# Chain Surveying

- Principle of chain survey
- The main principle of chain survey is to prepare a framework or network of
- triangles because a triangle is a figure, which can be plotted on paper by measuring its sides only. Great care has to be exercised in the formation of well-proportioned or well conditioned
- triangles so that the process of chain surveying becomes smooth. A well proportioned or well-shaped triangle has no angle greater than 120 degrees or smaller than 30 degrees
- As far as possible, the triangles formed should resemble to the shape of an equilateral triangle. If, however, the conditions are not favorable for forming well-proportioned triangles, extreme care should be taken in chaining and plotting of the unavoidable ill-conditioned triangles.

# Schematic diagram

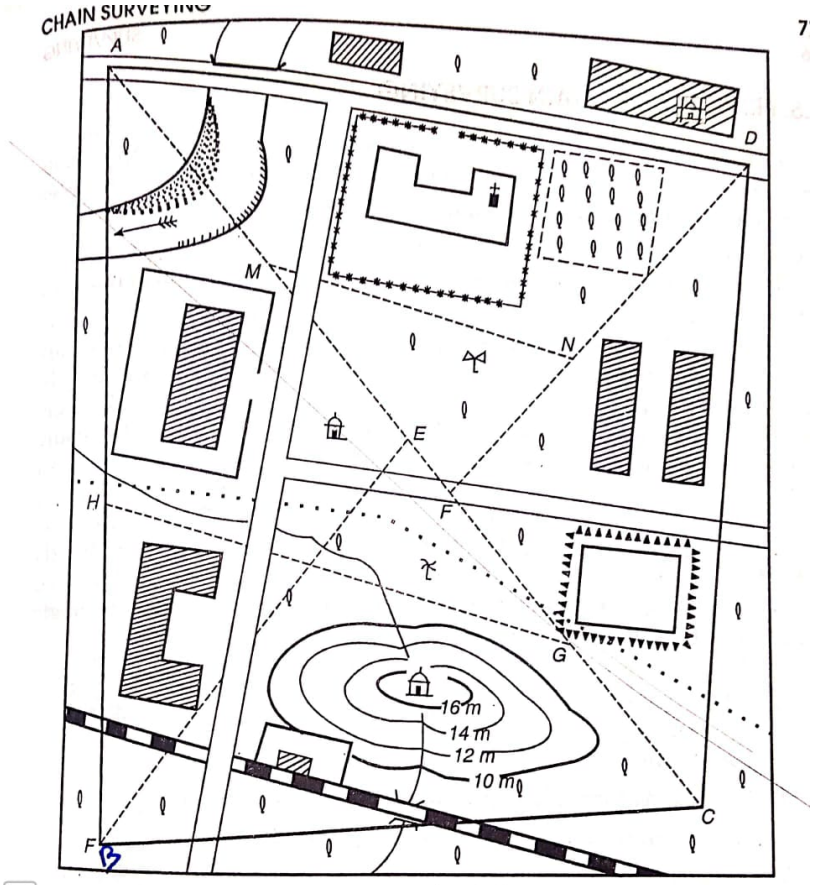





Fig. 3.2. Layout of a chain survey.

# Chain Survey

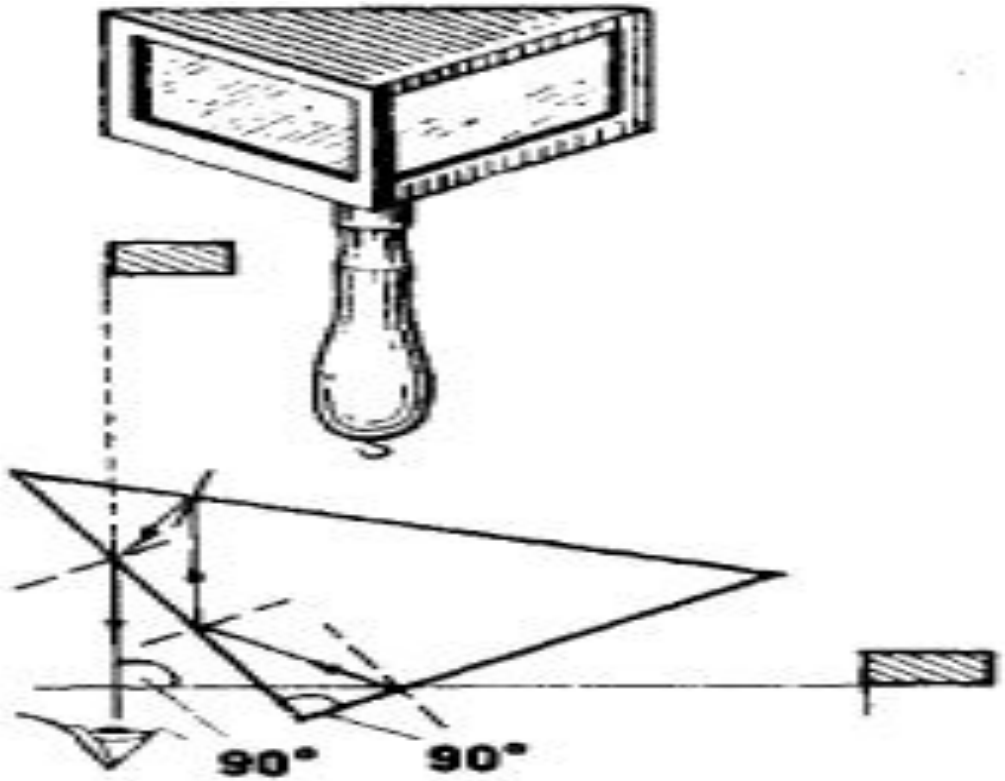
Chain survey is the simplest type of survey in which the area to be surveyed is divided into a number of triangles. The perpendicular distance, called offsets, of various objects in the field from the line are measured and recorded in a book called filed book. From these records in the field book, the whole area can be plotted on a drawing sheet to a reduced scale. Note that we will not use field book, all the offset will be recorded on the drawing sheet directly.

Instruments needed: **Compass, Chain, Tape, Arrows, Ranging rods, and Optical Square (or tape or rope).**

Working Procedure

***Locating Stations:*** These are points on the ground fixed by driving pegs. Every station should be located with respect to three permanent objects i.e., the distances from these objects to the stations should be measured very accurately and recorded in the drawing paper.

# Optical square



- 1) Reconnaissance survey;
- A reconnaissance survey indicates the preliminary inspection of the site of work and hence, first of all, visits the area to be surveyed. The salient features of the site are studied with reference to the following aspects:
- (i) Index plan: The area under survey ,prepare an index plan or sketch in the field book showing roughly the area to be surveyed and important objects such as buildings, roads, streams, etc. are included in this index plan. It also contains the sequence in which the survey lines are to be measured. The stations are indicated by number or letter and the direction in which the work is to proceed is shown by arrows.

- (ii) Main station: Suitable positions of main stations are decided by the surveyor.
- The important fact to be kept in mind is the intervisibility of main stations.
- The lengths of main survey lines are measured roughly by pacing or some such approximate method of measurement.
- (iii) Study of area: During reconnaissance survey, the surveyor has to carry out intensive study of the site so that he can get a clear picture of the area to be surveyed, probable difficulties to be encountered during the work, time required to finish up the job, etc.

- Instruments required in chain survey:
- Following instruments are required for carrying out a chain surveying:
- (1) Chain and 10 arrows
- (2) Tape of 10 m or 20 m length
- (3) Ranging rods about 10 to 15 in number
- (4) Offset rod
- (5) Cross-staff or optical square to set right angles
- (6) Plumb bob
- (7) Field book with pencils, rubber, pen-knife, etc.
- (8) Miscellaneous items such as hammer, axe, nails pegs, bundle of string, chalk, etc.
- Procedure for carrying out chain survey:

  Following are the four distinct steps involved in carrying out the chain survey of any plot of land:
- (1) Reconnaissance survey
- (2) Marking of stations
- (3) Preparation of reference sketches
- (4) Running of survey lines

# Marking of stations:

- The stations selected during reconnaissance survey should be properly marked on ground by using suitable equipment so that they can be readily and easily identified.
- Depending upon the nature of ground and importance of stations, the marking of stations is done with ranging rods, wooden pegs, nails, stones, etc.

- Preparation of reference sketches:
- After marking of stations, the location or reference sketches of these stations should be neatly drawn in the field book. The reference sketch of a station helps in locating the station at a future date or in cases where its position is not traceable ad it is to be  fixed again.

# Sketch

## Schematic diagram

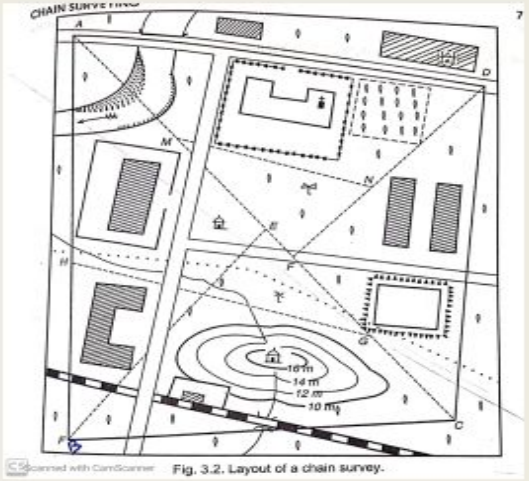



Fig. 3.2. Layout of a chain survey.

- Two measurements from permanent structures will be sufficient. But usually three measurements are taken to ensure the check on exact location of the  stations. T
- The measurements are taken with reference to the permanent objects that may be in the form of corner of a building, electric or telegraph post, compound wall  or gate, trees, etc.

- The measurements are taken to the nearest 5-mm.
- North line should invariable be drawn on the reference sketch. Thus, the position of a station is resorted with the help of it reference sketch by swinging arcs from the respective permanent structures.

# Chain Survey

The selection of a particular station depends upon the following important considerations:

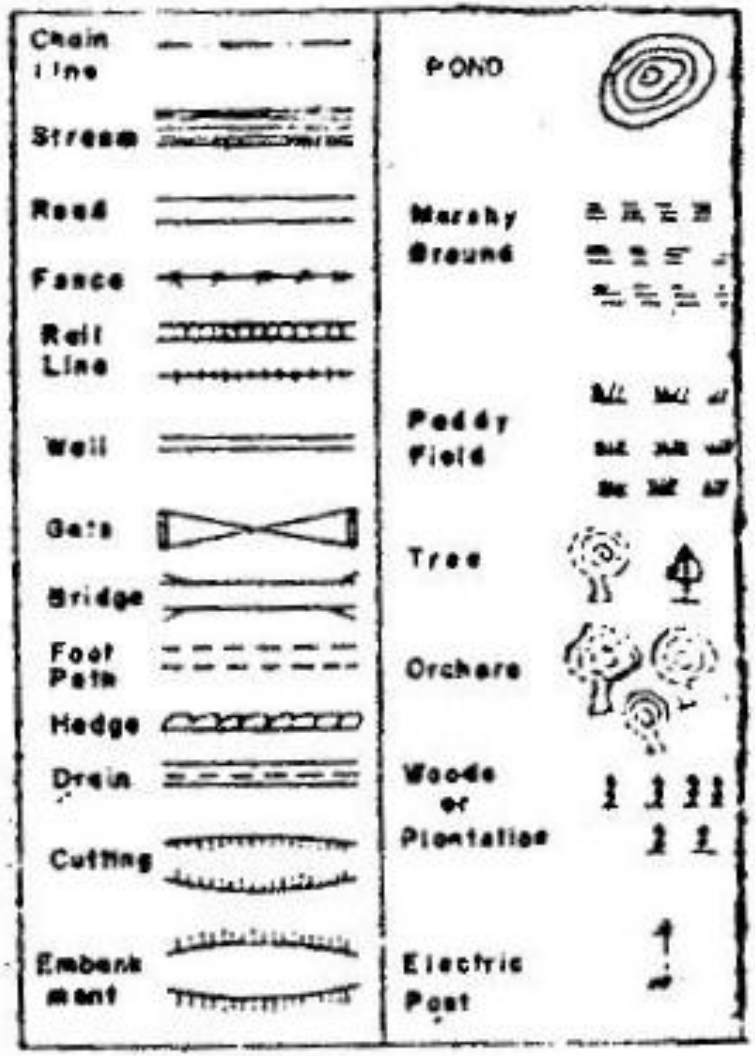
- The triangle should be a well-defined one, i.e., nearly equilateral triangle.
- Identify the north-south direction by compass.
- Every main station should be visible from the other two.
- There should be minimum number of obstacles in chaining.
- Offsets should not exceed one chain.

**Plotting of details:** Before plotting the details of chain survey on a drawing paper a suitable scale should be chosen first because drawings are prepared to a reduced scale.

A scale is the ratio between the actual length on the ground and the corresponding length of the line on the map. For an example, when the scale of a map is 1 inch = 10 ft., it indicates a length of 10 ft. on ground being equal to 1 inch on the map.

# Chain Survey

CONVENTIONAL SIGNS FOR DIFFERENT OBJECTS



# Chain Survey

Report Submission:

Every group will have to submit a group chain survey details in drawing paper just after the completion of the work. So, each group must carry **drawing paper, pencils, and eraser**. A sample report is shown in the next page.

# Station 1 → Locate it.

# Same way identify other two.

# Record all the objects which is nearer to any station.

# Record the horizontal & vertical distance adjacent to the object with its symbol.

A typical chain survey report on drawing paper:

Scale: Assume, 5 ft = 1 inch

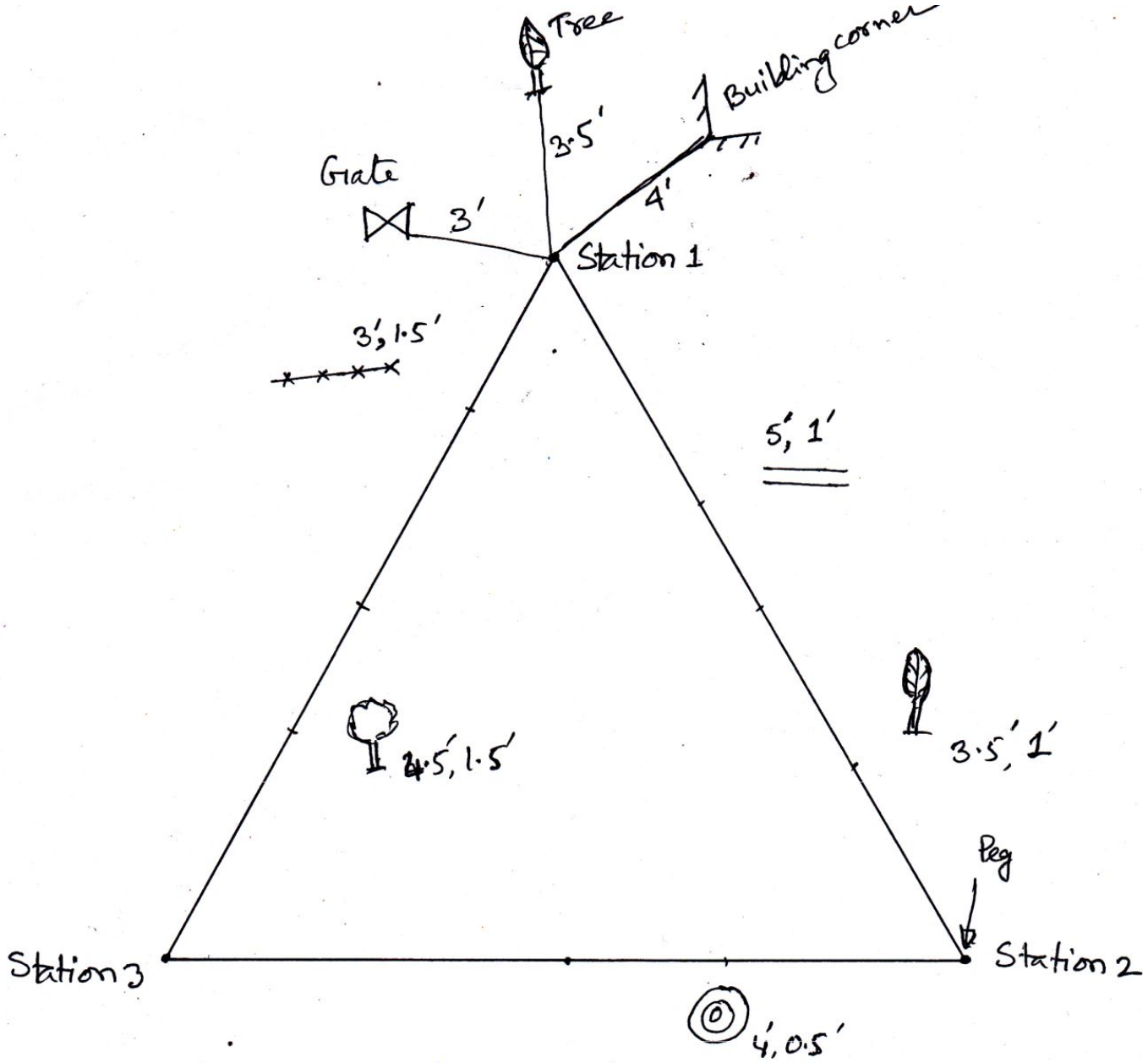



Fig: Details of chain Survey.