

LECTURE 16

THE PRISMATIC COMPASS



This is an instrument used for the measurement of magnetic bearings. It is small and portable usually carried on the hand. This Prismatic Compass is one of the two main kinds of magnetic compasses included in the collection for the purpose of measuring magnetic bearings, with the other being the Surveyor's Compass. The main difference between the two instruments is that the surveyor's compass is usually larger and more accurate instrument, and is generally used on a stand or tripod.

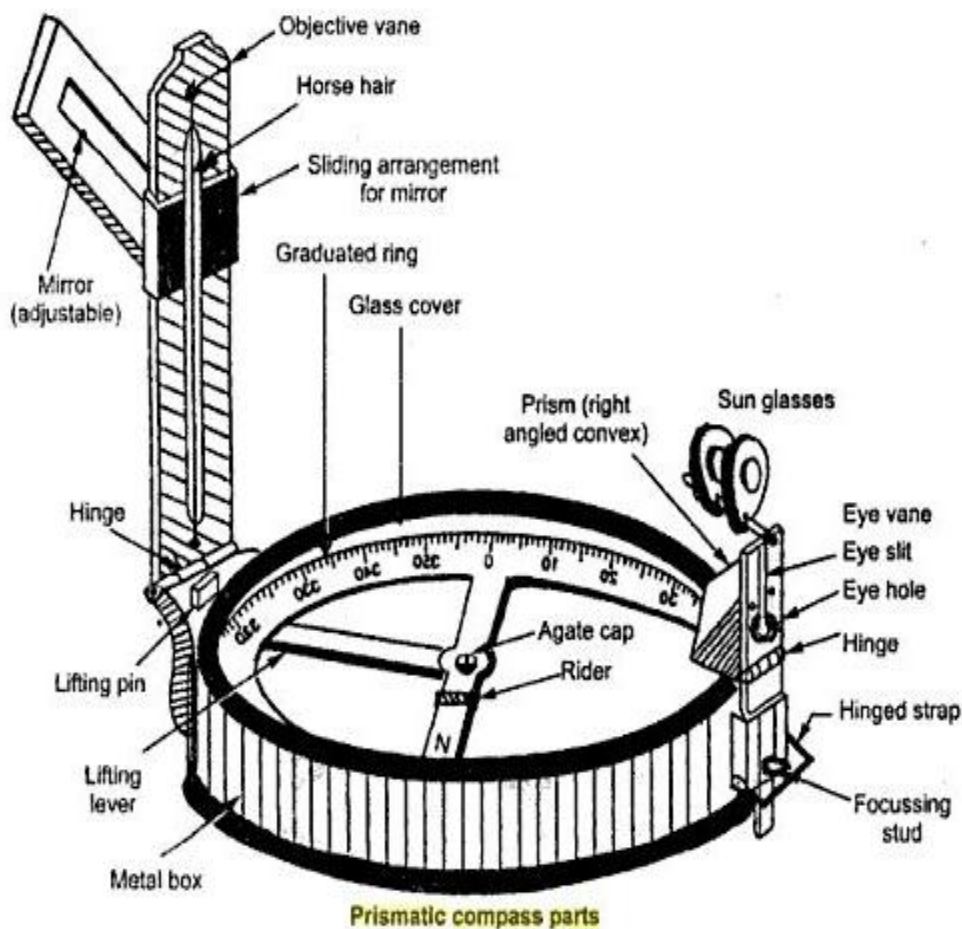
- The prismatic compass on the other hand is often a small instrument which is held in the hand for observing, and is therefore employed on the rougher classes of work. The graduations on this prismatic compass are situated on a light aluminum ring fastened to the needle, and the zero of the graduations coincides with the south point of the needle. The graduations therefore remain stationary with the needle, and the index turns with the sighting vanes. Since the circle is read at the observer's (rather than the target's) end, the graduations run clockwise from the south end of the needle (0° to 360°), whereas in the surveyor's compass, the graduations run anti-clockwise from north.
- The prismatic attachment consists of a 45° reflecting prism with the eye and reading faces made slightly convex so as to magnify the image of the graduations. The prism is carried on 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 graduations is seen through a small circular aperture in the prism mounting, and immediately above this aperture is a small V cut on

top of the mounting, over which the vertical wire in the front vane may be viewed. Using the V cut, the vertical wire and the station whose bearing is required are viewed in one line, the bearing is directly read off the graduated arc at the point immediately underneath the vertical wire.

- The mirror located in front of the forward vane slides up and down the vane, and is hinged to fold flat over it or to rest inclined at any angle with it. 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.

COMPONENTS OF A PRISMATIC COMPASS

Prismatic compass consists of a non-magnetic metal case with a glass top and contain the following:



Elements of prismatic compass

- ⊙ **Cylindrical metal box:** Cylindrical metal box is having diameter of 8 to 12 cm. It protects the compass and forms entire casing or body of the compass. It protects compass from dust, rain etc.

- ⊙ **Pivot**: pivot is provided at the center of the compass and supports freely suspended magnetic needle over it.
- ⊙ **lifting pin and lifting lever**: a lifting pin is provided just below the sight vane. When the sight vane is folded, it presses the lifting pin. The lifting pin with the help of lifting lever then lifts the magnetic needle out of pivot point to prevent damage to the pivot head.
- ⊙ **Magnetic needle**: Magnetic needle is the heart of the instrument. This needle measures angle of a line from magnetic meridian as the needle always remains pointed towards north south pole at two ends of the needle when freely suspended on any support.
- ⊙ **Graduated circle or ring**: This is an aluminum graduated ring marked with 0° to 360° to measure all possible bearings of lines, and attached with the magnetic needle. The ring is graduated to half a degree.
- ⊙ **Prism** : prism is used to read graduations on ring and to take exact reading by compass. It is placed exactly opposite to object vane. The prism hole is protected by prism cap to protect it from dust and moisture.
- ⊙ **Object vane**: object vane is diametrically opposite to the prism and eye vane. The object vane is carrying a horse hair or black thin wire to sight object in line with eye sight.
- ⊙ **Eye vane**: Eye vane is a fine slit provided with the eye hole at bottom to bisect the object from slit.
- ⊙ **Glass cover**: it covers the instrument box from the top such that needle and graduated ring is seen from the top.
- ⊙ **Sun glasses**: These are used when some luminous objects are to be bisected.
- ⊙ **Reflecting mirror**: It is used to get image of an object located above or below the instrument level while bisection. It is placed on the object vane.
- ⊙ **Spring brake or brake pin**: to damp the oscillation of the needle before taking a reading and to bring it to rest quickly, the light spring brake attached to the box is brought in contact with the edge of the ring by gently pressing inward the brake pin