Practical No: 04 **Measure Fore Bearing and Back Bearing of survey lines of open traverse using Prismatic Compass.**

I. Practical Significance:

Chain and cross staff surveying can be used for small and fairly flat areas but in case of large area it become essential to use some sort of instruments which helps to observe the angles and directions of lines. These horizontal angles can be observed by using prismatic compass.

II. Industry/Employer expected outcome(s):

- Determine the angle of survey line on ground.

III. Course Level Learning Outcome (COs):

- CO 2- Undertake cross staff and compass survey for the given field.

IV. Laboratory Learning Outcome (LLO):

- LLO 4.1 Determine bearing using Prismatic Compass.

V. Relevant Affective Domain related Outcome(s):

- Using Safe behaviors effectively.
- Maintain high standards of hygiene.
- Efficient application of tools, equipment's and machinery.
- Professional and ethical standards.

VI. Relevant Theoretical Background:

Bearing of line is the horizontal angle made by the line with reference to the north direction. Bearing observed in the progress of survey work and in the opposite of survey work are known as fore bearing and back bearing respectively. The fore and back bearing of line shows the difference of $\pm$ 180 degree when it is free from the nearby presence of magnetic substances. The instrument which is used to measure the bearing is known as prismatic compass.

VII. Required resources/equipment.

Sr. No.	Resource required	Particulars	Quantity
01	Prismatic compass with stand	As per IS standard	1 nos
02	Metric chain	30m	1 nos.
03	Metallic tape	30m	1 nos
04	Ranging rods	2m length	5 nos
05	Pegs	Wooden	1 nos
06	Arrows	GI wired	4 nos

VIII. Precautions to be followed:

1. Fix the prismatic compass exactly over the station.
2. Temporary adjustment of the prismatic compass should be done precisely.
3. The graduated aluminum ring should float freely.
4. Bearing should observe and record carefully.

IX. Procedure:

1. First collect the all instruments as per mentioned in point no VIII from the survey lab.
2. Fix the prismatic compass over Station A.
3. The following steps of temporary adjustment of prismatic should follow before observing the baring of line AB.

   Centering: It is the process of keeping the instrument exactly over the station. For this drop the small piece of stone from the underneath of compass so that it will fall exactly over the peg fixed on the station point.

   Levelling: It is the process of keeping the compass in level by using the ball and socket arrangement provided at the top of tripod stand. When graduated aluminum ring is started to swing freely the instrument is said to be levelled.

   Adjustment of prism: It is the process of focusing the prism by moving up and down of its vertical run to ensure that readings are clearly visible.
4. Fix the ranging rod at station B.
5. Turn the prismatic compass until the ranging rod of station B is get bisected by the horse hair of object vane.
6. After that when needle and graduated ring stop the oscillation observe the bearing of line which is fore bearing of line AB and note the same accurately.
7. Then shift the compass over station B repeat the procedure followed over station A and observe the bearing of line AB which is back bearing of line AB.
8. Record the reading accurately.
9. Return back the instrument to survey store.

X. Observation Table:

Sr. No.	Station	Line	Length (m)	Fore Bearing	Back Bearing	Difference (FB-BB)=+180
		AB		68° 15'	248° 15'	180°
		BC		148° 45'	326° 15'	177° 30'
		CA		224° 30'	46°	178° 30'

XI. Results:

- Fore Bearing and Back Bearing of line AB respectively are 68° 15' & 248° 15'
- Line AB is having exact 180 degree.

XII. Interpretation of results:

using a prismatic compass we find out force bearing and back bearing of line which is excet match 180°

XIII. Conclusions:

Force Bearing and back bearing of survey line AB is exact 180°

XIV. Practical Related Questions:

1. Why don't we observe the FB & BB with respect to South?
2. Explain error in compass survey.

Space for Answer

Q. 1 ⟶ ?

Ans:- In surveing, we typically don't observe fabric and back bearings with respect to south because the standard practice is two always reffrence bearings to true north as the base direction. meaning all bearings are measured clockwise from the north point, making it easiar to calculate and plot direction accurately on a map: therefore, taking a map as north is the universally accepted reffrence point for direction.

Q. 2 ⟶ ?

Ans:- An error in a compass survey occurs when the magnetic needle of the compass does not accurately point to magnetic north due to external influences like nearby magnetic objects (like power lines, metal structures) variations in the earth's magnetic field (didination) impoper instrument handling or human error in reading the compass, leading to accurate measurments of bearings and directions during a survey.

XV. Assessment Scheme

Sr. No.	Performance Indicators	Weightage	Marks Obtained
A.	**Process Related (15 marks)**	**60%**	
1.	Handling of equipment's & Survey Conduction	40%	
2.	Accuracy in length measurement.	20%	
B.	**Product Related (10 marks)**	**40%**	
3.	Conclusion of practical	20%	
4.	Practical Question Answer	20%	
C	**Total marks (25 marks)**	**100%**	