

Civil and Environmental Engineering Department
College of Engineering – Majmaah University

4- Determination of the Tachometric Constants

Surveying II – CE 371

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Student Name:

Section No.:

2018-19-3

Fieldwork # 4

Determination of the Tachometric Constants

Objectives:

1. To determine the instrument multiple constant (K) and the instrument additive constant (e) of a theodolite used for tacheometric measurements.
2. Ability to conduct a field experiment to determine the constants practically.

Problem:

If the two constants of an instrument (K and e) are unknown, These can be computed from field observation by adopting the following procedure.

Equipment and Tools:

1. Theodolite
2. Tripod
3. Leveling rod
4. Pags
5. 30 or 50 m – tape

Procedure:

1. Set up the tacheometer at any station say A on a flat ground.
2. Select another point say B about 100 m away. Measure the distance between A and B accurately with a precise tape. Then, drive pegs at a uniform interval; say 20 m, along AB. Mark the peg points as 1, 2, 3 and last peg -4 at station B.
3. Keep the staff on the peg-1, and obtain the staff intercept $s_1 = (u_1 - l_1)$
4. Likewise, obtain the staff intercepts say s_2 , when the staff is kept at the peg-2,
5. Note: The line of sight is made horizontal by setting vertical readings at $90^\circ 00' 00''$ or $270^\circ 00' 00''$
6. Two known distances say (50 m and 100 m) are sufficient to calculate the constants as follows:

$$D1=K (u1 - l1) + e \dots\dots\dots (1)$$

$$D2=K (u2 - l2) + e \dots\dots\dots (2)$$

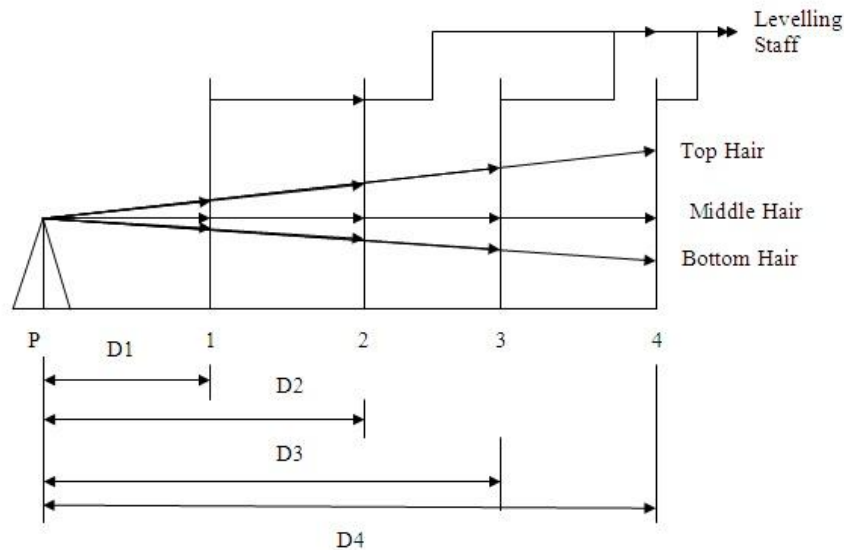
In this case:

$$D1 = 50 \text{ m}$$

$$D2 = 100 \text{ m}$$

And the unknowns are K and e

Solve equations (1) and (2) to get K and e



7. Form another set of observations to the pegs 3 & 4, Simultaneous equations can be obtained from the staff intercepts s_3 and s_4 at the peg-3 and point B respectively. Solving those equations, determine the values of K and e again say K_2 and e_2 .
8. The average of the values obtained in steps (5) and (6), provide the tacheometric constants K and e of the instrument.

Data Presentation:

Submit a report containing the following”

1. A table of stadia measurements and computed constants.
2. A plot of the field work

Tabulation

S.No.	Distance D (m)	Stadia Hair Reading (m)		Equations
		Upper	Lower	
1	D1 = 50			
2	D2 = 100			

Result: The tacheometric constant of the given instrument are determined:

- Multiplying Constant K =
- Additive Constant e =

Check

S.No.	Distance D (m)	Stadia Hair Reading (m)		Equations
		Upper	Lower	
3	D3 = 20			
4	D4 = 40			

Result: The tacheometric constant of the given instrument are determined:

- Multiplying Constant K =
- Additive Constant e =