

# Chain Survey

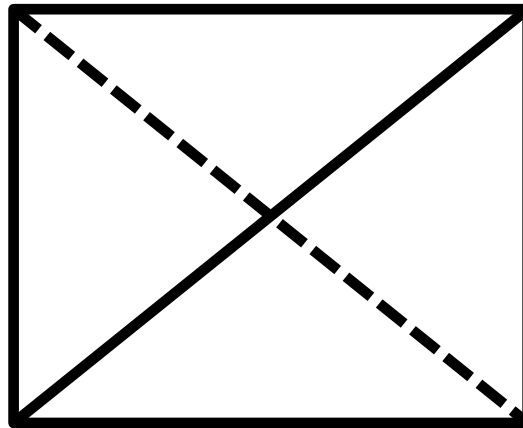
**Introduction** :- Chain Survey or linear Surveying is that method of Surveying in which only linear measurements are made in the field. It is unsuitable for large areas or difficult for undulating areas but suitable for small areas on plain and open ground with simple detail.

**Principle** :- The principle of Chain Survey is to form a frame work of figures which can be fixed by measurement of sides only and to Survey the position of details with respect to this frame work.

The simplest Survey is that of a triangular plot with straight boundaries. In this case only horizontal lengths and sequence of the three sides are required to plot the field.

## Definitions :-

Check lines: - The Surveyor should be able to guarantee that within permissible errors of measurement and plotting the plan produced does actually represent the area Surveyed. Hence necessity, of making cross-measurements called Check or proof lines as shown in the following figure.



**Off-Sets**: - Off-sets are lateral distances measured from the Survey lines to the objects or features which are to be plotted. They can be on either side of the chain line.

### **Points to which Off-sets are taken**

For a straight line only two ends are sufficient. For an irregular line it is treated as divisible into a series of lengths each sensibly straight and a sufficient number of off-sets is taken or locate these lengths.

Off-sets must, therefore, be measured to every point at which the line has a marked change of direction.

The degree to which minor irregularities may be neglected depends on the character of the line being surveyed and on the Scale of Survey.

## Field Work :-

**Reconnaissance** – Select the best positions of stations after Scanning the area and intervisibility of poles/flags being used is to be tested. Prepare a rough sketch of the ground showing arrangement of lines and the numbering or lettering of stations.

**Selection of Stations** – Stations should be selected so as to meet the following requirements :-

Survey lines to be as few as practicable and such that the frame work can be plotted.

- If possible a long line should be run roughly through the middle of the area to form a backbone on which to hang the triangles.
- Each portion of Survey should be provided with check lines.
- When there is no off-set, lines should not be run. Only few lines can be run for checking.
- Off-sets should be short, particularly for locating important features.
- Obstacles to ranging and chaining should be avoided as far as possible.
- Lines should lie over level ground.

## **Method of providing frame work**

Normal method is by measuring the sides of triangles laid on the ground. However, for large areas theodolite traverse or triangulation might be used for this purpose.

The area should first be divided into a number of main triangles. Principle of working from the whole to the part is followed.

## **Running of Survey lines**

The routine of running a Survey line comprises the chaining of the line and location from it of the adjacent detail.

## Precautions

The following precautions should be taken:

- Guard against gross mistakes in reading.
- Take and record off-sets in order of chain age – taking care not to omit any off-set.
- Accuracy required in measuring off-sets depends on scale.
- On Scale 1:1000, measurements to be taken to the nearest  $\frac{1}{2}$  link.

## Recording

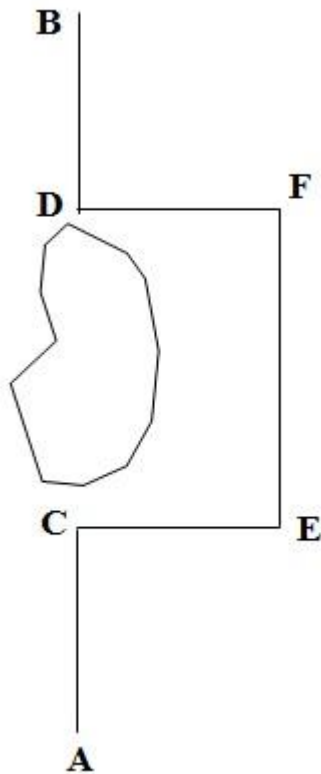
The two essential points in booking are accuracy and clarity and these are promoted by :

- Neat figures and legible writing.
- Lucid sketches.
- Clarity in representing the points to which off-sets have been taken.
- Leaving nothing to memory.
- Keeping the book clean.



## Obstacles:-

The figure below illustrates the method of overcoming these obstacles.



Let A and B be the two ends of a chain line whose distance is required to be measurement.

- Select two points C and D near the pool and in the same line AB
- Erect two perpendiculars of equal distance CE at C and DF at D with the help of an Optical Square.
- Measure the distance EF.

Distance  $CD = EF$  (By Construction)

Therefore  $AB = AC + EF + DB$ .