Step by Step Guide to Plane-table Surveying

Plane-table surveying is a traditional method of mapping earthworks. It is less accurate than modern surveying techniques, but the process is relatively easy.

Before you start

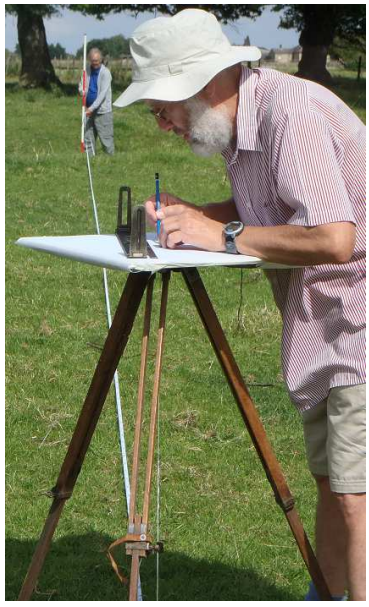
1. Seek permission from the landowner (and tenant farmer, if applicable). Enquire about past land use of the site, e.g. how long the field has been ploughed and to what depth (if applicable).

2. Once you have fixed a date for the exercise, please notify Cambridgeshire Historic Environment Team (HET) that you are about to commence work and request an Event Cambridgeshire (ECB) number by emailing Sally Croft: sally.croft@cambridgeshire.gov.uk.

3. You will need two or three participants. Decide who is in charge of the project. Ensure that everyone is agreed about the general forms and extent of the features to be recorded, and define your research aims for the project.

Equipment

1 x plane table
1 x line level
1 x plumb-bob
1 x 0.55m² sheet permatrace
1 x 5H or 6H pencil
1 x scale ruler
2 x 2m ranging pole
1 x notebook and biro
1 x tripod
1 x magnetic compass
1 x alidade
1 x masking tape
1 x eraser
3 x grid pegs
2 x 50m tape
1 x handheld GPS (if available)



When to do it

Best conditions are:
Fairly short grass, or crop off field
Weather not too cold!
Dry (permatrace discolours when wet)

Setting up the Equipment

1. Take all your equipment to roughly the centre of the area you wish to survey, so that all features can be recorded within a 50m radius of the table. If the area to be surveyed exceeds this, you may require more than one sheet of permatrace.

2. Set up the tripod, extending the legs to a height at which you can survey standing up without bending over excessively.

3. Secure the sheet of permatrace to the top of the table. Set up the table on the tripod and ensure it is level by placing the line-level on the table and checking it at various diagonals.

4. Put a cross in the centre of the permatrace to mark the position of the table in the field. Use the compass to draw a north arrow, and write the location (site name, grid reference, parish), group name, participants' names and the date in a corner of the map. Put a scale on the map (usually 1:500, but you may want a smaller scale for surveys of smaller areas).

5. In a notebook, write down the time of day, weather, visibility, state of the ground and vegetation cover. These factors may aid interpretation of the survey.

6. Hang a plumb-bob from the centre of the tripod and mark the spot on the ground immediately below with a grid peg. Attach the zero end of the 50m tape
to the peg (Figure 1).

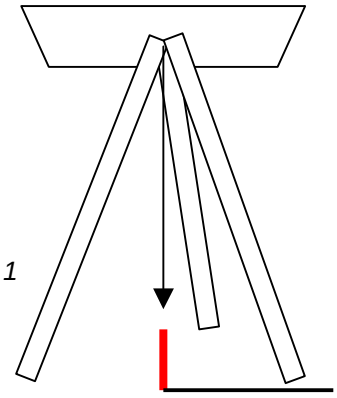


Figure 1

Conducting the Exercise

1. Send one person with the other end of the tape and a ranging pole to the first point you wish to mark. Hold the ranging pole perfectly vertical and pull the tape tight and as horizontal as possible.

2. Place the alidade about 5mm to the left of the cross on the permatrace (Figure 2).

Figure 2

3. Line up the alidade with the ranging pole using the foresight and the backsight (Figure 3). Shut one eye! Ideally only one person should mark the points on the plan, so there is consistency.

Figure 3

4. Once aligned, slide the slider bar across so it intersects the cross (Figure 4). Draw a faint line from the cross roughly to where you think the point you wish to mark lies. You are now ready to mark your first measurement.

Figure 4

5. Slide the alidade slider bar back in again, and place your scale ruler where it was (Figure 5). Ask your colleague what measurement they have on the tape, i.e. how far the ranging pole is away from the plane table. Using the 1:500 side of the scale ruler, mark on your first point with a dot. For example, 17.50m = 3.5cm. Erase the faint line when done.

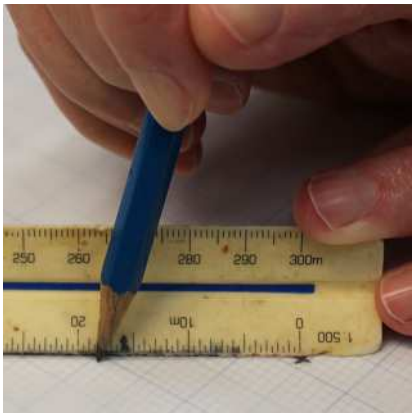


Figure 5

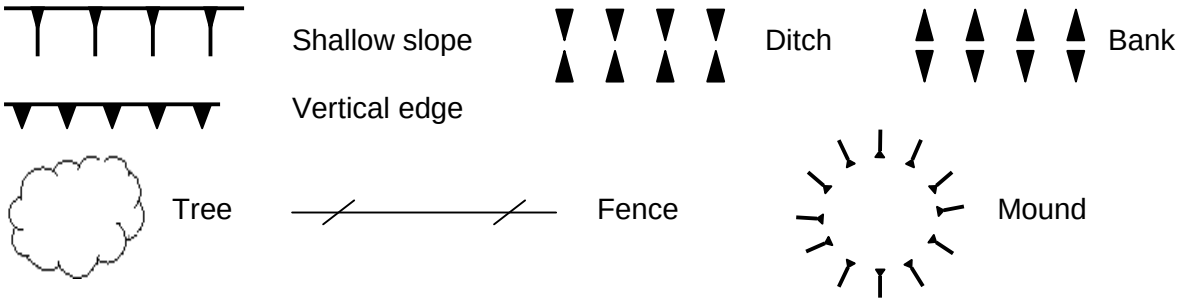
NB: when surveying over large distances or in a high wind, you may find it easier to have the zero of the measuring tape at the ranging pole end, to save shouting over long distances.

6. Continue in this vein for each point. When recording a continuous feature, such as a ditch, take measurements at about every 1m, or 2m, depending on how uniform the feature is.

7. Once you have completed your survey (or have finished work for the day), GPS in the location(s) of the plane table using a handheld GPS and mark the co-ordinates on the map. Use these co-ordinates and the compass arrow to plot the location of your map on an Ordinance Survey map or Google Maps. In the absence of a GPS, measure the position of the plane table from two fixed points such as a road or corner of a building.

Drawing Conventions

Hachures are used to denote direction of slope, with the arrow pointing down the slope.



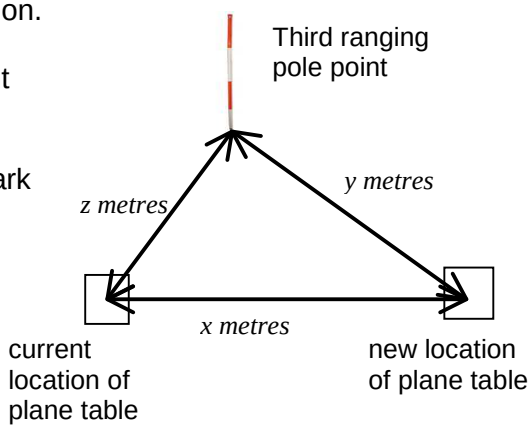
Moving the plane-table

At some point in the survey you may find you need to move the plane table to take measurements further than a 50m radius of your current location.

1. Put a grid peg in the ground at the new location you want for your plane table.

2. Sight and measure in the position of the grid peg and mark it on your plan with a second cross (you may need to place a ranging pole on this point to aid visibility).

3. Placing a ranging pole in a third location, sight and measure in this point and mark on your plan. Leave the ranging pole in place.



4. Leaving the grid peg under the plane table behind, set up the plane table at its new location. Orientate the plane table with the compass so that the north arrow on the plan points in the same direction as before.

5. Check the new position of the plane table is correct by checking the measurement to the old location of the plane table, and to the third point marked by the ranging pole. You are now ready to continue surveying.

After the Exercise

Report brief findings to the Historic Environment Record (HER) using the online Jigsaw HER Report Form: http://surveys.thehumanjourney.net/index.php?sid=12258&newtest=Y&lang=en. Then write a report structured by aims, methods, results, interpretation and additional information, and submit it to the HER within six months of the exercise.