

Surveying, the first step of starting a new civil engineering project, is a very important branch of civil engineering. To understand the techniques of surveying a student must carefully study the basics of it. To start learning surveying one must start with the definition of surveying and its importance.

What is Surveying?

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.

Surveying also includes the technique of establishing points by predetermined angular and linear measurements. From the plans, sections, and maps prepared by surveying, the area and volume of a particular plot of land can be calculated. A map represents the horizontal projection of the area surveyed and not the actual area. But the vertical distance can be represented more correctly by drawing sections.

During a survey, surveyors use various tools to do their job successfully and accurately, such as total stations, GPS receivers, prisms, 3D scanners, radio communicators, digital levels, [dumpy level](#) and surveying software etc.

To understand the full scope of surveying, you can watch the following youtube video.

Importance of Surveying

The knowledge of surveying is advantageous in many phases of engineering. Surveying is of vital importance in any engineering project. Some of the basic importance of Surveying is discussed below.

- The first necessity in surveying is to prepare a plan and a section of an area to be covered by the project. From these prepared maps and sections the best possible alignment, amount of earthwork and other necessary details depending upon the nature of the project can be calculated.
- The planning and design of all [Civil Engineering](#) projects such as railways, highways, tunneling, [irrigation](#), dams, reservoirs, waterworks, sewerage works, airfields, ports, massive buildings, etc. are based upon surveying measurements.
- During execution of the project of any magnitude is constructed along the lines and points established by surveying.
- The measurement of land and the fixation of its boundaries cannot be done without surveying.
- The economic feasibility of the engineering feasibility of a project cannot be properly ascertained without undertaking a survey work.
- The execution of [hydrographic](#) and oceanographic charting and mapping requires.
- Surveying is used to prepare a [topographic map](#) of a land surface of the earth.

