



DEPARTMENT OF CIVIL ENGINEERING
SURVEY LABORATORY

Surveying is the science and art of determining the relative positions of points above, on, or beneath the earth's surface and locating the points in the field. The work of the surveyor consists of 5 phases:

1. Decision Making – selecting method, equipment and final point locations.
2. Fieldwork & Data Collection – making measurements and recording data in the field.
3. Computing & Data Processing – preparing calculations based upon the recorded data to determine locations in a useable form.
4. Mapping or Data Representation – plotting data to produce a map, plat, or chart in the proper form.
5. Stakeout – locating and establishing monuments or stakes in the proper locations in the field.

Different categories of Surveying:

1. Plane Surveying – surveying with the reference base for fieldwork and computations are assumed to be a flat horizontal surface.
2. Geodetic Surveying – surveying technique to determine relative positions of widely spaced points, lengths, and directions which require the consideration of the size and shape of the earth. (Takes the earth's curvature into account.)

The following survey can be performed in the laboratory:

1. Plane Table Surveying
2. Auto Level Levelling
3. Dumpy Level Levelling
4. Chain Surveying
5. Total Station Surveying
6. Theodolite Surveying
7. Digital Global Positioning System Surveying (DGPS) etc.

The detailed descriptions of the equipment are listed below:

1. Plane Table Surveying:

Plane table surveying is a graphical method of the survey in which the field observations and plotting are done simultaneously. It is simple and cheaper than the Theodolite survey but it is mostly suitable for the small-scale survey.



Plane Table

2. Auto Level Levelling:

Leveling or leveling is a branch of surveying, the object of which is to establish or verify or measure the height of specified points relative to a datum. An auto level is an optical instrument that can be used to establish or verify points on the same horizontal plane, and it has an internal mechanism that eliminates variation and inaccuracy from measurements.



Auto Level

3. Dumpy Level Levelling:

Dumpy level is a commonly used leveling instrument to locate the points in the same horizontal plane. It is also called an automatic level or builder's level. Elevations of different points and distance between the points of the same elevation can be determined by dumpy level.



Dumpy Level

4. Chain Surveying:

The chain survey is the simplest method of surveying. In the chain survey, only measurements are taken in the field, and the rest work, such as plotting calculation, etc. are done in the office. Here only linear measurements are made i.e., no angular measurements are made. This is most suitably adapted to small plane areas with very few details. If carefully done, it gives quite accurate results.



Chain Survey

5. Total Station Surveying:

A total station is a surveying instrument that uses the data generated by radar and digital receivers to provide both distance and height measurements over a land survey. They are used with GPS precision in a vertical position, horizontal distance, and angular geometry.



Total Station

6. Theodolite Surveying:

This instrument is really needed for building construction work. In the field of civil engineering, workers need this to measure each and all works that can be done in proper ways. Theodolite uses for many purposes, but mainly it is used for measuring angles, and scaling points of construction works. For example, to determine highway points, huge buildings' escalating edges theodolites are used. Depending on the job nature and the accuracy required, theodolite produces more curved readings, using paradoxical faces and swings or different positions for perfect measuring survey.



Theodolite Survey

7. Digital Global Positioning System Surveying (DGPS) :

The Differential Global Positioning System (DGPS) service transmits correction signals to GPS navigation equipment on board vessels. The DGPS service improves the accuracy of your GPS position and the quality of the signal.

Differential Global Positioning System (DGPS) is an enhancement to Global Positioning System that provides improved location accuracy, from the 15-meter nominal GPS accuracy to about 10 cm in case of the best implementations. • DGPS refers to using a combination of receivers and satellites to.



Digital Global Positioning System (DGPS)