will be designated as the Project Manager/Project Engineer/Construction Manager. There will be Engineers known as Site Engineers, Field Engineers etc. as well as other members to assist the Project Manager. Actual project team will depend on size and nature of the project.

You as the Supervisor will have to perform the task of instructing and guiding the field workers and get the work done from them.

How will you accomplish this task successfully ?

- i) You must carefully study all the documents – drawings, specifications, contract documents etc. and understand them thoroughly. In case there are any doubts consult the Engineer to whom you report and get the doubts cleared.
- ii) Study the programme of construction prepared by the project in-charge. From this programme prepare a detailed working schedule for a suitable duration, say a week. Such a schedule should show the details of actions to be taken by you on every day. Supervisor's schedule for a typical day will show the following:
  - a) Brick masonry for the superstructure of building No.1 to be continued.
  - b) Excavation for the foundation of building No. 2 to be started today. Labour gang to be organised, instructions to be given to them, necessary tools to be issued.
  - c) Excavation work should be completed by tomorrow evening; the field engineer to be requested to inspect the work tomorrow and approve the foundations so that laying the concrete bed for the foundation can be commenced day after tomorrow.
  - d) To send a requisition to the store to supply cement, to place an order for supply of sand and aggregates so that these materials will be delivered to site by tomorrow evening.
  - e) To request the project office to supply the working drawings of RCC slab so that they can be studied and the necessary preliminaries such as method statements, requirement of materials and equipment can be worked out; arrangements for their procurement can be planned and concerned labour contractor can be informed in time to be ready to start the work.
  - f) To send a note to the accounts department to arrange for the payment of wages to labour at the end of the week.
  - g) Reports to be submitted to the project office.

The above list of activities is not exhaustive but is of an indicative nature only.

Supervisor should ensure the following facilities on the construction site:

- i) Site offices, site stores, workshops, canteen & mess etc. with necessary furniture, ventilation, lighting etc.
- ii) Access to the site as well as various units such as site office, stores, workshops etc.
- iii) Adequate packing facilities, unloading platforms for incoming materials.

- iv) Toilets suitably located – separate toilets for ladies
- v) Adequate supply of water for drinking, washing and construction operations.
- vi) Arrangements for regular cleaning of office, stores, canteen etc.
- vii) Ensure adequate safety precautions on site by :
  - a) safe stacking of material,
  - b) safe handling of material,
  - c) insisting on the use of protective wears like helmets, gloves, gum-boots, goggles where necessary,
  - d) providing fencing around the excavated trenches,
  - e) Ensuring good housekeeping on site,
  - f) providing first-aid box on site,
  - g) employing trained workers and operators,
  - h) ensuring proper maintenance of equipment, and
  - i) providing training to workers and creating an awareness of safety amongst workers.

Supervisor should maintain the necessary documents on the work site. The following is the indicative list of some important documents.

- i) A list of names, addresses and telephone numbers of the persons and agencies concerned with project (viz. owners, higher officers, officers of local authorities, Govt. Suppliers, police department etc.).
- ii) A set of approved drawings and specifications.
- iii) Contract documents (in case of contract work).
- iv) Construction programme (network or bar chart).
- v) Files containing important letters.
- vi) Work order book.
- vii) Progress chart.
- viii) Registers for materials, use of equipment, labour employed.
- ix) Record of tests carried out on materials, works.
- x) A general plan of work showing thereon work completed every day.
- xi) Daily diary containing
  - a) details of works in progress,
  - b) notes regarding weather conditions,
  - c) names of visitors,
  - d) number of hours worked,
  - e) details of work carried out by sub-contractors, labour contractors,
  - f) workers employed on work site,
  - g) materials arrived; issued to sub-contractors, consumed on works,
  - h) equipment details such as hours worked, fuel/power used, repairs & maintenance output etc., and
  - i) any other relevant details.

Entries in daily diaries form the basis of the reports which the supervisor has to submit in the prescribed form to various offices periodically.

## 1.9 CONSTRUCTION SUPERVISION AND INSPECTION AND TESTING

Inspection and testing constitute very important features of a construction work from its commencement to completion. Construction Supervisor has to be ready to start the work.

### 1.9.1 Inspection

Inspection involves checking, with or without the aid of any instruments. This is done with a view to ascertain the predetermined quality parameters. Thus inspection for construction materials is done to ensure that the materials is of the specified colour, size, shape, and quantity etc. While the construction work is in progress inspection is carried out to ensure that

- i) the construction materials are used in the specified proportion,
- ii) the work is carried out in the correct sequence,
- iii) construction activities are carried out by following correct procedure, and
- iv) the output of the construction activity satisfies the predetermined/specified requirements in term of physical attributes e.g. dimensions, shape, gradient etc. or performance e.g. watertightness.

Two factors need to be considered in connection with the inspection. They are

- i) who does the inspection, and
- ii) when (i.e. at what stage of the construction process) is the inspection carried out ?

Inspection is carried out by the Supervisor himself and he has to do this very frequently. The officers (Engineers) at higher level also inspect the work. If the construction is done through contract the owner's Engineer will also inspect the work so will the inspection be carried out of the Engineers at higher level in the client's organisation.

Inspection will be necessary for checking materials, equipment and method of construction used. It is necessary to approve the intermediate stages of work e.g. approval of foundation, formwork, placement of reinforcement etc. before further work is proceeded with. Inspection is also required after an item of work is completed to check the dimension, level, plumb etc. as per drawing and specification.

Certain stages have to be inspected by Engineers. The supervisor has to arrange for such inspections in advance by requesting the concerned officers to visit the site, inspect the work and give his approval. The date and time of inspection and the observations made by the Engineer should be recorded in the work order book maintained at the site. When such an inspection has to be carried out by the Engineer of the client's organisation the same procedure is followed. Even though the inspections are carried out by various officers at diferent occasions. Supervisor should ensure that work is done as per specifications, drawings (and conditions of contract) by being vigilant constantly.

You should identify the important stages of work and the results to be achieved at that stage and inspect the work regularly. Any deviations noticed should be corrected promptly. This is particularly necessary if you are client's/owner's Supervisor. You should not delay the inspection till such time when defects/deviations if detected can be remedied only by rejecting and redoing the work.

Rejection of works delays the completion of work, adds to the cost of work and embitters the relationship between the client and contractor. All these factors are not conducive to the effective construction management. You should remember in this regard that 'prevention is always better than cure'.

### 1.9.2 Testing

Inspection is almost always accompanied or closely followed by testing. Tests are carried out on the materials of construction, components, (such as mixed concrete), completed parts of the structure or the structure itself. Tests can be classified as

- i) those carried out on the work-site by the Supervisor himself (e.g. silt in sand slump test, moisture content etc.),
- ii) those carried out in the laboratory by sending the samples of materials (e.g. steel bars, concrete cubes),

- iii) Tests carried out on site by experts, in the presence of the supervisor (e.g. non-destructive tests on the built components of the structures,

Supervisor has to prepare a schedule of tests to be carried out in all the above categories. He should ensure that

- a) test schedules are strictly adhered to,
- b) the instruments/equipments are as per standards, they are calibrated and well maintained,
- c) tests are carried out as per procedure laid down in the specifications or as per codes and specifications prescribed by Bureau of Indian Standards.

A record should be maintained showing the details of tests such as date and time of testing, materials or part tested, result of the test.

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## 1.10 CONSTRUCTION SUPERVISOR'S ROLE IN ENSURING PROGRESS

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Perhaps no other matter is as important or of concern to the construction supervisor as that of ensuring progress on the work he is supervising. Maintaining the progress as scheduled means completing the work in the stipulated time. This further means that the cost over run due to time overrun is avoided. What have you to do, as a supervisor, to ensure progress on the construction project ?

- a) Study the construction programme prepared by the project manager/site Engineer.
- b) Prepare detailed programmes to elaborate this schedules and also prepare schedules for organising the resources required for your work.
- c) Make a careful study of the system of compiling and reporting the progress on the work periodically.
- d) Implement the programme of construction closely.
- e) Check the progress achieved and compare it with planned targets. In case of deviations, report the matter to the supervisors and ask for corrective measures. Introduce the corrective measures promptly.

### SAQ 2

- i) Enumerate the responsibilities of a supervisor appointed by a client.
- ii) Mention the important documents which a contractor's supervisor has to maintain on the site.
- iii) What steps will you ensure to maintain the progress on the construction work you are supervising ?

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## 1.11 SUMMARY

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In this unit you have studied different aspects of supervision of construction work. Construction is field work where a large number of people contribute their efforts. Workers who actually do the work have to be guided and their work has to be supervised. Construction supervisor forms the first line manager who acts as link between higher level of management and the field workers.

Construction Supervisor's responsibilities are explained in detail and the qualifications and experience needed to fulfil these responsibilities are also discussed.

A number of agencies are associated with construction work and each agency may have its supervisor. Role played by the supervisor has therefore to be clearly understood to discharge his duties properly.

You have also been acquainted with the Supervisor's role in various aspects of construction viz. planning the work, inspection and testing as well as ensuring the progress.

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## 1.12 KEY WORDS

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<b>First Line Managers</b>	:	The lowest level manager in the management who has to get the work done by skilled and unskilled workers.
<b>Levels of Management</b>	:	Management hierarchy showing the levels of authority and responsibility in an organisation.
<b>Phases of a Construction Project</b>	:	Different stages through which a typical project passess from inception to completion.
<b>Client</b>	:	Owner/user who initiates a projects and enters into a contract with a constructor for construction of the project.
<b>Work Order Book</b>	:	A register maintained on work site in which all the officers (Engineers) record their observations, instructions when they visit the work site.
<b>Requisition</b>	:	Request submitted in the prescribed form for supply of specific resource.

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## 1.14 ANSWERS TO SAQs

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### SAQ 1

- i) Managers generally get the work done by other people. There are different levels of management handling the construction activity particularly large and complex work. Management hierarchy can be broadly categorised as top level, middle level and the first line management. The first line management is in direct contact with workers, guide them and get the work done through them. In construction, supervisors do this function and hence they form the first line Management.
- ii) As mentioned earlier the management levels could be categorised under three levels.
  - a) **Top Level:** On a construction site he may be designated as Project Manager, Construction Manager, or Site Manager. He is overall incharge of the project. He is responsible for organisation of entire project.
  - b) **Middle Level:** This level comprises Field Engineers/ Junior Engineers who report to and get instructions from the Project Manager. They are responsible for a particular function such as concreting work or for all the works in progress in a specific area for large project.
  - c) **Lowest Level:** Supervisors who are in contact with field workers. They report to Field Engineers.Designations of the people of the above levels vary from organisation to organisation.
- iii) A construction project involves creation of structures meant for serving a predetermined purpose of the user. The user initiates a project, the architect/engineer carries out investigations and data collection for preparing designs, drawings, specifications as well as estimates of cost to take up the project for construction.
- iv) Actual construction work can be done by the user by organising the resources required. The method is usually known as departmental method of execution. Alternatively, the user may entrust the construction work to a suitable agency after entering into an agreement. The agency known as contractor agrees to construct the structure in accordance with contract documents and receive payment from the user known as contract method.

### SAQ 2

- i) The main responsibility of client's Supervisor is to ensure that
  - a) Contractor does the work in accordance with the conditions of contract.
  - b) Quality standards and schedules are maintained.
  - c) Regular progress reports are submitted to the client.

- d) Should inform his Engineer about the deviations/variations that become necessary during the course of work.
  - e) Maintain work diaries, work order book etc.
  - f) Arrange for inspection, approvals, supply for working drawings to ensure smooth progress.
- ii)
- a) Set of approved drawings and specifications
  - b) Construction programme
  - c) Important correspondence
  - d) Progress chart
  - e) Registers for material and equipment
  - f) Worker's attendance
  - g) Records of tests
  - h) Work order book
  - i) Record of visitors and any other relevant information
- iii)
- a) Study the construction programme
  - b) Prepare a detailed day to day programme
  - c) Report any deviations/variations to the Engineer and obtain instruction for correction
  - d) Implement the instructions strictly.

