



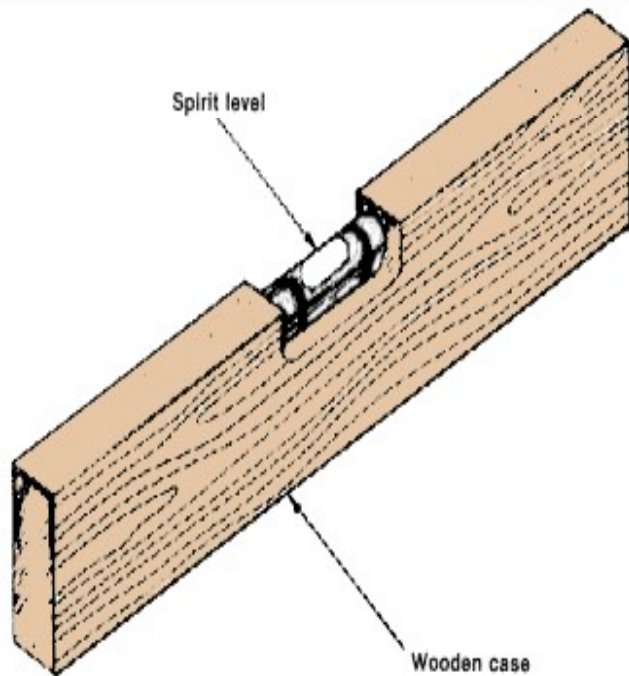
FACULTY OF ENGINEERING AND
TECHNOLOGY (DEPARTMENT OF
CIVIL ENGINEERING)

Lecture -02

EQUIPMENT USED IN PLANE TABLE SURVEYING

Spirit Level

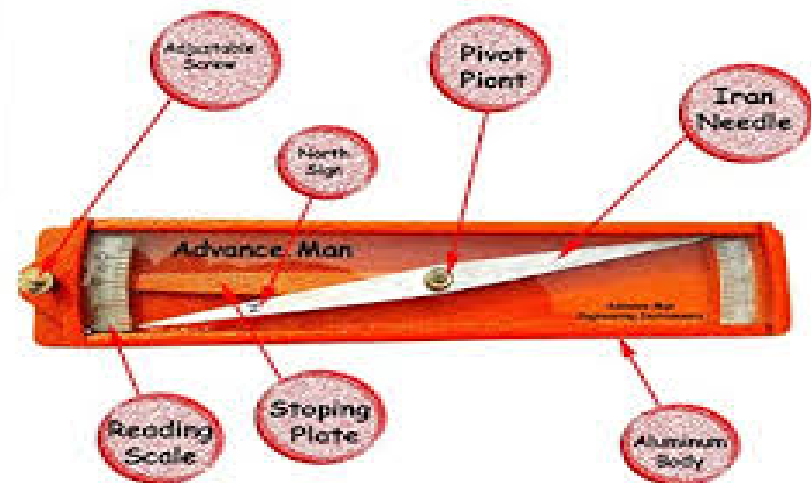
- A spirit level with a flat base is utilized for leveling plane table.
- To ensure proper leveling, spirit level needs to be used in two positions at right angles to one other, and leveling of the plane table ought to be ensured.
- The spirit level can be placed in two perpendicular directions and leveled.



EQUIPMENT USED IN PLANE TABLE SURVEYING

TROUGH COMPASS

- Trough Compass A trough compass is made up of an 80 to 150 mm long and 30 mm wide box carrying out a freely suspended magnetic needle in its center. At the top of the box is provided with a glass cover.
- In the ends of the needle, graduations are marked out of zero to five degrees on each side of the center.
- When the needle ends to coincide with zero-zero, the line of needle ends is parallel to the long edge of the box.
- Hence, a marking on either side of a long edge indicates the north direction of the survey.
- Thus, the trough compass is useful for marking the north line on the drawing sheet.



EQUIPMENT USED IN PLANE TABLE SURVEYING

DRAWING SHEET AND ACCESSORIES FOR DRAWING

- The drawing paper of superior quality ought to be used in a plane table survey.
- It ought to be well seasoned before use by exposing it alternatively to warm and moist atmosphere.
- By seasoning, shrinkage of sheets in the future is reduced considerably. The sheet ought to be in a position to withstand rubbing against alidade.
- The drawing sheet shouldn't be folded. Many times two sheets attached using their grains at right angles to one another and using a sheet of muslin between them are utilized.
- For works of importance, fiberglass sheets or paper backed with thin aluminum sheets are utilized.
- Clips, clamps and adhesive tapes /Chain might be used for fixing drawing sheet into the table. Sharp hard pencil (4 H), good quality eraser, pencil cutter and sandpaper to keep pencil point sharp are other accessories need for drawing work.
- A waterproof cover such as plastic sheet ought to be carried from the surveyor, to protect drawing sheet out of the rain, if required.

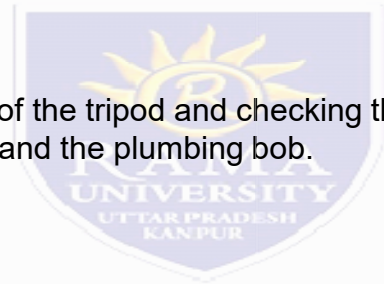
WORKING OPERATIONS OF PLAIN TABLE SURVEY

Once fixing the table into the stand and drawing sheet into the following operations are to be carried out :

- **Centering**
- **Leveling**
- **Orientation**

CENTERING

- Centering is the process of setting the plane table on the point so that its plotted position is exactly over the position on the ground.
- This is achieved by moving the legs of the tripod and checking the position of the point on the ground and on the paper with the help of plumbing fork and the plumbing bob.



LEVELING

- Spirit level is used to check the level of the table. The level ought to be ensured in two positions of spirit level that are at right angles to one another.
- The legs of the tripod are moved radially or along the circumference to correct the level of the table.

WORKING OPERATIONS OF PLAIN TABLE SURVEY

ORIENTATION

- Orientation is the process of placing a plane table in a station such that all the lines plotted are parallel to corresponding lines on the ground.
- This is a very important process in plane tabling. Accuracy of plane table survey mainly depends on how correctly at each station perfect orientation is achieved. It may be achieved by anyone of the following methods:
 - a) Using trough compass
 - b) By back sighting
 - c) By solving two-point or three-point problems.

ORIENTATION USING TROUGH COMPASS:

- After the survey work starts from the first station, the table is oriented in appropriate direction, and the north direction is marked near the right-hand top corner utilizing trough compass.
- This orientation is to be kept at all subsequent stations.
- To acquire exactly the same orientation, trough compass is placed along the north direction marked, and the table is rotated until the compass needle is along with zero-zero readings.
- Then it's clamped. Therefore, the necessary orientation of this table is obtained. This procedure of orientation is considered rough since the local attraction to compass can impact proper orientation.
- This way is used as a preliminary orientation, and finer orientation is obtained from other methods.

WORKING OPERATIONS OF PLAIN TABLE SURVEY

ORIENTATION BY BACK SIGHTING:

- It's a commonly employed way. Before shifting the table, point in Measurement book from station **A** to station **B**, line ab is attracted from a plotted position of station **A** (i.e., a) towards following station **B**. Distance **AB** is Plotted and measured position b of station **B** is located.
- Subsequently, plane table is shifted to station **B** and centered such that point 'it is exactly over station **B** keeping the alidade along with ba station A is sighted and clamped.
- This offers the required orientation. Checks could be applied by sighting already plotted objects from point ' b .'



METHODS OF PLANE TABLE SURVEYING

These four methods are available for carrying out a plane table survey as per below Plane Table Surveying Methods:

- **Radiation**
- **Intersection**
- **Traversing, and**
- **Resection**

The first two methods are usually employed for locating the details whereas Another two methods are used for testing and locating the positions of plane table stations onto the drawing sheet.

RADIATION

- To fill details of objects near station '**0**', a plane table is set on station '**0**' the plotted position '**0**' approximately over the ground station.
- Then using alidade pivoted at '**0**', the rays are drawn in the direction **OA, OB. OC** ... with soft pencil [As per below Figure] Then the distances **OA, OB. OC** ... is scaled and measured down to get the plotted positions **a, b, c** ... of field positions A, B,... Thus, these items are plotted by first drawing radial lines.



METHODS OF PLANE TABLE SURVEYING

- This method is acceptable for small areas, and it is convenient if the distances are small.
- This method has a wider scope if the telescopic alidade is used, where distances are measured tacheometrically.

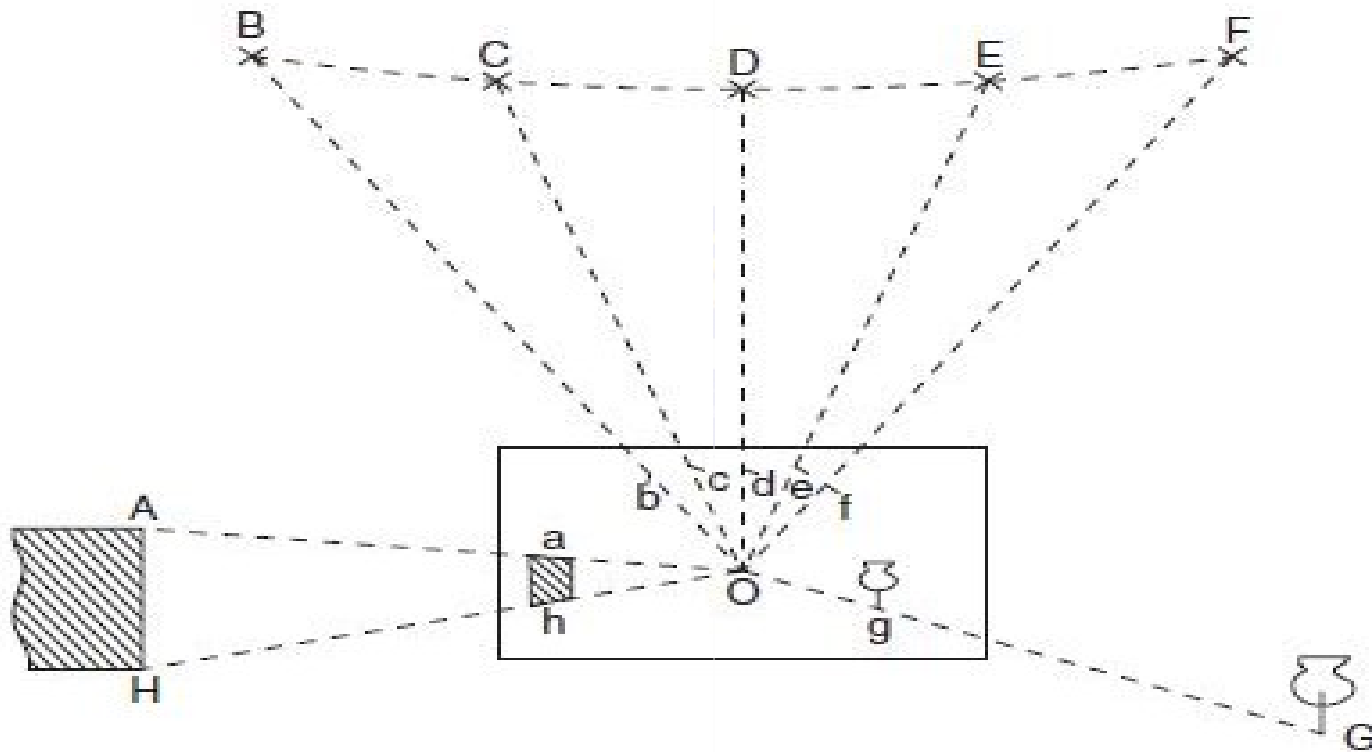


Fig. 14.7. Radiation method of plane tabling

METHODS OF PLANE TABLE SURVEYING

INTERSECTION

- Within this method, two stations are so chosen that all of the other stations to be plotted are observable from these. The line joining both of These stations is called the baseline. The length of the line is measured very accurately.
- Also, rays are drawn from these stations to the stations to be plotted.
- The intersection of the line from the two stations provides the position of the station to be plotted onto the drawing sheet. From time to time, this way is also termed as graphical triangulation.

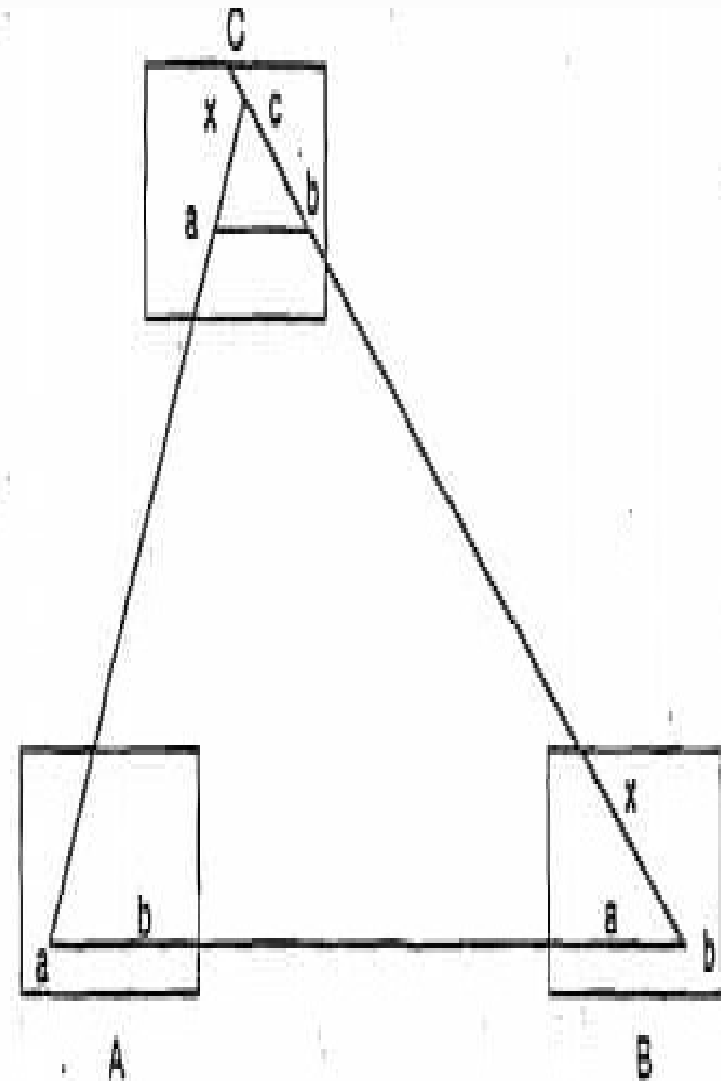
PROCEDURE

- Let **A** and **B** be the two accessible stations (as per below figure), such that **A** and **B** can be suitably plotted. **C** is the station to be plotted by intersection.
- Place the plane table at **A**. Set it up. Plot the **NS** direction. Transfer ground station **A** as an onto the drawing sheet. With the alidade centered at a. sight station **B**.
- Draw a ray **aB** and cut ab to a suitable scale. With the alidade at a sight, **C** also and draw a ray **aC**. Shift the table to **B** and set it up. Place the alidade at **b** and sight **C**. Draw a ray **bC**. The intersection of the two-line gives the position of station **C** as **c** on the plane table.

METHODS OF PLANE TABLE SURVEYING

This method is commonly employed for locating:

- Details
- The distant and inaccessible points
- The station which may be used latter.



THANK YOU

