Theodolite

Experiments

HYDROGEOLOGY LAB

CENTRE OF EXCELLENCE IN WATER RESOURCES ENGINEERING

UET, LAHORE

Experiment no. 1: Determination of elevation of points by tacheometric surveying

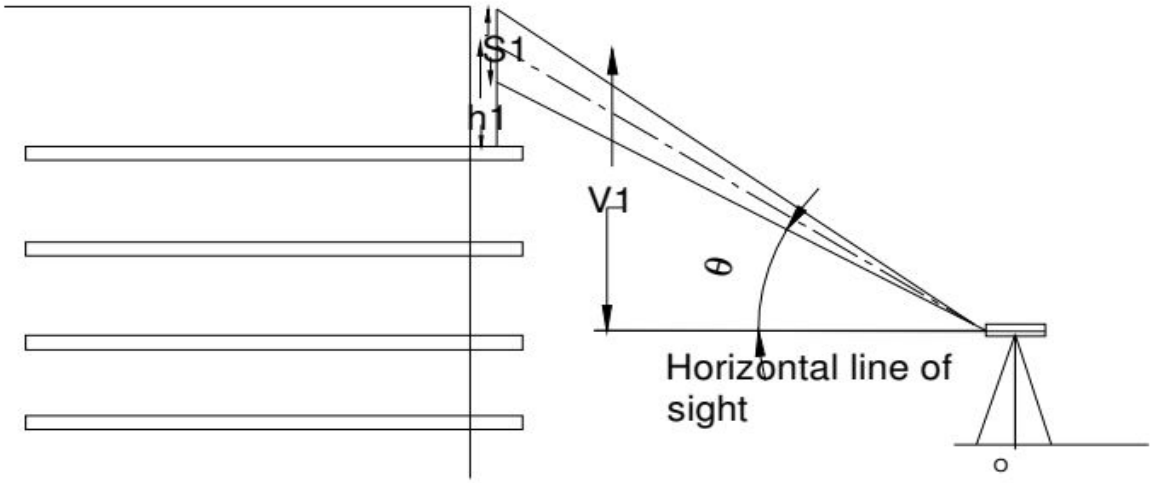
PURPOSE:

The purpose of this job is to find the reduced levels of different points above or below the ground surface.

INSTRUMENT/ ACCESSORIES USED:

Transit Theodolite with tripod stand

Leveling staff



$$V = KS \frac{Sin\ 2\theta}{2} + c \sin \theta$$

Procedure:

- Set up the instrument in such a way that all the point should be visible from the instrument station.
- Carryout the temporary adjustment and set vernier zero reading making line of sight horizontal.
- Take the first staff reading on Benchmark and determine height of instrument.
- Sight the telescope towards the staff station whose R.Ls are to be calculated.
- Measure the angle on vernier if line of sight is inclined upward or downward and also note the three crosshair readings.

- Determine the R.Ls of various points by calculating the vertical distance.

OBSERVATIONS & CALCULATIONS:

Instrument station	Staff station	Vertical angle	Stadia hair Reading			Remark
			Top	Center	Bottom	
A	BM	$00^0 00'00''$				R.L.= 100.00m
	G.Floor					
	First Floor					
	Second Floor					
	Third Floor					

- Reduced level of ground floor = RL of BM + BS on BM + V1- h1=
- Reduced level of 1st floor = RL of BM + BS on BM + V2- h2 =
- Reduced level of 2nd floor = RL of BM + BS on BM + V3- h3 =
- Reduced level of 3rd floor = RL of BM + BS on BM + V4- h4 =

RESULT:

- RL of staff station P = ……..
- RL of staff station Q = ……..

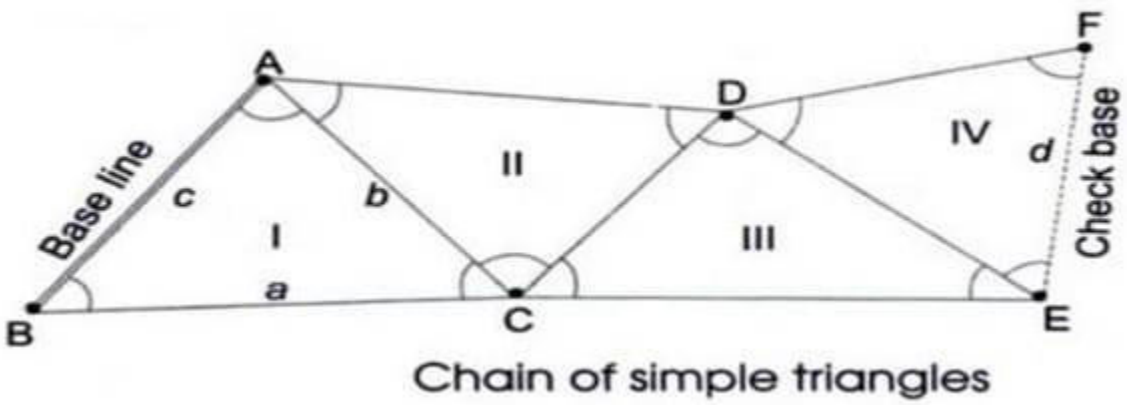
Experiment no.2: Measurement of area of closed traverse by triangulation method

PURPOSE

The purpose of this job is to determine area of field having irregular boundary.

APPARATUS:

- Transit Theodolite.
- Ranging Rods.
- Measuring tape



Chain of simple triangles

PROCEDURE:

- First of all we measure base line.
- Let "A, B, C, D, E, and F" be the given field whose Area is to be calculated.
- Fix the Rods at A, B, C, D, E and F.
- Divide the area into triangles.
- Measure two angles of a triangle by theodolite then use sine law to find lengths of remaining sides.
- Calculate the area of the triangles by using Hero Formula.
- The sum of all the areas of the triangles to get the required area.

OBSERVATIONS & CALCULATIONS:

Area of triangle = $[s(s-a)(s-b)(s-c)]^{1/2}$

Where $S = (a+b+c)/2 \rightarrow$ a, b and c are the sides of a triangle.

Line	Length (m)
AB	
BC	
CD	
DE	
EA	
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RESULTS:

Area of closed traverse =