

Surveying

Surveying: is the art of determining horizontal distances, difference in elevation, direction, angles, locations, areas, and volumes on or near the surface of the earth.

Surveying comprises:

1. Field work: of measuring.
2. Office work: of computing and drawing.

Surveys are made of the purpose:

1. Of establishing the boundaries of land.
2. Of providing information necessary to the construction of engineering works.
3. Of portraying land and water forms for purpose of navigation, mining, construction.

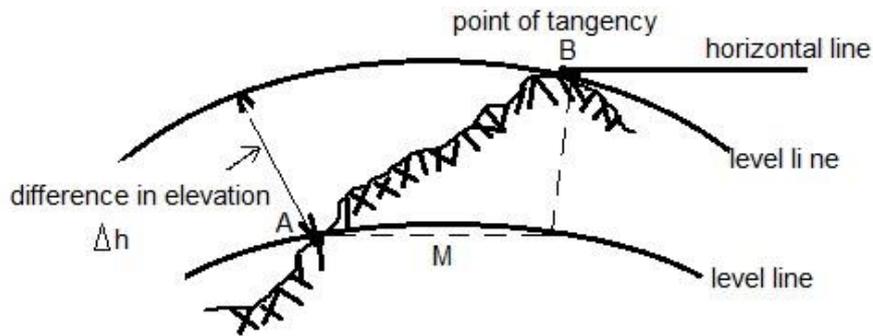
Kind of surveying:

1. **Plane surveying:** in surveying that extends over a relatively small part of the earth's surface, generally the spheroid shape of the earth is neglected and the surface of the earth is considered as a plane.
2. **Geodetic surveying:** in geodetic surveying the shape of earth is taken into account, either approximately by considering the earth as the true sphere or more precisely by considering the earth as an oblate spheroid of revolution.

Definitions:

- **The elevation of point:** its vertical distance above or below arbitrary assumed level surface (datum), usually the datum is taken at mean sea level.

- **Difference in elevation between two points:** is the vertical distance between two level surfaces in which the points lie.
- **A horizontal line:** is a line in surveying taken as straight, tangent to a level surface.
- **M:** be the distance in (k. meters) between A, B.
- **Level line:** is a line in a level surface.



Operations of Surveying

1. **Land surveying:** consists in subdividing land into parcels, reestablishing old obliterated land lines, calculating areas, constructing land maps, and writing descriptions for dead.
2. **Topographic surveying:** consists in securing field data for plotting a map which shows the configuration of the earth's surface and the location of natural and artificial objects.
3. **Route surveying:** consists in determining the ground configuration and location of objects along a proposed line such as that of a high way, railway, canal, or pipeline, establishing the line on the ground ; and calculating volumes of earth work.
4. **Cadastral surveying:** made for the purpose of locating property lines and improvements in detail, primarily for use in connection with the extent, value ownership, and transfer of land, it is applied to the primary control of public-land surveys.

5. **City surveying:** it is applied to the surveying operation, with regard to mapping it area, laying out new street, and constructing streets, sewers, city survey has come to mean a coordinated topographical survey of the area in and near city for use in planning city improvement.
6. **Hydrographic surveying:** has reference to surveying bodies of water for purposes of navigation, water supply, it usually comprises a topographic survey along the shore line, taking and plotting soundings, and observing the change in level of bodies of water .
7. **Mine surveying:** makes use of principles of land, topographic, and route surveying in establishing mineral claims location the mine Structures and underground workings, determining geological formations. And calculating volumes removed.
8. **Photogram metric surveying:** is the application to surveying of the science of measurement by means of photographs taken with specially designed camera either from airplanes or from ground stations, it is employed in the projection of details from the photographs onto maps drawn to scale.

Field work

It consists of:

1. Adjusting instruments and caring for field equipment.
2. Measuring horizontal and vertical distance and angles.
3. Recording the field measurements usually in field notebook.

The field notes consist of:

1. Title.
2. Purpose.
3. The name of members of the party.
4. The date and the weather conditions.
5. Location of the survey; explanatory notes, and sketches.
6. Numerical data.

Ranging the measurement

Direct Ranging:

The operation of fixing points in a straight line, this done before the measurement to lay out a straight line joining the survey station. This method is used for:

1. Fixing point on extending line.

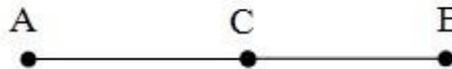
Prolonging a straight line as AB to be prolonged to C. Establishing a succession of stations C, D.

Method:

The ranging pole is set up at A, B, a sight is taken to B, and a point C is established on line beyond B.



2. Fixing point at the intermediate of the line



The ranging pole is set up at A, B, a sight is taken to B, and a point C is established on line beyond A.