Welcome

Introduction to Surveying

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Introduction

Course Outlines
- Reconnaissance survey
- Linear Measurements
- Traverse survey
- Plane table survey
- Leveling & contouring
- Calculation of areas and volumes
- Problems on heights & distances
- Curves and curve ranging
- Transition curve
- Vertical curve

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Course Outlines
- Tacheometry
- Astronomical surveying
- Photogrammetry
- Project surveying
- Errors in surveying
- Remote sensing
- Introduction and application of GPS and GIS
- House setting

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Reference Books

2. Surveying (Volume I, II, III) – Dr. B. C. Punmia
4. Surveying & Levelling – N N Basak
5. Surveying & Levelling – S. V. Kulkarni
Introduction

Surveying is the art of determining the relative positions of different features on, above or beneath the surface of the earth by means of direct or indirect measures of distance, direction and elevation and finally representing them on a sheet of paper known as plan or map.

Plans and Map: A plan or map is the graphical representation, to some scale, of the features on, near or below the surface of the earth as projected on a horizontal plan which is represented by plane of the paper on which the plan or map is drawn.

- The representation is called a map if the scale is small, while it is called a plan if the scale is large.
- On a plan, generally, only horizontal distance and directions are shown. On a topographic map, however, the vertical distances are also represented by contour lines, hachure or other systems.
Introduction - Importance of Surveying

- The first necessity of surveying is to prepare a plan and a section of the area to be covered by the project.
- From these prepared maps and sections the best possible alignment, amount of earth work and other necessary details depending upon the nature of the project can be calculated.
- Details of the proposed work are plotted from the filed notes. The reliability of the estimation of quantities and effectiveness of the design depends upon the precision and carefulness exercised during the survey.
Introduction - Importance of Surveying

- Without proper surveying nobody can think of a project like railway, highway, tunneling, irrigation, dams, reservoir, water works, sewerage works, airfields, ports, massive buildings etc.

- Even the measurements of land and the fixation of its boundaries cannot be properly ascertained without undertaking a survey work.

- Surveying promotes a feeling of confidence, a habit of working in groups, neatness and care in documentation, and begin interpersonal relations by way of simultaneous and tactful handling of clients.
Introduction - Classification of Surveying

A. Primary classification: Surveying is primarily classified as:

i. Plane survey: In plane surveying, the curvature of the earth is not taken into account, as the surveys extend over small areas.

- The earth surface is considered as plane; the line connecting any two points as a straight line, and the angles of polygon as plane angles. Plane surveying is done on an area of less than 250 km².
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ii. Geodetic survey: In geodetic surveying, also called trigonometrical surveying, it is necessary to take into account the curvature of the earth, since large distances and areas are covered.

- As the shape of the earth is spherodial, the line connecting any two points on the surface of the earth is curved or is an arc of a great circle.
Introduction - Classification of Surveying

B. Secondary Classification

1. Classification based upon the nature of the field of survey:

a. Land survey:

- Topographical survey: This consists of horizontal and vertical location of certain points by linear and angular measurements and is made to determine the natural features of a country such as rivers, streams, lakes, woods, hills, etc., and such artificial features as roads, railways, towns and villages.
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a. Land survey:
   - Cadastral survey: Cadastral surveys are made incident to the fixing of property lines, the calculation of land area, or the transfer of land property from one owner to another. They are also made to fix the boundaries of municipalities and of state and federal jurisdictions.
   - City Survey: They are made in connection with the construction of streets, water supply systems, sewers and other works.
   - Astronomical survey: The astronomical survey offers the surveyor means of determining the absolute location of any point or the absolute location and direction of any line on the surface of the earth.
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2. Classification based upon the object of survey:
   a. **Engineering survey**: This is undertaken for the determination of quantities or to afford sufficient data for the designing of engineering works such as buildings, roads, and reservoirs, or those connected with sewage disposal or water supply.
   b. **Military survey**: This is used for determining points of strategic importance.
   c. **Mine survey**: This is used for exploring mineral wealth.
   d. **Geological survey**: This is used for determining different strata in the earth’s crust.
   e. **Archaeological survey**: This is used for finding rests of antiquity.
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3. Classification based upon the methods employed in survey:

a. **Triangulation survey**: In this type of surveying, a network of well-defined triangles is formed on the plot of land to be surveyed.

b. **Traverse survey**: It is a type of surveying, in which the plot of land to be surveyed is enclosed by a series of straight lines making angles with one another.
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3. Classification based upon the instrument used:
   a. Chain survey
   b. Theodolite survey
   c. Tacheometric survey
   d. Compass survey
   e. Plane table survey
   f. Photographic survey
   g. Aerial survey
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Uses of Survey

Surveying may be used for the following various applications:

i. To prepare a topographical map which shows the hills, valley, rivers, villages, towns, forests, etc. of a country.

ii. To prepare a cadastral map showing the boundaries of fields, houses and other properties.

iii. To prepare an engineering map which shows the details of engineering works such as buildings, roads, railways, reservoirs, irrigation canals, etc.

iv. To prepare a military map showing the road and railway communications with different parts of a country. Such a map also shows the different strategic points important for the defense of a country.

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Uses of Survey

v. To prepare a contour map to determine the capacity of a reservoir and to find the best possible options for building, roads, railways, etc.

vi. To prepare a geological map showing areas including underground resources.

vii. To prepare an archaeological map including places where ancient relics exist.
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Assignment

- What is reconnaissance survey? Why it is so important? Mention its advantages and disadvantages.

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Thank You!