FIELD PROCEDURES FOR A TOTAL STATION IN TOPOGRAPHIC SURVEYS

Total stations can be used in any type of preliminary survey, control survey, or layout survey. They are most suitable for topographic surveys in which the surveyor can find the X, Y, Z (easting, northing, elevation) positions of a large number of points (about 2 to 3 times of those using conventional techniques) per day.

Initial Data Entry

The initial data entry could be all or some of the following:

1. Project description

2. Data and crew

3. Temperature

4. Pressure

5. Prism constant

6. Curvature and refraction setting

7. Sea-level correction

8. Number of measurement repetitions

9. Choice of Face 1 and Face 2 positions

10. Automatic point number incrementation

11. Choice of units

SURVEY STATION DESCRIPTORS

Each survey station or point must be described with respect to surveying activity, station identification and other attribute data. Generally, the total stations prompt the data entry and then automatically assign appropriate labels. Point description data can be entered as alpha (for example, backsight as BS) or numeric (for example, backsight as 20) codes.
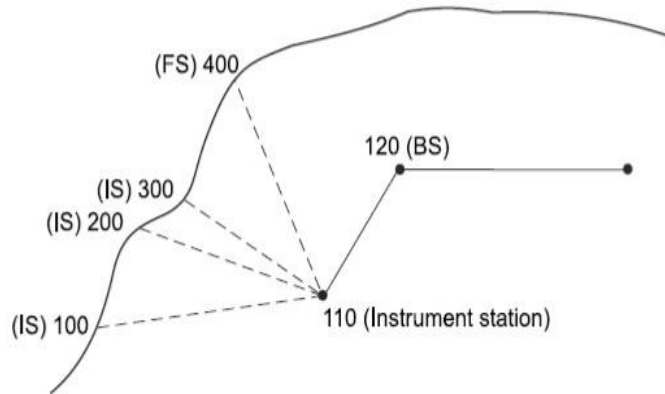
SURVEY STATION ENTRIES

1. Code Say 20 (BS), 30 (IS), 40 (FS)

2. Height of instrument

3. Station number (say) 110

4. Station identification code

5. Coordinates of occupied station

6. Coordinates of back sight station

SIGHTED POINT ENTRIES

1. Operation code

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2. Height of prism

3. Station number: 120 (BS)

4. Station identification code

Procedure

Fig. 8.

The total station is mounted on tripod, centred and levelled. The initial data and occupied station data are entered.

(i) When the instrument is set up and turned on it sets itself to be pointing to zero degrees (north) when power is first supplied. The total station is then reset to zero degree when it is actually pointing north.

(ii) If battery dies during measurements, the instrument must be reset to zero degrees.

2. Sight at desired station, say 120; press the zero-set button to set the horizontal circle at zero.

3. Enter code 20 (BS). The prism is mounted on a pole of known height. The reflection point of the prism gets aligned with the centre of the pole. Since the instrument aims at the prism, it calculates the position of the prism and not that of ground point. The ground point is located by subtracting the height of the pole. This necessitates that the pole is held upright while making observations. Measure and enter the height of the prism.

4. Press the appropriate measure buttons, e.g., slope distance, etc.

5. Press the record button after each measurement. In the automatic mode, all the three X, Y, and Z measurements are made after pressing just one button.

6. After the station measurements have been recorded, the data recorder on board will prompt for the station point number (e.g., 120), and the station identification code.

7. For next sights, repeat steps 4 - 7 using appropriate data.

8. When all the topographic details in the area of the occupied station (110) have been recorded, the total station is moved to the next traverse station and the process is repeated.

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9. Download the data to a computer, where it is stored into a format that is compatible with the computer program that is to process the data.

10. If the topographic data are for a closed traverse, the traverse closure is calculated, and then all adjusted values of X, Y, Z are computed.

11. From the data stored in coordinate files, the data required for plotting by digital plotters is assembled, and the survey can be quickly plotted at any desired scale.

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