

# Types of Surveying

Surveying is a very crucial branch of civil engineering. Depending on the requirement, various types of surveying has been evolved. To understand surveying fully one must know details of these surveying types.

Surveying is the technique of determining the relative position of different features on, above or beneath the surface of the earth by means of direct or indirect measurements and finally representing them on a sheet of paper known as plan or map.

According to the American Congress on Surveying and Mapping (ACSM),

Surveying is the science and art of making all essential measurements to determine the relative position of points or physical and cultural details above, on, or beneath the surface of the Earth, and to depict them in a usable form, or to establish the position of points or details.

# Types of Surveying

Surveying can mainly be classified into 2 groups-

- **Plane Surveying**
- **Geodetic or Trigonometrical Surveying**

## Plane Surveying

Plane surveying deals with small areas on the surface of the earth assuming the surface of the land to be plane. So curvature of the earth is neglected. Plane surveying can further be subdivided in the following ways:

### Chain Surveying

- Area to be surveyed is divided into a number of triangles
- The length of the sides are measured and the interior details recorded
- Whole are then plotted on a drawing sheet to a suitable scale to produce the map

### Traverse Surveying

- The plot of the plan is enclosed by a series of straight lines making angles with each other.
- The length of the lines and angles are measured and plotted with details on a drawing paper to a suitable scale to produce the map

## Plane Table Surveying

- The observations and plotting are done simultaneously
- An art paper or sheet is fixed on a calibrated plane table
- The field observations are taken and recorded side by side on the paper and eventually the map is prepared.

## Ordinary Leveling

- The elevations of different points on the earth surface are determined.
- Provides all the elevation data needed for construction activities

## Geodetic Surveying

Geodetic surveying deals with vast areas, so curvature has to be considered. Geodetic surveying can be subdivided in the following ways:

### Triangulation

- A network of well-defined triangles is formed on the plot of land to be surveyed.
- One of the lines is considered as the baseline, all other lines and angles are then measured accordingly.

### Reciprocal Leveling

- Used in leveling across streams, gullies, and other obstructions to eliminate instrumental errors
- Level readings are taken from two setups at two different points
- The difference in levels between two sites with obstructions is determined through this survey

## Tacheometry or Stadia Surveying

- A telescopic sight instrument is used to measure distances
- It incorporates a theodolite controlled by an operator and a level staff held by another surveyor at a distance.
- Both vertical and horizontal distances are computed through stadia (the two horizontal markings on a theodolite) readings

## Astronomical Surveying

- The meridian, azimuth, latitude, longitude, etc. of the plot to be surveyed is determined with the help of celestial bodies.

## Photographic surveying

- Maps are prepared from photographs taken from suitable camera stations; the stations can be even airplanes.
- The output is a map, a drawing or a 3D model of some real-world scene or object.

