

FE 308 - Lecture 7 – Leveling

Leveling and Elevations

Definitions:

Leveling -

Level surface –

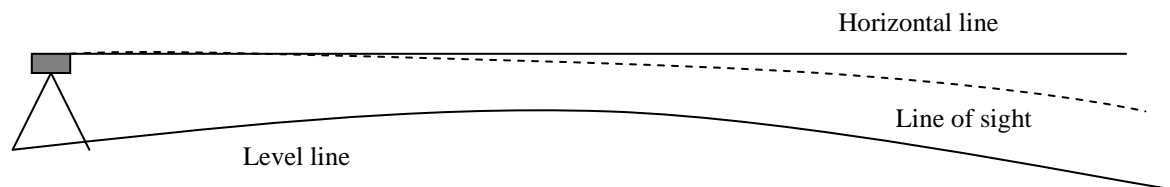
Horizontal line -

Vertical datum –

Bench mark –

Vertical control –

Line of Sight



The line of sight is refracted downward approximately $1/7$ (14%) of the deflection between the horizontal and the level lines.

Types of Leveling

- 1.
- 2.
- 3.
- 4.
- 5.

Profile and Differential Leveling

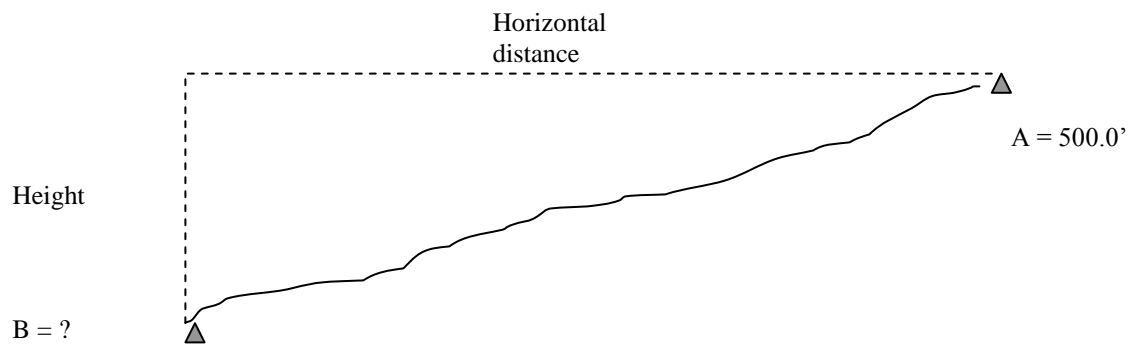
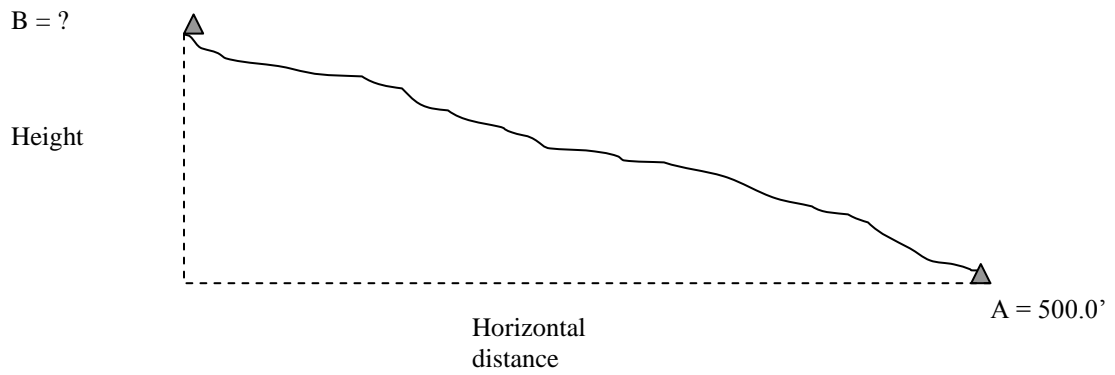
Used to determine ground profiles and elevations for forest operations and planning

- Road maintenance for grade changes
- Skylines for deflection clearance
- Preliminary route design for major breaks
- General landform

Equipment used

- Clinometer or Abney (profile leveling)
- Tape or other distance measurement device (profile leveling)
- Hand level and grade rod

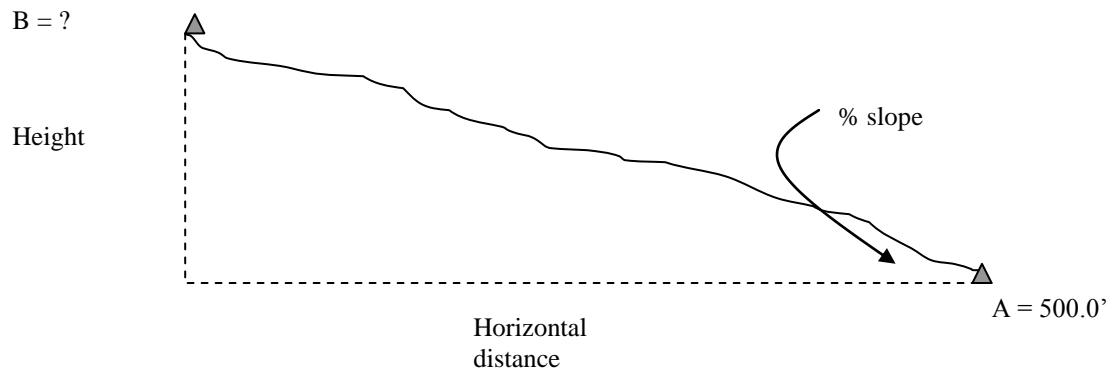
Elevation can be thought of as the difference in height between a known point and an unknown point.



Methods for Profile Leveling

Clinometer or abney

The clinometer or abney may be used to determine the % angle between two points of interest

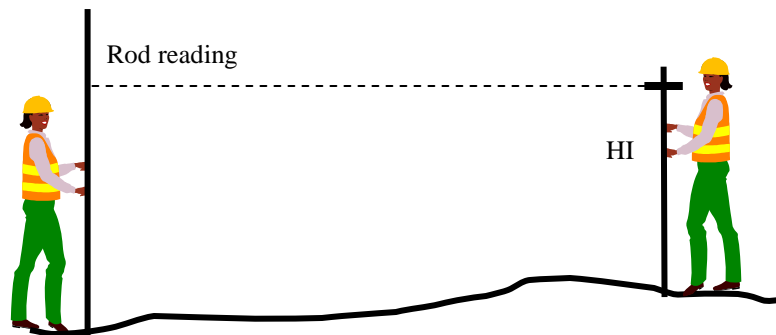


Example 1

Example 2

Differential Leveling with Hand Level

The hand level and grade rod may be used to determine the height difference between two points of interest directly. The hand level uses the concept of a height of instrument reading subtracted from a grade rod reading.



Example 1

Example 2

Notes for profile leveling with a clinometer

STA	SD	%	HD	BRD FWD	ELEV
1+94.3					
	56.5	-26	54.7		
1+39.6					
	41.0	-8	40.9		
0+98.7					
	53.0	+23	52.0		
0+46.7					
	47.0	+12	46.7		
0+00					500.0

Notes for differential leveling with a hand level

STA	HD	HI	Rod	Brg ahd	ELEV
1+94.3					
	54.7	5.2	9.1		
1+39.6					
	40.9	5.2	7.3		
0+98.7					
	52.0	5.2	2.7		
0+46.7					
	46.7	5.2	1.3		
0+00					500.0