

CONSTRUCTION SURVEYING AND SITE MANAGEMENT

(2015)

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SECTION I

Q₁. Highlight four (4) reasons why site surveys are carried out:

- a. To produce a plan of an area, often with contours
- b. To produce section of the ground
- c. To determine land areas in plan
- d. To determine volumes of earth or water
- e. To set out construction works
- f. To monitor and structural movement
- g. To know the site condition
- h. To determine the elevation of the site
- i. To establish the site boundary
- j. To assess the quality of work done
- k. To determine the bearing capacity of the soil.

Q₂. Give the meaning of the following terms used in surveying and site management:

i) Leveling: It is a technique or operation performed in surveying in order to determine the difference in levels between two points and to establish the points with respect to the assumed ~~data~~ datum or given datum.

ii) Staff management: It is a group of persons in charge of organising, reading, controlling and evaluating any group of person for intended/provided benefit of the company.

(iii) Surveying: It is an art or science of determining relative position of points

below, above the earth's surface by means of direct and indirect measurement of distance, direction, elevation and angles.

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iv) Construction surveying: It is an art of taking out data survey data in construction field stake out reference point and markers that will guide the construction of new structures.
ex: roads, dams, bridges,...

v) Plane surveying: It is an ~~art~~ of surveying for which the surface of the earth is considered as plane surface and the curvature (spheroidal shape) is neglected.

vi) Geodetic surveying or geodesy: is the theory and practice of determining the position of points on the earth's surface and the ~~diam~~ dimensions of areas so large that the curvature of the earth must be taken into account.

vii) Setting out: It is a process of establishing pegs, profiles and levels for excavation and positioning buildings or marking out the position of walls on a floor slab. or It is technique of laying down excavation lines and centreline before starting the excavation.

Q3. What do you understand with the following terms:

a. linear measurement: This is the measurement of length.

b. Reconnaissance: It is the preliminary inspection of the area to be surveyed.

Q4. Differentiate between chaining and chain surveying

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a) Chaining: The operation of measuring distance with the help of chain or tape

b) Chain surveying: It is the method of surveying in which the area is divided into a net work of triangles and the sides of the triangles are measured directly in the field with chains or tape and no angular measurements are taken.

Q5 a) The work of surveying is divided into three parts, name the 3 parts

- Field-work, - office work, - care and adjustment of instruments

b) Discuss briefly each of the three parts named above

(i) Field work: It consists in taking measurements for details, recording field notes and setting out of works

(ii) Office work: It involves preparing maps, plans and sections from data collected in the field and also calculating the area and volumes and designing the various structures.

(iii) Care and adjustment of instrument: The surveyor must be thoroughly familiar with the instruments he/she uses. To test them fix them and adjusting them for proper use.

Q6 State clearly the two main systems of measurements used in surveying works.

(i) M.K.S (Metre, Kilogram, Second) or the metric system

(ii) F.P.S (Foot, Pound, Second) or the British system

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Q7. a) mention the three commonly possible errors found when undertaking chaining in surveying.

(i) Instrumental errors (ii) Natural errors (iii) Personal errors

b) Describe briefly, each of the 3 chaining errors mentioned above.

(i) Instrumental errors: They occur due to faulty adjustments or imperfections of the instruments or devices such as chain or tape may be too long or too short.

(ii) Natural errors: They arise due to variations in phenomenon of nature such as temperature etc.

(iii) Personal errors: They are due to chain or tape not being straight or applying different tension in the chain than the standard one etc or these arise from the limitation of the human senses such as sight, touch and hearing.

Q8. List five instruments used in chain surveying;

(i) Chain (ii) Tapes (iii) Offset rod (iv) Plumb-bobs
(v) Arrows (vi) Ranging rods (vii) Pegs

SECTION II

Q9. The five factors which can determine the accuracy of the surveying works are:

a. Purpose of surveying

b. The nature and size of the work to be surveyed

c. The instruments and methods of observations employed

d. The source of errors

e. The time available

f. The fund available

g. The scale used for plotting.

h. Competence of the surveyor

(i) experience of the surveyor

(ii) environmental conditions

Q10. Highlight clearly five purposes of carrying out reconnaissance on a new site:

1. To determine the suitable field processes on a specific site
2. To help in equipment and materials selection
3. To locate existing surveying control points for plan and level
4. To plan control station positions
5. To plan between the correlation between control and detail work
6. To assess potential problems e.g. obstacles
7. To investigate land ownership
8. To investigate the access to the site
9. To establish the need of man-made features e.g. roads, structures and services

Q11. Explain the following terms used while manipulating a transit theodolite:

- a) Centering: It means setting the theodolite exactly over an instrument-station so that its vertical axis lies immediately above the station mark.
- b) Vertical axis: It is the axis about which the telescope can rotate in the horizontal plan.
- c) Axis of the telescope: It is an imaginary line joining the optical centre of object glass to centre of the eyepiece.
- d) Changing face: It is the operation of bringing the vertical circle to the right of the observer, if originally it is to the left and vice-versa.
- e) Line of collimation: It is also known as line of sight is the line passing through the intersection of the horizontal and vertical cross-hair and the optical centre of the glass and its continuation.

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Q12. Identify the ten parts of a dumpy level :

- | | |
|-------------------|------------------------|
| 1. Levelling head | 5. Focussing screw |
| 2. Telescope | 6. shade |
| 3. eyepiece | 7. longitudinal bubble |
| 4. Diaphragm | 8. level tube nuts |
| | 9. cross bubble tubes |
| | 10. Foot screw. |

Q13

Stations	BS	IS	FS	RISE	FALL	RL	Remarks
A	0.240					107.520	A (TBM)
B		3.450			3.210	104.310	B
C		0.655		2.795		107.105	C
D		0.650		0.005		107.110	D
E		2.290			1.640	105.470	E
-			1.855	0.335		105.805	F
	0.240 - 1.955 ----- - 1.715		1.955	3.135 - 4.850 ----- - 1.715	4.850	105.805 - 107.520 ----- - 1.715	

SECTION C

Q14. Name at least 15 parts in the theodolite below :

- | | |
|----------------------------|---------------------|
| 1. Vertical axis | 11. Vernier A/B |
| 2. Objective | 12. lower plate |
| 3. Telescope | 13. Inner spindle |
| 4. Altitude bubble | 14. Outer spindle |
| 5. Vertical clamping screw | 15. Tribranch |
| 6. Trunnion axis | 16. levelling screw |
| 7. Vertical circle | 17. Trivet |
| 8. eyepiece | 18. Tripod Head |
| 9. Plate level | 19. Tripod leg |
| 10. upper plate | 20. levelling head |

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Q15. Highlight ten (10) satisfaction factors that affect positively construction workers at a site:

- (i) Fair level of salary
- (ii) incentives and financial rewards
- (iii) Salary received on time
- (iv) Good site facilities
- (v) Safe and healthy working conditions
- (vi) Good working conditions
- (vii) Good working relations with supervisors
- (viii) Favourable promotion prospects
- (ix) Good working relations with other workers
- (x) Job security
- (xi) Opportunity to help a friend to get a job in that company
- (xii) Recognized for doing a good job.

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- (xiii) ~~Reasonable~~ Reasonable level of overtime demand
 - (xiv) Competent level supervisor
 - (xv) Reliable job description / specification
 - (xvi) A good type of work
 - (xvii) Challenging tasks with solutions
 - (xviii) Responsibility given reasonably
 - (xix) Good relations with employer
 - (xx) Participation in decision making process.

Q16. Discuss the main purpose of the following building construction team members to show who they are:

- (i) The client: Owner of the land, money and project.
This can be a person or an organization
- (ii) Architect: Responsible for architectural drawings e.g. plans, elevation and perspective
- (iii) Structural engineer: In charge of all structural designs for structural stability
- (iv) Quantity surveyor: Prepares the bill of quantities and preliminary estimate

- (i) Clerk of works: An expert in construction appointed by the client to represent him on the site
- (ii) Main contractor: Enters a contract with the client to implement the project as per the design specification
- (iii) General foreman: Supervises all construction activities on a site for the contractor on small projects, he has a lot of experience
- (iv) Surveyor: Responsible for all site measurement of the land, prepares all site plans, layouts, sets out the building, responsible for all ground leveling
- (v) Site agent: This is the contractor's representative on the site for large projects. He is an expert in construction works.
- (vi) Trades people: These are skilled and experienced in specific trades like masonry, plumbing, carpentry etc.