Experiment No.6

Setting Out of Hexagon in the Field

Objective: To set out a hexagon in the field when the centre is accessible and when the centre is inaccessible

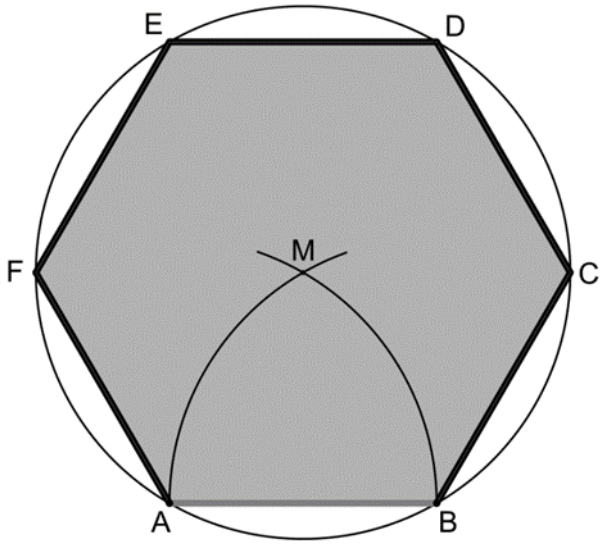
Apparatus: Measuring Tape (10 m, 20 m or 30 m) or Metric Chain and a set of arrows

Theory: Surveying is a science that enables the engineer to determine the relative position of points on the surface of the earth. Before the Construction of any structure, surveying of the land on which construction takes place is carried out. A Plan is prepared of the existing features on the ground and its relative positions are also marked.

CASE 1: Construct a hexagon of 5m when center is accessible

Procedure

1. Mark AB of 5 m length in the field with the help of tape and arrows
2. Draw arcs of 5m radius from A and B to locate Centre M of hexagon ABCDEFA.
3. Draw arcs of 5 m radius from M and B to locate C.
4. Repeat the same procedure to locate D, E and F of Hexagon.
5. Measure the distances BC, CD, DE, EF and FA and determine the difference between the measured versus calculated values.



Properties of regular Hexagon: all included angles are equal

Sum of included angles in a polygon = (2n - 4) Right angles

Where n= no of sides;

N=6, sum of included angles in a regular hexagon = $(2x6 - 4) \times 90 = 720^0$

$\angle A = \angle B = \angle C = \angle D = \angle E = \angle F = 120^0$

CASE 2: Construct a hexagon of 5m when center is inaccessible

Procedure

1. Mark AB of 5m length using tape and arrows in the field.
2. Extend AB, draw arc of 2.5m radius from B to locate B1. From B1 cut an arc of length 4.3m and from point B cut an arc at 5m to locate the new point C.
   5cos60 = 2.5
   5sin 60=4.3
3. Extend B1C, with C as center and 4.3m radius cut an arc. This point is D1. With D1 as center and 2.5m radius cut an arc, with C as center and 5m radius cut an arc, intersecting point is D.
4. Extend AB, draw arc of 2.5m radius from A to locate A1. From A1 cut an arc of radius 4.3m and from point A cut an arc of radius 5m to locate the new point F.
   5cos60 = 2.5
   5sin 60=4.3
5. With D as center 5m radius cut an arc, With F as center 5m radius cut an arc, point of intersection is E.
6. Measure the distances BC, CD, DE, EF and FA and determine the difference between the measured versus calculated values.