HEIGHT OF INSTRUMENT METHOD



Methods of Reducing Levels

Height of Instrument Method

• This method consist of finding H.I. for every setup of instrument, and then obtaining the R.L. of point of reference with respect to H.I

Height of Instrument Method



Station	B.S	I.S	F.S	H.I	R.L	Remark
А	0.9			100.9	100.00	B.M
В		1.1			99.800	
С	1.450		1.05	101.3	99.850	C.P.
D			1.550		99.750	

- The following staff readings were observed successively with a level the instrument is moved by **third, sixth and eighth readings.**
- 2.228 :1.606 :0.988 :2.090 :2.864 :1.262 0.602 :1.982
 :1.044 :2.684 m
- enter the reading in record book and calculate R.L. if the first reading was taken at a **B.M of 432.383m**

H.I. Method

Station	B.S	1.8	F.S	HI	RL	REMAR KS
1	2.228			434.612	432.384 M	B.M.
2		1.606			433.006	
3	2.090		0.988	435.714	433.624	3 RD C.P.
4		2.864			432.850	
5	0.602		1.262	435.054	434.452	6 th C.P
6	1.044		1.982	434.116	433.072	8 th C.P
7			2.684		431.432	
	5.964		6.916			

CHECK Σ B.S- Σ F.S = 5.964-6.916= -0.952 = LAST R.L-FIRST R.L= 431.432-432.384=-0.952

The following readings were taken with a dumpy level and 4m leveling staff. The instrument was shifted after 3rd and 6th readings. The readings are 2.665, 3.225, 2.905, 1.85, 0.98, 2.62, 1.585, 0.96, 0.425. m Enter the above readings in a page of level book and calculate R.L. of points, if the first reading was taken with a staff held on B.M. of 240 m. use rise and fall method. Apply arithmetic checks

HI Method

Station	B.S.	I.S.	F.S	HI	RL	Remarks
А	2.665			242.665	240.00	BM
В		3.225			239.44	
С	1.85		2.905	241.61	239.76	3 rd CP
D		0.98			240.63	
Е	1.585		2.62	240.575	238.99	6 th CP
F		0.96			239.615	
G			0.425		240.15	
CHECK	\sum BS- \sum FS				L.RL –F. RL	
	6.1		5.95			
	\sum BS- \sum FS= 0.15				L.RL –F. RL	= 0.15

 The Following observations were taken with dumpy level and 4 m leveling staff. The instrument were shifted after the 4th and 7th reading. The first reading was taken on a bench mark whose R.L. was 15.575 m. prepare a page of level book and calculate RL of all the points. The observations were taken at every 30 m interval. Use H.I. Method. Observations are: 0.565, 1.250, 1.675, 3.695, 0.125, 2.345, 0.500, 1.785, 2.535.

Observations are: 0.565, 1.250, 1.675, 3.695 (CP),0.125, 2.345, 0.500 (CP), 1.785, 2.535.

Station	B.S.	I.S.	F.S	HI	RL	Remarks
А	0.565			16.14	15.575	BM
В		1.250			14.89	
С		1.675			14.46	
D	0.125		3.695	12.565	12.44	СР
Е		2.345			10.22	
F	1.785		0.500	13.85	12.065	СР
G			2.535		11.315	
CHECK	Σ	∑BS-∑FS			L.RL –F. RL	
	2.47		6.73			
	\sum BS- \sum FS= -4.26				L.RL –F. RL	= -4.255

GRADIENT

- Gradient of line AG = Diff of RLs Length
- Gradient of line AG = 4.260180



= 1 in 42.25 Gradient.

The following readings are taken on continuous falling ground with staff of 4 m the are 0.4 m, 0.765, 1.270, 2.56, 3.22, 3.95, 0.390, 1.690, 3.5, 0.8, 1.920, 2.45, 3.98. Enter the reading in the page of level book and calculate the RLs of all point if the first reading was taken on **Benchmark of 100m**.

0.400, 0.765, 1.270, 2.560, 3.220, 3.950, 0.390,1.690,3.500,0.800,1.920, 2.450,3.980 (Continuous Sloping Ground) 4m staff

Station	B.S.	I.S.	F.S	HI	RL	Remarks
А	0.400			100.4	100.00	BM
В		0.765			99.635	
С		1.270			99.13	
D		2.560			97.84	
E		3.220			97.18	
F	0.390		3.950	96.84	96.45	СР
G		1.690			95.15	
Н	0.800		3.500	94.14	93.34	СР
Ι		1.920			92.22	СР
J		2.450			91.69	
Κ			3.98		90.16	
\sum	1.59		11.43			
CHECK	\sum BS- \sum FS=	= -9.84 m			L.RL –F. RL	= -9.84 m

- The following consecutive readings were taken with a level and a 4m staff at a common interval of 30m; The first reading was taken at B.M. having R.L. =100m. The instrument were shifted after the 4th and 9 th readings. Rule out a page of a level book, enter the readings given and also calculate the reduced levels of the points by the collimation method. Also apply arithmetic checks.
- Consecutive readings are: 2.650, 1.745, 0.625, 0.260, 2.525, 2.160, 1.235, 0.870, 1.365, 0.625, 1.790, and 2.535.

Consecutive readings are: 2.650, 1.745, 0.625, 0.260 (CP), 2.525, 2.160, 1.235, 0.870, 1.365 (CP), 0.625, 1.790, and 2.535.

Station	B.S.	I.S.	F.S	HI	RL	Remarks
А	2.65			102.65	100 m	BM
В		1.745			100.905	
С		0.625			102.025	
D	2.525		0.260	104.915	102.39	СР
Е		2.160			102.755	
F		1.235			103.68	
G		0.87			104.045	
Н	0.625		1.365	104.175	103.55	СР
Ι		1.79			102.385	
J			2.535		101.64	
K	5.8		4.16			
Σ						
CHECK	\sum BS- \sum FS=	= 1.64 m			L.RL –F. RL	= 1.64 m

EXAMPLE

• The following consecutive readings were taken with a level and a 4m leveling staff on a continuously sloping ground at a common interval of 30 m on line AB.

Chainag e	0	30	60	90	120	150
Level	0.585	0.930	1.95	2.845	3.645	3.93
Station	Α					В

The reduced level (RL) of station A is 50.00. Calculate the reduced levels at all the points where the leveling staff is placed. Tabulate the results and apply usual checks. Also determine the gradient of line AB.

EXAMPLE (HI Method)

Station	B.S.	I.S.	F.S	HI	RL	Remarks
A (0 m)	0.585			50.585	50.00	BM
B (30 m)		0.930			49.655	
C (60 m)		1.950			48.635	
D (90 m)		2.840			47.745	
E (120 m)		3.645			46.94	
F (150 m)			3.930		46.655	
G (180 m)						
CHECK		\sum BS- \sum FS			L.RL –F. RI	- _
	0.585		3.930		3.345	
	\sum BS- \sum F	S= -3.345 m			L.RL –F. RI	L= 3.345 m





