MIT World Peace University

Basic Civil Engineering
First Year B. Tech, Trimester 3
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Study and Use of Auto Level, and Finding RL using Digital Level

Experiment No. 2 and 3

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EXPERIMENT – 2, 3

(*) **Aim:**

→ To find R.L of at least 15-20 points by using collimation plane method and rise and fall method.

(*) **Theory:**

(1) **Line of Collimation:**

Imaginary line joining intersection of cross hairs of ~~diaphragm~~ diaphram to center of object glass and its continuation.

(2) **Axis of Telescope:** Line joining optical center of object glass and center of eyepiece.

(3) **Axis of bubble:**

Straight line tangential to the longitudinal curves ~~at~~ of the level tube at the center of the tube, when telescope is perfectly horizontal.

(4) **Vertical Axis:** Axis about which the telescope can be rotated in a horizontal plane.

(5) **Adjustment of dumpy Level**

A. **Permanent adjustment:**

nbow

1. Bubble must be perpendicular to vertical axis
2. Horizontal cross hair must lie perpendicular to vertical axis.
3. Line of sight must be parallel to axis of bubble tube.

D. Temporary adjustment

1. Setting up the load.
2. Focusing Eye piece and object glass.

(*) Observations And Calculations;

station	B.S	I.S	F.S	Height (m)	R.L	Remark.
1	1.195			H.I = 501.195	500	BM
2		1.536			499.659	
3		2.080			499.195	
4		2.490			498.705	
5		2.850			498.345	
6	1.565		1.7605	500.995	499.43	CP
7		1.289			499.706	
8		1.300			499.695	
9		1.570			499.61	
10		1.385			499.826	
11		1.690			499.826	
12			1.310		499.685	

Arithmatic check: $\Sigma BS - \Sigma FS = RL_L - RL_F$

$\Rightarrow 2.76 - 3075 = -0.315$

$= 499.685 - 500 = -0.315$] (equal)

Rainbow

Finding RL levels using Rise and Fall method.

Station	B.S	I.S	F.S	Rise (+)	Fall	RL
1	1.195					500
2		1.536			0.343	499.659
3		2.080			0.462	499.195
4		2.490			0.49	499.705
5		2.850			0.36	498.345
6	1.565			1.085		499.43
7		1.289		0.276		499.706
8		1.300			0.011	499.695
9		1.570			0.27	499.61
10		1.395		0.185		499.61
11		1.690		0.216		499.826
IL			1.310		0.141	499.685

$\Sigma BS = 2.76$;

$\Sigma FS = 3.075$;

$\Sigma Rise = 1.762$;

$\Sigma Fall = 2.077$;

$\Sigma BS - \Sigma FS = -0.315$

$\Sigma Rise - \Sigma Fall = -0.315$

$RL_{Last} - RL_{First} = -0.315$

} equal.