LAB EXERCISE - 4

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OBJECTIVE :

The primary goal of this lab is to :

→ Learn the principle of working with a EDMI.

→ Understand the concept of horizontal and vertical angle measurement as well as distance measurement.

INTRODUCTION :

In this lab we explore the practical application of EDMI. for measuring horizontal distance between two points on the ground. These are surveying instruments that combine electronic theodlites and distance meters. The experiment's context lies in enhancing our understanding of surveying techniques and trigonometry applied to real world scenarios.

EQUIPMENT / TOOLS / DATA USED :

- EDMI and Total stations
- Prism target with bipod
- Surveying rod
- Observation data collected in the field.
- Pegs

PROCEDURE

The experimental procedure involved the following steps :

1) Centering and levelling the EDMI at the designated point.

2) Setting a reference direction (Hz angl = 0° 0′ 0″)

3) Placing prism target at A and B and measuring the sloping distances.

4) Measuring horizontal and vertical ~~sto~~ angle using EDMI.

CALCULATIONS / MEASUREMENTS:

SNo	(Horizontal Angle) HA	VA	SD (m)	HD (m)	VD (m)
1.	0° 00′ 00″	89° 39′ 58″	29.289	29.288	0.171
	87° 30′ 25″	89° 30′ 32″	25.796	25.795	0.221
	Horizontal angle = 87° 30′ 25″				
2	359° 59′ 58″	89° 47′ 46″	29.305	29.305	0.104
	87° 25′ 08″	89° 41′ 31″	25.799	25.798	0.139
	Horizontal angle = 87° 25′ 10″				
3.	(272° 29′ 14″) *(360+)	89° 39′ 30″	29.288	29.288	0.175
	87° 30′ 34″	89° 30′ 32″	25.796	25.795	0.221
	Horizontal angle = 87° 30′ 34″				
4	87° 25′ 13″	89° 41′ 21″	25.799	25.799	0.140
	277° 30′ 43″	89° 38′ 10″	29.296	29.295	0.186
	Horizontal angle = 87° 25′ 31″				
5	87° 30′ 04″	89° 41′ 34″	25.798	25.798	0.138
	0° 0′ 0″	89° 48′ 07″	29.300	29.300	0.101

Horizontal angle = 87°30'04"

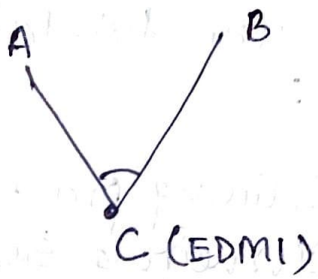
6.

272° 31' 45"	89° 41' 52"	29.305	29.305	0.103
0° 0' 0"	89° 41' 35"	25.794	25.798	0.138

Horizontal angle = 89° 28' 15"

$AC_{Average} = 25.797\ m$

$BC_{Average} = 29.297\ m$



$\angle ACB_{Average} = 87°28'16.83"$

Standard deviation for AC = 0.00158 m

Standard deviation for BC = 0.00710 m

Standard deviation for ∠ACB = 2.31"

To calculate distance AB,

Applying cosine formula,

$$AB^2 = AC^2 + BC^2 - 2(AC)(BC)(\cos(\angle ACB))$$

Setting the values,

$\Rightarrow \boxed{AB = 38.172\ m}$

RESULT

The horizontal distance AB with 95% confidence interval = 38.172m

CONCLUSION

Through this lab, we achieved the learning objective by:

- Gaining practical experience in using EDMI for surveying task.
- Understanding the importance of proper instrument setup and measurement technique
- Applying trignometric principles to calculate horizontal distance based on angle and taking measurements.

COMMENTS AND FEEDBACK:

- The lab provided valuable hands on experience
- Encountered challenges involving maintaining accurate centering and levelling of EDMI.