

## Introduction of Total Station

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**Abstract-**In the era of science and technology we need advanced techniques for any work. To make work fluent in surveying advanced instrument are used for easy and fast working. One of them is Total Station. Total station is an instrument use for calculating area horizontal and vertical distance, starting points from one station, Total station, is one of the very accurate instrument with reliable readings and less error. The completion of work done in site and office word.

### 1. INTRODUCTION

Total station surveying define as the use of electronic survey equipment use to perform horizontal and vertical measurements in reference to grid system. Total station is expensive instrument use in survey. The height differences and the coordinates are calculated automatically and all measurements and additional information are recorded. The measurements results can be recorded into the internal memory and transfer to a personal computer interface. For design and established 3D representation of the building. AutoCAD program is adopted. It is completely faster and effortless.

The name Total station is applied to instrument that combine an Electronic distance –measuring (EDM) instrument and theodolite. The total station consists of a measure angle and distance at the same time. The total station are use wherever the position and heights of points or nearly their positions, needed to determine,

Total Station is a compact instrument and weighs 50 to 55 N. A person can easily carry it to the field. It also consist a battery socket which houses the battery. A fully charged battery works for about 3 to 5 hours continuously. It also has the memory card to store the data. The processors is capable of applying temperature, and pressure correction to the measurements if atmospheric temperature and pressure are supplied.

### 2. LITERATURE REVIEW

Sami H, Ali, Najat Nader omar [2016] provided recent technological developments surveyors new high take surveying equipment, such as, prism less total station instruments. The results of the current practical field experiments, computations and analysis of this test using various calculations and list squares theory (computer adjustment programs, Excel and Auto CAD 2010) are also presented in digital and graphical forms.

### 3. TOTAL STATION PARTS



### 4. SETUP OF TOTAL STATION

➤ **Tripod Setup-** Tripod legs should be equally space, it should be approximately level. Head should be directly over survey point.

➤ **Mount Instrument On Tripod** –Place instrument on tripod secure with centering screw while bracing the instrument with the other hand. Insert battery in instrument before leveling.

➤ **Focus on Survey Point-**Focus the optical plummet on the survey point.

➤ **Leveling The Instrument-** Adjust the leveling foot screws center the survey point in the optical plummet reticule. Centre the bubble in the circular level by adjusting the tripod legs. Loosen the horizontal clamp and turn instrument until plate level is parallel to 2 of the leveling foot screw. Centre the bubble using the leveling screw the bubble moves towards the screw that is turned clockwise. Observed the survey point in the optical plummet and center the point by losing the centering screw and sliding the entire instrument. It should be checked that the plate level bubble is level in several direction.

➤ **Electronically Verify Leveling-** Turn on the instrument by pressing and holding the “ON” Button opening screen will be the “MEAS” screen. Select the TITLE function adjust the foot level screws to exactly center the electronic bubble. Rotate the instrument 90 degrees and repeat.

➤ **Adjust Image and Reticule Focus-**Releases the

horizontal and vertical clamps and point telescope to a featureless light background. Adjust the reticle focus adjustment until reticle image is sharply focused. Point telescope to target is focus. Move your head from side to side to test for image shift. Repeat the process.

#### **5. ACCURACY OF TOTAL STATION**

Accuracy depending upon the instrument and varies from instrument to instrument:

- The angular accuracy varies from 1" to 20"
- The distance accuracy depends upon two factors Instrumental error which ranges from +/- 10mm to +/-.

#### **6. CALCULATING AREAS**

- Set up the total station in the terrain so that it is within view of the entire area to be surveyed. It is not necessary to position the horizontal circle.
- Determine the boundary points of the area sequentially in the clockwise direction. You must always measure distance.
- Afterwards, the area is calculated automatically at the touch of a button and is displayed.

#### **7. TOTAL STATION CAN BE USED**

- When two points are given.
- When only one co-ordinate is given. In this case the coordinate of the back station is determined by any suitable method.
- When no coordinate were given in which case arbitrary system of coordinate can be used.

#### **8. FUNCTION PERFORMED BY TOTAL STATION**

Total station, with their microprocessor, can performed a variety of functions and computations, depending on how they are programmed. The capabilities vary with different instrument, but some standard computations include:

- Averaging multiple angle and distance measurements.
- Correcting electronically measured distanced from prism constant, atmospheric pressure, and temperature.
- Making curvature and refraction correction to elevation determine by trigonometric leveling.
- Reducing slope distance to their horizontal and vertical components.
- Calculating point elevations from the vertical distance components (Supplemented with keyboard input of instrument and reflector heights).
- Computing coordinates of survey points from horizontal angle and horizontal distance.

- **Averages multiple angles** measurements.
- **Averages** multiple **distance** measurements.
- Compute **horizontal** and **vertical distances**.
- **Correction** for temp, pressure, and humidity.
- **Compute** inverse, polar, and resection.
- **Compute** X, Y, and Z **coordinates**.

#### **9. APPLICATION OF TOTAL STATION**

There are many other facilities available, the total station can be used for the following purposes.

- Detailed survey i.e., data collection.
  - Control survey (Traverse).
- Height measurement (Remove elevation measurement- REM).
- Fixing of missing pillars (or) setting out (or) stake out.
  - Resection.
  - Area calculation, etc.
  - Remote distance measurement (REM) or missing line measurements (MLM).

#### **9. CONCLUSION**

By using Total Station, it is very easy to calculate the vertical and horizontal distances. It record the data in the inbuilt data recorder and generate map in friction of time. Hence time consuming will be less and total station made survey work easy. For taking more advantages for survey Total Station should be use.

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