CALCULATION OF AREA OF LAND

One of the primary objective of most land surveys in large scale surveying is to determine the area of a tract.

A technique called traverse is run, the lines of the traverse being made to coincide with property lines where possible.

The length and bearing of all straight boundary lines are determined either directly or by computation.

In case of irregular boundaries which are located with respect to traverse line, perpendicular offsets are taken at appropriate intervals and the radii and central angles of circular boundaries are obtained.

GENERAL METHODS OF DETERMINING AREA

The followings are the general methods for calculating areas:-

- By computations based on directly on the field measurement. These includes:

1. by dividing the area into a number of triangles
2. by offset to the base line
3. by latitude and departure
4. by double meridian (DMD) method
5. By double parallel distance
6. By coordinates
7. By mechanical methods (planimeter, pantographs etc.

Measurement of Area- Irregular Boundaries

Mathematical Rules : Here only common and popular methods are illustrated for this course.

1. Area Between the Survey Lines and the Boundaries: - the number of offsets are measured from the Survey line to the nearest boundary line.

   The area of the belts bounded by the adjacent offsets, the boundary line and the base line may be assumed as trapeziums and their area may be computed as under:

   The area is calculated by multiplying the mean of each successive pair of adjacent offsets, by the distance between Them.

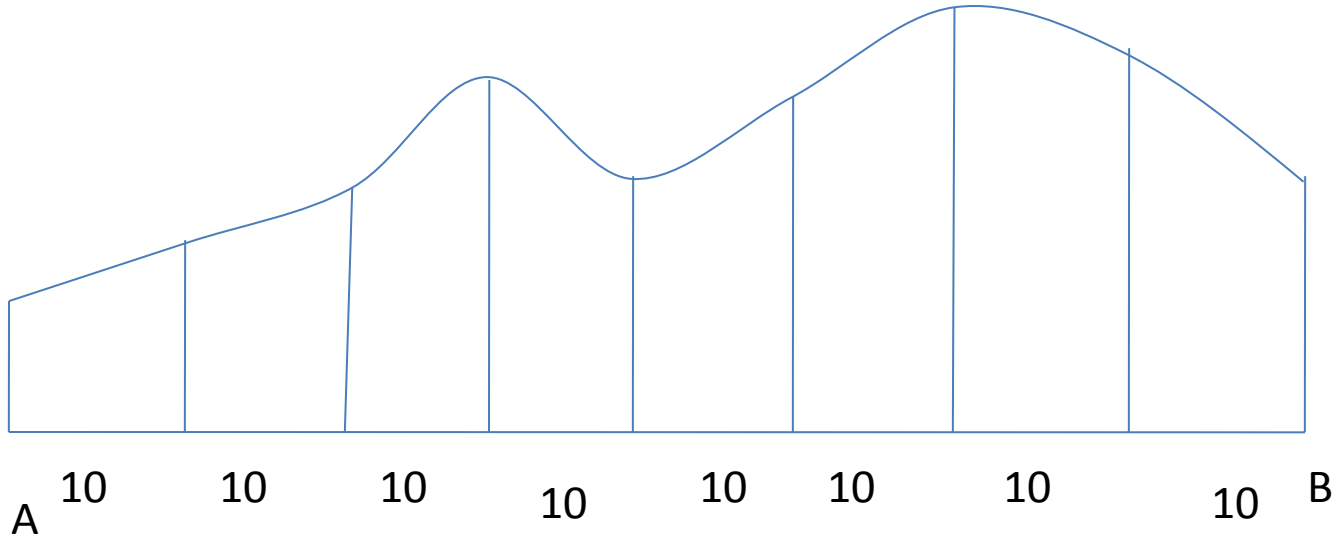
Mid Ordinate Rules : - in this method a baseline AB is divided into a number of equal parts and ordinates are drawn at the mid- points of each division. The length of each ordinate is then scaled off.

Area = Sum of the mid ordinates multiplied by the common distance ‘d’

The Trapezoidal Rules : - in this method , a base line AB is drawn and is divided into equal parts. The ordinates at each point of division are drawn and their lengths scaled off. This method assumes that the area between adjacent ordinates is of the shape of a trapezoid.

Example

The following perpendicular offsets were taken at 10 m interval from a survey line AB to an irregular boundary lines,



2.50,3.50,4.5,6.5,5.2,7.5,8.8,8.3 and 5.5 metres. Calculate the area in sq. m enclosed between the survey lines and the irregular boundary. The first and the last offsets by Trapezoidal rules.

(Formula: A rea = d/2(first offests + last offest+2xsum of remaining offsets)

- **CALCULATION OF AREA OF A CLOSED TRAVERSE FROM CO-ORDINATES**
- The area of a closed traverse from field notes, may be calculated by one of the following methods;
- Areas from Coordinates
- Areas from Latitudes and Double Meridian Distances
- Areas from Departure and Total Latitudes.

Area from Departure and Total Latitudes-

Assume any one of station as reference station from which the Total latitude of the other station may be calculated.

- **Rules:**
- **Calculate the total departure.**
- **Calculate the algebraic sum of the departures of the lines meeting at that station.**
- **Multiply total latitude of each station by corresponding algebraic sum of the departure.**
- **Calculate the algebraic sum of the product**
- **Half the sum gives the required area of the closed traverse.**

Example