



## **Surveying and Prismatic compass survey by S. Manna, Department of Geography, Narajole Raj College**

**Surveying** is relatively large-scale, accurate measurements of the Earth's surfaces. It includes the determination of the measurement data, the reduction and interpretation of the data to usable form, and, conversely, the establishment of relative position and size according to given measurement requirements. Thus, surveying has two similar but opposite functions: (1) the determination of existing relative horizontal and vertical position, such as that used for the process of mapping, and (2) the establishment of marks to control construction or to indicate land boundaries.

Surveying has been an essential element in the development of the human environment for so many centuries that its importance is often forgotten. It is an imperative requirement in the planning and execution of nearly every form of construction. Surveying was essential at the dawn of history, and some of the most significant scientific discoveries could never have been implemented were it not for the contribution of surveying. Its principal modern uses are in the fields of transportation, building, apportionment of land, and communications.

Except for minor details of technique and the use of one or two minor hand-held instruments, surveying is much the same throughout the world. The methods are a reflection of the instruments, manufactured chiefly in Switzerland, Austria, Great Britain, the United States, Japan, and Germany. Instruments made in Japan are similar to those made in the West

### **CLASSIFICATION BASED ON INSTRUMENTS.**

1. **CHAIN SURVEY:** This is the simplest type of surveying in which only linear measurements are made with a chain or a tape. Angular measurements are not taken.
2. **COMPASS SURVEY:** In Compass Survey, the angles are measured with the help of a magnetic compass.
3. **CHAIN AND COMPASS SURVEY:** In this survey linear measurements are made with a chain or a tape and angular measurements with a compass.
4. **PLANE TABLE SURVEYING:** It is a graphical method of surveying in which field works and plotting both are done simultaneously.



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5. **THEODOLITE SURVEY:** In theodolite survey the horizontal angles are measured with the theodolite more precisely than compass and the linear measurements are made with a chain or tape.
6. **TACHOMETRY SURVEY:** A special type of theodolite known as tachometer is used to determine horizontal and vertical distances indirectly.
7. **LEVELING SURVEY:** This type of survey is used to determine the vertical distances (elevations) and relative heights of points with the help of an instrument known as level.
8. **PHOTOGRAMMETRIC SURVEY:** Photogrammetry is the science of taking measurements with the help of photographs taken by aerial camera from the air craft.
9. **EDM SURVEY:** In this type of survey all measurements ( length, angles, co-ordinates) are made with the help of EDM instrument ( i.e.. Total Station).

### **CLASSIFICATION BASED ON METHODS**

1. **TRIANGULATION:** Triangulation is basic method of surveying, when the area to be surveyed is large, triangulation is adopted. The entire area is divided into network of triangles.
2. **TRAVERSING:** A Traversing is circuit of survey lines. It may be open or closed. When the linear measurements are done with a chain and a tape and the directions or horizontal angles are measured with a compass or a theodolite respectively the survey is called traversing.

### **3. CLASSIFICATION BASED ON PURPOSE**

1. • **GEOLOGICAL SURVEY:** In this both surface and subsurface surveying are conducted to locate different minerals and rocks. In addition, geological features of the terrain such as folds and faults are located.

2. • **MINE SURVEY:** Mine Survey includes include both surface and underground surveys. It is conducted for the exploration of mineral deposits and to guide tunneling and other operations associated with mining.



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3. • **ARCHAEOLOGICAL SURVEY:** It is conducted to locate relics of antiquity, civilization, kingdoms, forts, temples, etc.

4. • **MILITARY SURVEY:** It has a very important and critical applications in the military. Aerial surveys are conducted for this purpose. It is conducted to locate strategic positions for the purpose of army operations.

### **4. CLASSIFICATION BASED ON NATURE OF FIELD**

1. • **LAND SURVEY:** Land Survey is done on land to prepare plan and maps of a given area. Topographical, city and cadastral surveys are some of the examples of land surveying. □

2. • **HYDROLOGICAL SURVEYING:** This survey is conducted on or near the body of water such as lake, river, coastal area. This Survey consists of locating shore lines of water bodies.

3. • **ASTRONOMICAL SURVEY:** This survey is conducted for the determining of latitudes, longitudes, azimuths, local time, etc. for various places on earth by observing heavenly bodies.

4. • **AERIAL SURVEY:** An aerial survey is conducted from aircraft. Aerial cameras take photographs of the surface of the earth in overlapping strips of land. This is also known as photographic survey.

### **Prismatic compass survey**

Prismatic compass surveying is the types of surveying prismatic compass are used to measure the angles known as bearing and the distance are measured measuring tape.

It is small and portable usually carried on the hand. This prismatic compass is one of the two main kinds of magnetic compasses include in the collection for the purpose of measuring magnetic bearing, with the other being the surveyor's compass.



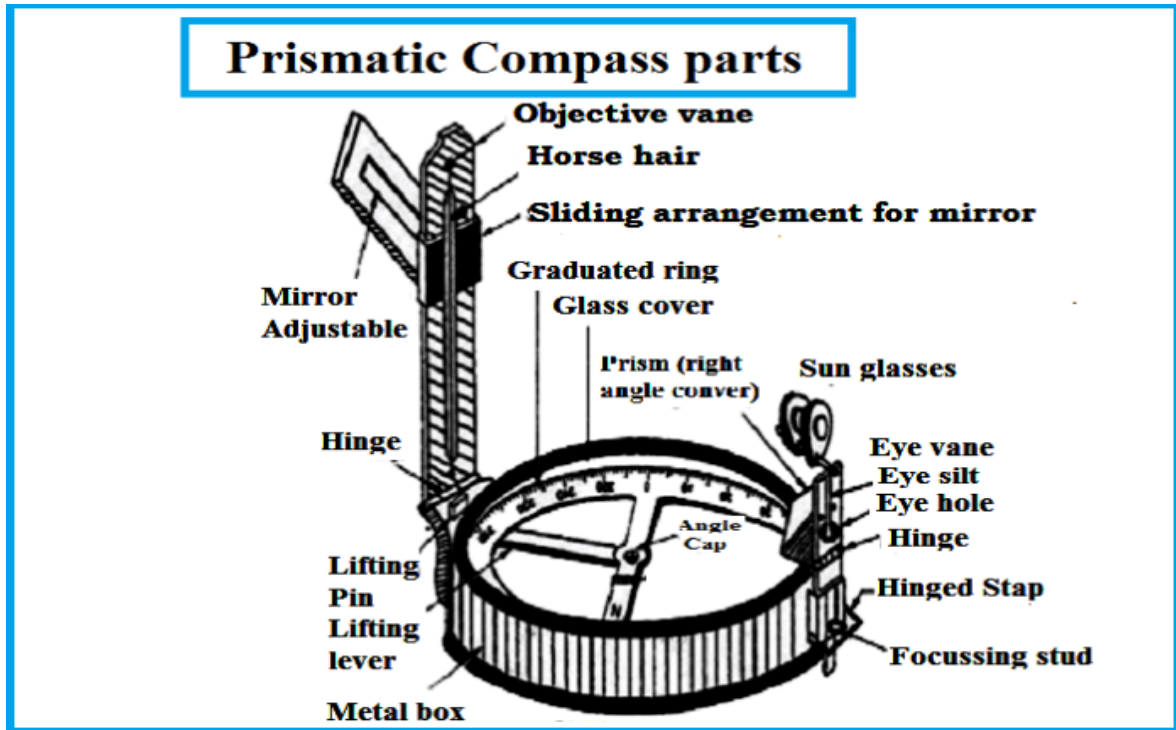
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The main difference between the two instruments is that the surveyor's compass is usually larger and the more accurate instrument is generally used to stand on a tripod.

- The prismatic compass on the other hand is often in a small instrument which is held in the hand for observing and therefore employed on the rougher classes of work.
- The graduation on this prismatic compass is situated on a light aluminum ring fastened to the needle and the zero of the graduation coincide with the south point of the needle the graduation, therefore, the remains stationary with the needle, and the index turn with the sighting vanes.
- The circle is read the observer end the graduation run clockwise from the south end of the needle.
- The prismatic attachment consists of a 45 degree reflecting prism with the ice and reading faces made slightly convex so ass to magnify the image of the graduation.
- The prism is carried out a mounting which can be moved up and down between slides fixed on the outside of the case.
- The purpose of this up and down movement is to provide an adjustment for focusing.
- The image of the graduation is seen through a small circular aperture in the prism mounting and immediately above this aperture is a small v cut on top on the mounting over which the vertical wire in the front vane may be viewed.
- The mirror located in front of the forward vane slide up and down the vane and hinged to fold flat over it or to rest inclined at any angle with it.
- This mirror is used for soler observations or for viewing any very high object and is normal fitting to a compass.



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Prismatic compass parts

- **CYLINDRICAL METAL BOX**

The cylindrical box having a diameter 8 to 12 cm protects the compass and from the entire casting or body of the compass.

- **PIVOT**

The pivot is provided at the center of the compass and supports a freely suspended magnetic needle.

- **MAGNETIC NEEDLE**

The magnetic needle is the heart of the instrument. This needle measures angle of a line from the magnetic meridian as the needle always remains pointed towards the north-south pole at two ends of the needle when freely suspended on any support.

- **GRADUATION CIRCLE**

This is an aluminum graduated ring marked with 0 degrees to 360 degrees to measure all possible bearing of lines, and attached with a magnetic needle.



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- **PRISM**

Prism is used to read graduation on the ring and to take an exact reading by compass. It is placed exactly opposite to object vane. The prism hole is protected by a prism cap to protect it from dust and moisture.

- **OBJECT VANE**

The object vane is diametrically opposite to the prism and eye vane. The object vane carries horsehair or black thin wire to sight the object in line with the object sight.

- **EYE VANE**

An eye vane is a fine slit provided with the eye hole in the bottom to bisect the object from sight.

- **GLASS COVER**

It covers the instrument box from the top such that the needle and graduated ring is seen from the top.

- **SUNGLASSES**

These are used when some luminous object are to be bisected.

- **REFLECTING MIRROR**

It is used to get an image of an object located above or below the instrument level while bisection is placed on the object vane.

- **SPRING BREAK**

To damp the oscillation of the needle before taking a reading and to bring it to rest quickly the light spring break attached to the box is brought in contact with the wedge of the ring by gently pressing in with the brake pin.

### **Uses of prismatic compass**

This mirror is used for solar observations, or for viewing any very high object, and is not a normal fitting to a compass.

The two circular discs in front of the back vane are dark glasses which can be swung in front of the vane when solar observations are being taken.



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**Advantages of Prismatic compass**

The greatest advantage of a prismatic compass is that both sighting the object as well as reading the circle can be done simultaneously without changing the position of the eye. The circle is read at the reading at which the hairline appears to cut.