

Coordinate Measurement using Total Station

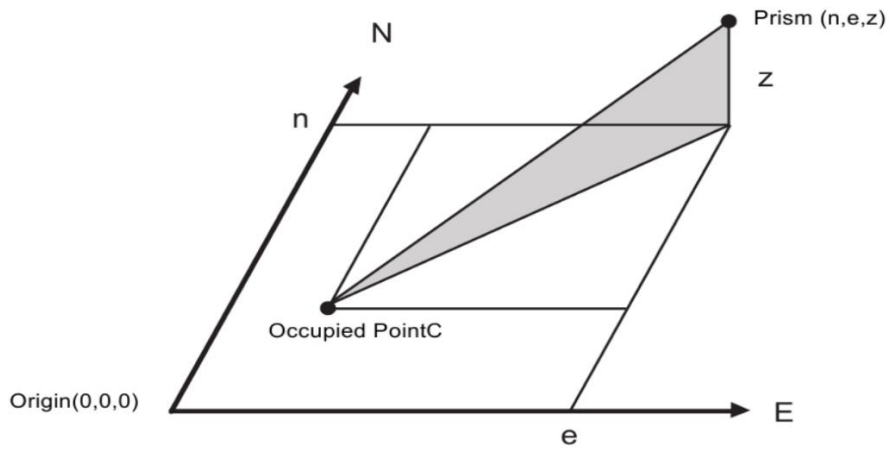
For measuring the coordinates of an unknown point, the instrument should know the coordinates of the point on which it is setup and the instrument should also know our reference coordinate directions (i.e. which direction corresponds to Northing/Easting). This is achieved by the process of orientation. There are several methods of orienting a Total Station, here we will use the backsight coordinate method.

Orientation:

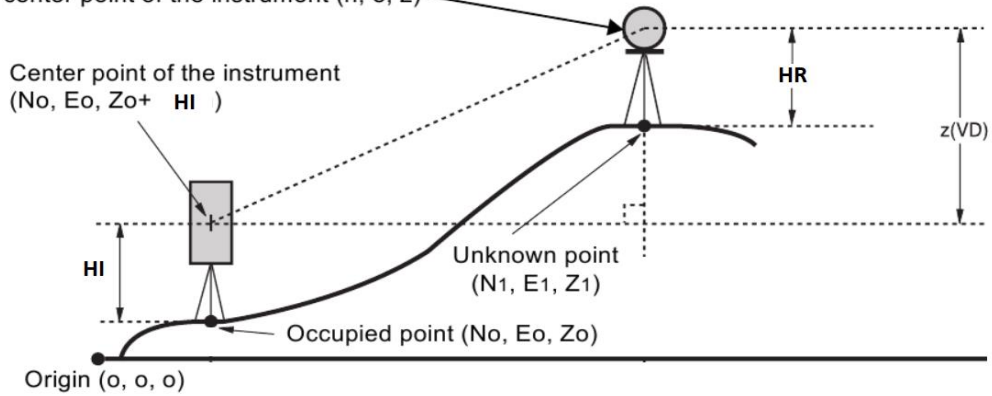
- 1) After setting up the instrument on a known station turn the instrument on and go into coordinate measurement mode.
- 2) Select Occ. Orientation (Occupied Station Orientation) and enter the Northing (N_o), Easting (E_o) and Elevation (Z_o) of the occupied point. Also enter a name for the station point and the height of instrument above the station (HI or INS.HT).
- 3) Select the Backsight Coordinate (NEZ) option and enter the coordinates of known point on which we are going to take the backsight and press OK.
- 4) Sight the known point through the telescope and put it in the crosshairs accurately and press "YES".
Note: We can target the point on the ground or a prism above the point. It doesn't make a difference because this operation is not dependant on Elevation.
- 5) The total station is now oriented.

Coordinate Measurement of unknown point:

- 1) Once oriented select the OBSERVATION option.
- 2) Place a prism on the unknown point keeping the staff of the prism as vertically erect as possible.
- 3) Check the height of Prism/Reflector and enter the value in total station (HR or R.HT)
- 4) Target the prism and press the MEAS (measure) function key.
- 5) The total station will display coordinates of the unknown point and will allow us to enter a name for this point.
- 6) You can note down the coordinates or record them in the total station.



Coordinates of the center of the prism, originated from the center point of the instrument (n, e, z)



Coordinates of occupied point	: (N_0, E_0, Z_0)
Instrument height	: HI
Prism height	: HR
Vertical distance (Relative elevation)	: $z(VD)$
Coordinates of the center of the prism, originated from the center point of the instrument	: (n, e, z)
Coordinates of unknown point	: (N_1, E_1, Z_1)
$N_1 = N_0 + n$	
$E_1 = E_0 + e$	
$Z_1 = Z_0 + HI + z - HR$	

VIDEO LINK:

<https://youtu.be/4C3jDWtx9fA>

Note:

- 1) Start from 1:13
- 2) The video is not perfect so when in doubt follow the procedure given in this document.
- 3) The purpose of taking a backsight is to orient the instrument and not what the person in the video says.