Tishk International University

Civil Engineering Department

Practical part

Report -1-

PROFILE AND CROSS SECTION LEVELING

CONTENTS

1. Introduction

Profile leveling: The process of determining elevations at points at short measured intervals along a fixed line is called Longitudinal or profile leveling.

Cross sectioning: It is a method of leveling to know the nature of Ground on either side of the centerline of the proposed route. Levels are taken at right angles to the proposed Direction of the road end at suitable distances and leveling is carried out along this cross Section.

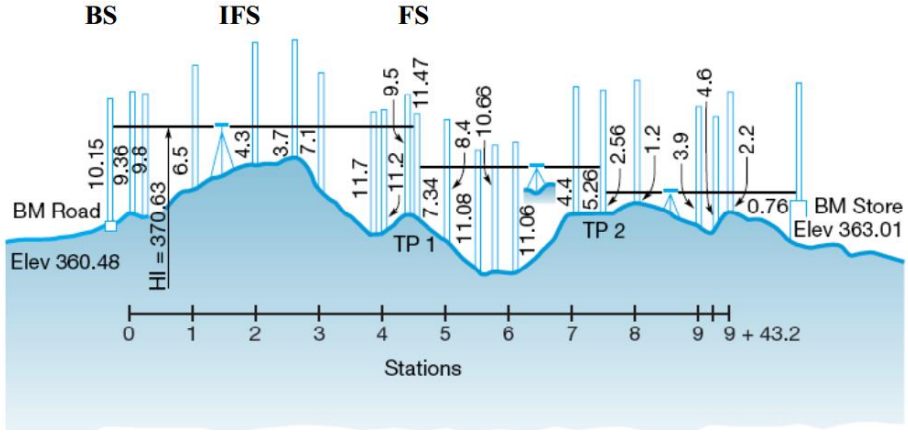
During location and construction of highways, Rail tracks sewers and canals strakes or other marks are placed at various aligned points and the undulation of the ground surface along a predetermined line is adjoined. The line of section may be A single straight lines changing directions.

Levels are taken at right angles to the proposed direction of the road end at suitable distances and leveling is carried out along this cross section.

Cross section are the sections run at right angles to the centerline and on the either side of it for the purpose. They are taken at each 10,m station on the centerline.

The length of cross section depends upon the nature of the work if cross sections are short they are set square out by edge. If long they are set out by the Optical square, box sextant or theodolite.

They are serially numbered from the beginning of the centerline and are taken simultaneously with the longitudinal section they may be taken at the hand level, level or theodolite



1. Objective

To find elevation of longitudinal and transverse stations for making profile and cross sections as well as finding a suitable grade for the profile leveling.

2. Apparatus Used

a) Level Instrument

b) Staff

c) Pegs

d) Tape

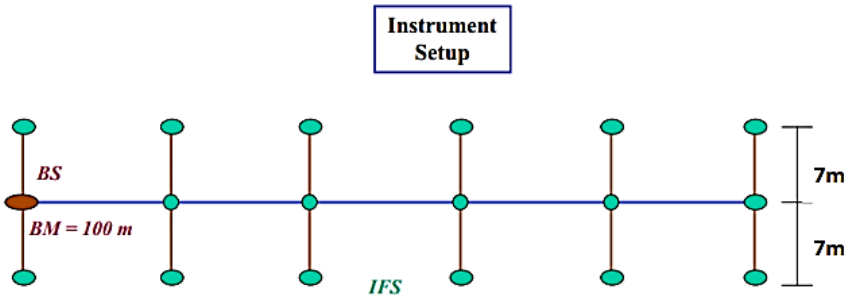
3. Procedure

- Fix the stations for the centerline 10m each from 0+00 to 01+00 by measuring tape.
- Then for each station mark 5R, 10R, 5L and 10L perpendicular to the longitudinal line.
- Instrument level is setup at convenient positions near bench mark.
- First sight of B.M (point of known elevation) is taken and reading is entered in back Sight column.
- If distance is large instrument is shifted, the instrument becomes turning point (or) changing point.
- After setting up instrument at new position, performing temporary adjustment and Take back sight as turning point.
- Thus turning point will have both back sight and fore sight readings.

- Take readings for near stations and enter the readings in intermediate column.
- Then take another turning point and shift to new location for other stations.
- Lock the leveling operation by returning to the first point (BM).
- Readings are entered in a tabular form given below and Reduced levels are calculate by height of instrument method .

4. Calculations and Results

Setup the instrument 40 to 50 m from your initial BM and take a BS and Intermediate Fore Sights (IFS) of each of the 20 m stations and the associated cross sections.

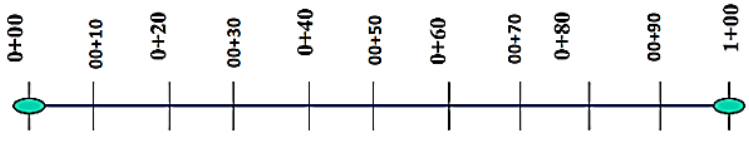


HI = BM + BS

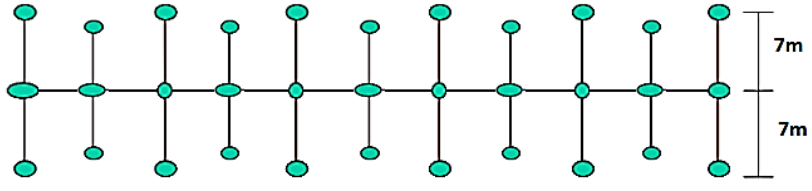
Elev. = HI - IFS

5. Calculations and Results

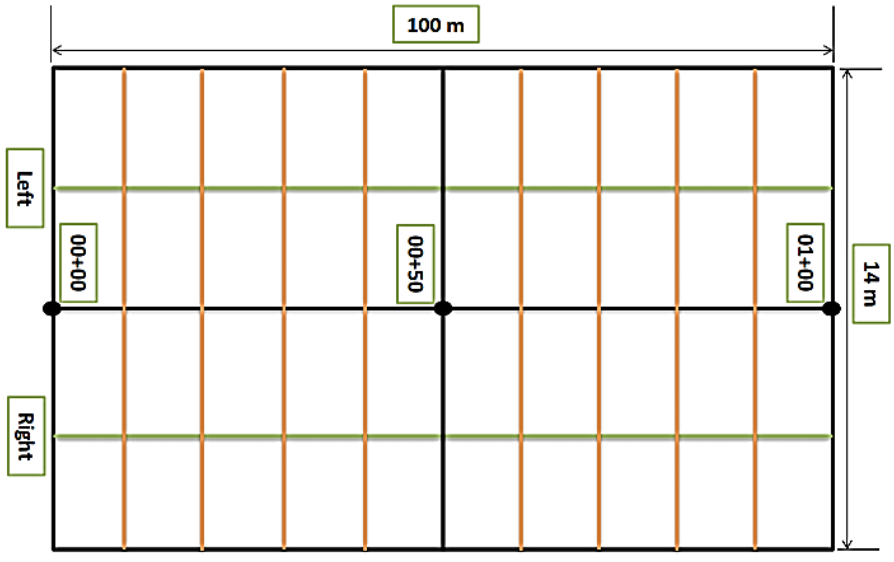
Layout a 100 m long straight line (starting at your starting point) and mark out stations by **10m** intervals along it.



Mark out the reference line at 10 m wide cross section perpendicular to the line at each of the 20 m stations.



5. Calculations and Results



5. Calculations and Results

- Reduce the levels by the height of Instrument and (Rise and Fall) methods and apply appropriate checks. (Simple and Full checks)
- Draw the design line with a appropriate grade.
- Find slope or (gradient) or (percentage grade) for the designed line.
- Plot cross section at all stations.
- Compute the values of the height of embankment and depth of cutting.

6. Discussions and Conclusions

???

7. Data Sheet

Point	Distance	Station	B.S.	I.S.	F.S.
A			1		
1	0	00+00		2	
2		3.5R		3	
3		7R		4	
4		3.5L		5	
5		7L		6	
6	10	00+10		7	
7		3.5R		8	
8		7R		9	
9		3.5L		10	
10		7L		11	
11	20	00+20		12	
12		3.5R		13	
13		7R		14	
14		3.5L		15	
15		7L		16	
16	30	00+30		17	
17		3.5R		18	
18		7R		19	
19		3.5L		20	
20		7L		21	

7. Data Sheet

21	40	00+40		22	
22		3.5R		23	
23		7R		24	
24		3.5L		25	
25		7L		26	
26	50	00+50	28		27
27		3.5R		29	
28		7R		30	
29		3.5L		31	
30		7L		32	
31	60	00+60		33	
32		3.5R		34	
33		7R		35	
34		3.5L		36	
35		7L		37	
36	70	00+70		38	
37		3.5R		39	
38		7R		40	
39		3.5L		41	
40		7L		42	

7. Data Sheet

41	80	00+80		43	
42		3.5R		44	
43		7R		45	
44		3.5L		46	
45		7L		47	
46	90	00+90		48	
47		3.5R		49	
48		7R		50	
49		3.5L		51	
50		7L		52	
51	100	01+00		53	
52		3.5R		54	
53		7R		55	
54		3.5L		56	
55		7L			57