

Surveying

Definition: Surveying is the art of making such measurements as will determine the relative position of points on the surface of the earth in order that the shape and extent of any portion of earth's surface may be ascertained and delineated on a map or plan.

Levelling is the art of determining and representing the relative heights or elevations of different points on the surface of the earth. It is the process of determining positions of points in a vertical plane.

Objective of Survey:

- The primary objective of a survey is the preparation of a plan or map.
- The results of surveys when plotted and drawn on paper constitute a plan. (The representation is called a map, if the scale is small, while it is called a plan, if the scale is large). For example, a map of India, a plan of a building).

Classification of Surveys

Surveying may be divided into two general classes, viz.

a) Geodetic and b) Plane

a. Geodetic Surveying Geodetic surveying is also called trigonometrical surveying. In geodetic surveying it is necessary to take into account the curvature of the earth, since large distances and areas are covered. Since the shape of the earth is spheroidal, the line connecting any two points on the surface of the earth is curved.

Such surveys are conducted by Survey of India

b. Plane Surveying In plane surveying curvature of the earth is not taken into account. Here the surveys extend over small areas and the earth's surface is considered as a plane. Thus the line connecting any two points is a straight line.

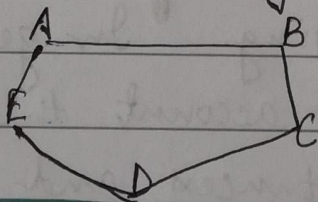
Based upon the two above mentioned methods surveying is of two types: triangulation and traversing.

In triangulation, the area to be surveyed is first divided into a network of triangles.

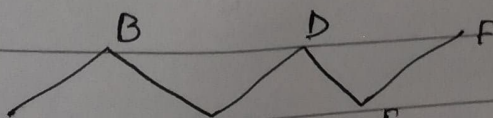
In traversing, the framework consists of a series of connected lines, the lengths and directions of which are progressively measured either in a clockwise or in an anticlockwise direction. Length is measured with a chain or a tape. Direction is measured with an angular instrument.

A traverse may be classed as (a) closed and (b) unclosed or open.

a. Closed traverse A traverse is said to be closed when a complete circuit is made, i.e. when it returns to the starting point forming a closed polygon.



b. Open traverse A traverse is said to be open or unclosed when it does not form a closed polygon. It consists of a series of lines extending in the same general direction and not returning to the starting point.



Instruments used for measurement of Angles

The measurement of angle is useful to determine the directions of a survey line which may be defined either (i) by the horizontal angle between the line and the line adjacent to it, or (ii) by the angle, called the bearing, between the fixed line of reference called the meridian and the line.

The prismatic compass does not measure any horizontal angle between two lines directly, but measures the angles between the magnetic meridian and the line.

The theodolite, on the other hand, measures the angle between two lines directly, and also, the bearing of the line.

Use of Prismatic Compass

The prismatic compass is used for surveys in wooded country, rough traverses, preliminary survey for a road construction.

It is unreliable in places abounding in magnetic rock or iron ore. It is less accurate than a theodolite.

Method of Using Prismatic Compass

Centring: The compass should be centred over the station where the bearing is to be taken by dropping a small piece of stone so that it falls on the top of the peg marking the station.

Levelling: The compass should be levelled by eye, by means of a ball and socket joint so that the ring may swing freely.

Observing Bearing.