

Civil and Environmental Engineering Department
College of Engineering – Majmaah University

3- Tachoemetry Measurements

Surveying II – CE 371

Dr. SaMeH

Student Name:

Section No.

2018-19S

Fieldwork # 3

STADIA

Objectives:

1. To become familiar with stadia method of measuring horizontal and vertical distances.
2. To learn how to do topographic surveys by stadia
3. To learn how to do grid leveling by stadia

Problem:

It is required to draw a topographic map for the area enclosed by polygon traverse. In order to do that, we need to determine the planimetric position and elevation of traverse stations and many points inside the polygon as needed. These measurements will be done by stadia method through grid leveling. Draw a topographic map will be the next field work.

Equipment and Tools:

1. Theodolite
2. Tripod
3. Leveling rod
4. 30 m – tape
5. Taping pins (12)
6. Range poles (2)

Procedure:

1. Establish a uniform grid of points covering the area within the polygon. Label grid points. Lay down the grid.
2. Select a suitable point to set up the theodolite on. A suitable point can be a traverse station or any other point inside or outside the polygon traverse, such that all other traverse stations can be seen.
3. Centre and level the theodolite over the station, then measure height of instrument (h_i) with the level rod.
4. Initialize the horizontal circle to back azimuth of XI joining your station and bench mark X. make the telescope horizontal. With lower motion. Back sight the level rod at BM X whose elevation will be given to you.

5. Make upper middle hair reading \textcircled{R} equal to height of instrument (hi). Record the following:
 - a. rod reading at upper hair u and lower hair l
 - b. zenith angle z
 - c. azimuth angle Az
6. With upper motion, turn theodolite to the level rod at the previous traverse station. Take stadia reading (step 5 above) repeat this step for the other stations.
7. With upper motion, turn theodolite to the level rod at each grid point. Repeat step 5 above at each point.

Data Presentation:

Submit a report containing the following”

1. A table of stadia measurements and computed horizontal distances and elevations of points at least 30 grid points must be measured.
2. A plot of the traverse showing planimetric position and elevations of all traverse stations.

Stadia

| Point sight | Azimuth (Az) | Upper hair (u) m | Lower hair (l) m | Zenith angle (z) Deg, min | Horizontal Distance (H) $K(u-l)\sin^2z$ | Vertical dist. (V) $0.5(u-l)\sin 2z$ | Elevation (Elev) $Elev_1+V$ |
|----------------------------|--------------|------------------|----------------------|---------------------------|---|--------------------------------------|-----------------------------|
| Instrument at station: | | | Elev _x = | | Hi = | m | K = 100 |
| Middle hair reading r = hi | | | (r ₉₀) = | | Elev ₁ =Elev _x + (r ₉₀) _x - hi = | | |
| A1 | | | | | | | |
| A2 | | | | | | | |
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