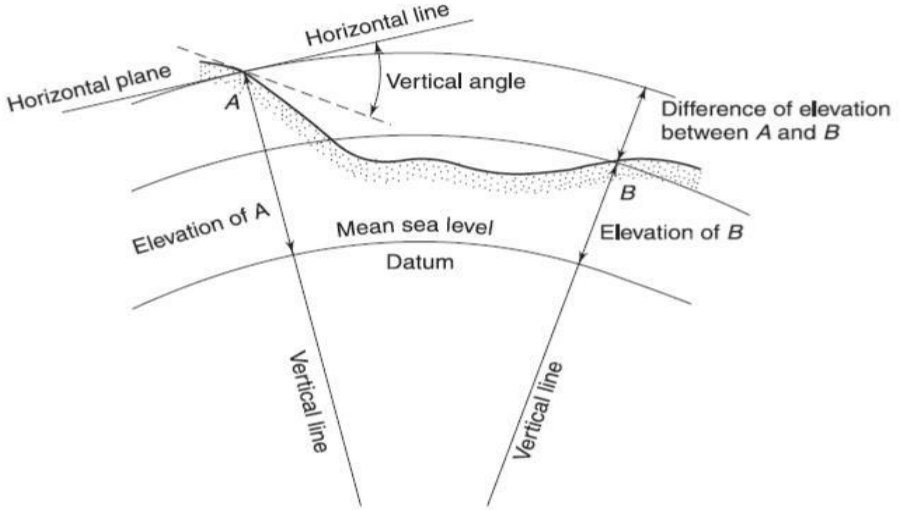
INTROUDCTION

The relative position of a point in terms of the vertical distance, above or below another point is designated by its elevation. The elevation of a point may thus be defined as its vertical distance above or below a reference surface (datum) having zero elevation. Therefore, elevation of a point may be considered as its vertical coordinate. It is treated as positive if the point is above and as negative if the point is below the datum. Grade and altitude are the two terms frequently used as an alternate to the term elevation. Grade is an expression of elevation in construction activities, whereas altitude is the vertical distance of a point in space. Usually, sea level is considered to be the standard datum, but sometimes an arbitrary assumed surface is taken as the reference. The vertical heights of points above or below a datum are referred to as simply levels or reduced levels and the operation of determining the difference of elevation of points with respect to each other on the surface of the earth is called levelling.

DEFINITIONS

Some of the basic terms defined below.



Levelling terms

Levell surface:

A surface parallel to the mean spheroidal surface of the earth is called level surface, e.g., a still lake. A level surface is a curved surface, every point on which is equidistant from the centre of the earth. It is normal to the plumb line at all the points.

Vertical Line:

It is a line from any point on the earth's surface to the centre of the earth. It is commonly considered to be the line defined by a plumb line.

Level line:

It is a line lying on a level surface. It is normal to the plumb line at all the points.

Horizontal Plane:

It is a plane tangential to the level surface at the point under consideration. It is perpendicular to the plumb line.

Horizontal Line:

It is line lying in the horizontal plane. It is a straight line tangential to the level line.

Elevation:

Elevation of a point is the vertical distance above or below the datum. It is also known as reduced level (R.L.).

Axis of telescope:

It is a line joining the optical centre of the objective to the centre of the eyepiece.

Line of sight:

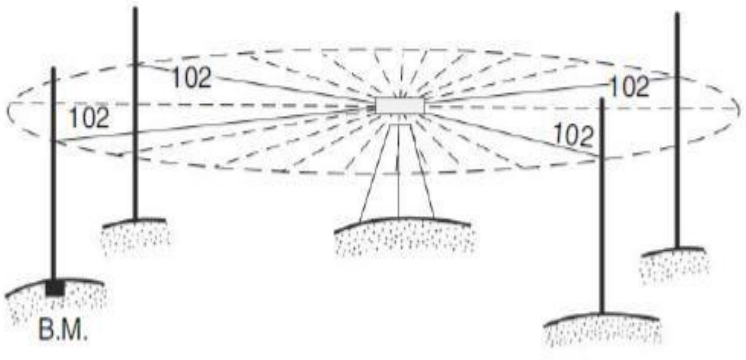
It is a line joining the intersection of the cross-hairs to the optical centre of the objective and its continuation. Since in levelling the line of sight should remain horizontal while making the sights, the line of sight when horizontal is called the line of collimation.

Bubble tube:

It is an imaginary line tangential to the longitudinal curve of the tube at its mid-point.

Height of Instrument:

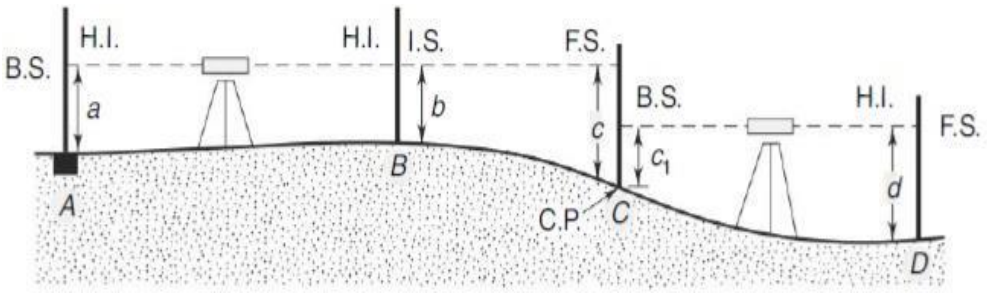
It is the elevation of the plane of collimation when the instrument is levelled, e.g., the height of the instrument is 102 m in Fig. It should be noted that the height of an instrument does not mean the height of the centre of the telescope above the ground, where the level is set up.



Height of the Plane of Collimation

Back sight:

It is a staff reading taken on a point of known elevation, e.g., a sight on a bench mark (station A) or on a change point, i.e., station C. In Fig. and c1, are back sights. It is the first staff reading taken after the level is set up. It is also called plus sight.



Measurement of sight with level

Fore sight:

It is a staff reading taken on a point whose elevation is to be determined, e.g., a sight on a change point, i.e., station C and D. In Fig. c and d are fore sights. It is also called a minus sight. It is the last staff reading and denotes the shifting of the level.

Intermediate Sight:

It is a staff reading taken on a point of unknown elevation between backsight and foresight, e.g., a sight on station B. In Fig. b is the intermediate sight.

Change Point:

It is a point, denoting the shifting of the level. Both F.S. and B.S. are taken on this point e.g., station C (Fig.).

Station:

A point, whose elevation is to be determined is called station. The staff is kept at this point, e.g., A, B and C (Fig.). It is the apparent movement of the image relative to the crosshairs when the image formed by the objective does not fall in the plane of the diaphragm.