Tishk International University
Civil Engineering Department
Surveying II

Practical Part

Report -4-

Measurement of Horizontal Angles by General Method

Measurement of Horizontal Angles By General Method

Aim

- To measure the horizontal angle by General method with the use of Theodolite.
- To become familiar working with angles in degrees, minutes & seconds format.

Apparatus Used

1. Theodolite
2. Tripod
3. Ranging rods
4. Pegs or Arrows

Apparatus Used




Measurement of Horizontal Angles By General Method

Procedure

1. Theodolite is set over an instrument station **(O)** exactly and all the temporary adjustments are done.

2. Vertical circle is placed left to the observer (face left observation).

3. Vernier **A** is set to **Zero** with the help of upper clamp screw and tangent screws.

4. Readings of Vernier **A** and **B** are noted.

5. Upper clamp is clamped. Lower clamp is loosened and the telescope is turned towards **"P".** Lower clamp is clamped and the point **"P"** is bisected exactly using tangent screws.

6. Both the Vernier **A** and **B** are read and noted (Must be equal to **0°** and **180°** respectively).

7. Upper clamp is unclamped and the telescope is turned clockwise and **"Q"** is bisected.

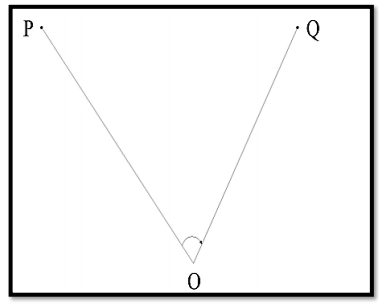
8. Upper clamp is clamped and **"Q"** is bisected exactly using tangent screws.

9. Both the Verniers are read. Mean of the readings provide an approximate included angle of **POQ**.

10. The reading of vernier **A** gives directly the angle **POQ**, and **180°** is subtracted by the reading of Vernier **B**. The mean value of two readings gives the angle **POQ** with one face.

11. The face is changed by transiting (Face right observation) and the whole process is repeated. Mean value of angle **POQ** is obtained with other face.

12. The average horizontal angle is obtained by taking the mean of the values obtained with the two faces.



"FACE" and "SWING"

• As defined earlier in the subject, the standard which houses the vertical circle is called the Face of the instrument. If, when sighting through the telescope, this standard (the face) is on your left, then **FACE LEFT** is recorded for all readings taken. If on the right, then we record **FACE RIGHT**.

• The Swing of the instrument is defined as the direction in which the theodolite is traversed (i.e. rotated about vertical axis). If, when traversing, the telescope lens moves to the left we record readings as **SWING LEFT.** If on the right, we record readings as **SWING RIGHT**.

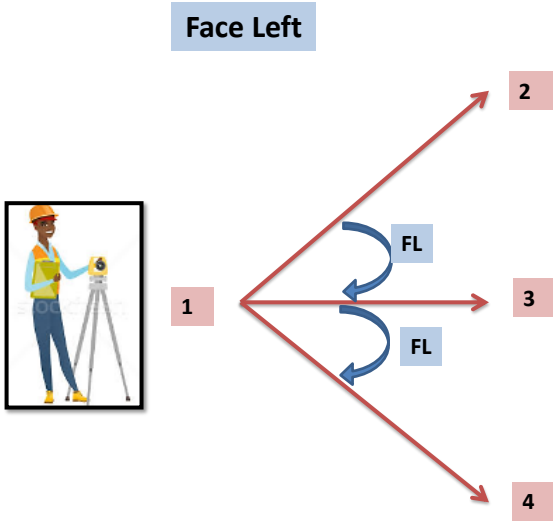
• Every horizontal circle reading must be booked with the face and swing identified. Usually it is conventional to work with opposite face and swing, i.e. **FL/SR and FR/SL.**

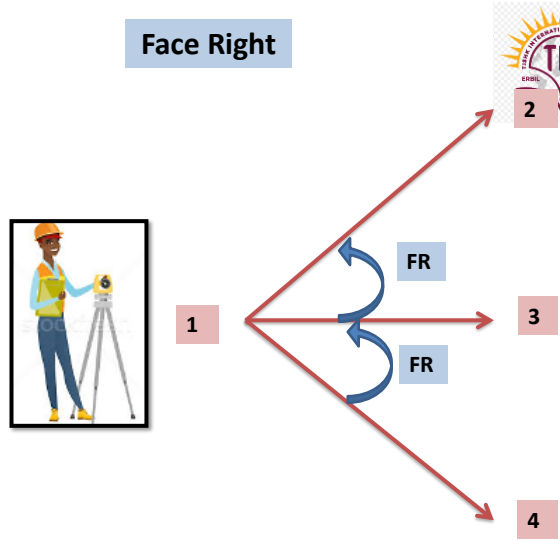
Calculation Example

Instrument Station (I.S.)	Target	Face/Swing	Horiz.Circle (º ′ ″)	Reduced Angle (º ′ ″)
O	P Q	L/R L/R	000-00-00 136-34-20	136-34-20
O	Q P	R/L R/L	316-34-40 180-00-10	136-34-30

Instrument Station (I.S.)	Target	Face/Swing	Horiz.Circle (º ′ ″)	Reduced Angle (º ′ ″)
O	P Q	L/R L/R	360-00-00 136-34-20	223-25-40
O	Q P	R/L R/L	316-34-20 180-00-10	223-25-30

Instrument Station (I.S.)	Target	Face/Swing	Horiz.Circle (º ′ ″)	Reduced Angle Mean (Average) (º ′ ″)
1	2 3 4	L/R L/R L/R		
1	4 3 2	R/L R/L R/L		





Result

The horizontal angle measured at O between P and Q i.e ∠ POQ:

a) With face left (**FL**):-

b) With face right (**FR**):-

c) Average:-

Discussion and Conclusion