



AVIT
AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

Name of the Lab- Survey practical II laboratory

Standard Operating Procedures (SOP)

Theodolite



A theodolite works by combining optical plummets (or plumb bobs), a spirit (bubble level), and graduated circles to find vertical and horizontal angles in surveying. An optical plummet ensures the theodolite is placed as close to exactly vertical above the survey point. The internal spirit level makes sure the device is level to to the horizon. The graduated circles, one vertical and one horizontal, allow the user to actually survey for angles.

How to Use a Theodolite

1. Mark the point at which the theodolite will be set up with a surveyor's nail or a stake. This point is the basis for measuring angles and distances.

2. Set up the tripod. Make sure the height of the tripod allows the instrument (the theodolite) to be eye-level. The centered hole of the mounting plate should be over the nail or stake.
3. Drive the tripod legs into the ground using the brackets on the sides of each leg.
4. Mount the theodolite by placing it atop the tripod, and screw it in place with the mounting knob.
5. Measure the height between the ground and the instrument. This will be used a reference to other stations.
6. Level the theodolite by adjusting the tripod legs and using the bulls-eye level. You can make slight tunings with the leveling knobs to get it just right.
7. Adjust the small sight (the vertical plummet) found on the bottom of the theodolite. The vertical plummet allows you to do ensure the instrument remains over the nail or stake. Adjust the plummet using the knobs on the bottom.
8. Aim the crosshairs in the main scope at the point to be measured. Use the locking knobs on the side of the theodolite to keep it aimed on the point. Record the horizontal and vertical angles using the viewing scope found on the theodolite's side.

Advantages of Using a Theodolite

Theodolites have many advantages when compared to other leveling instruments:

- Greater accuracy.
- Internal magnifying optical system.
- Electronic readings.
- Horizontal circles can be instantly zeroed or set to any other value.
- Horizontal circle readings can be taken either to the left or right of zero.
- Repeat readings are unnecessary

Standard Operating Procedures (SOP)

Tacheometer



A Tacheometer is used in surveying to determine vertical and horizontal angles by combining optical plummets (or plumb bobs), a spirit (bubble level), and graduated circles. An optical plummet ensures that the theodolite is positioned as vertically above the survey point as possible. The device's internal spirit level ensures that it is parallel to the horizon. The graduated circles, one vertical and one horizontal, enable the user to conduct an actual angle survey.

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Standard Operating Procedures (SOP) Dumpy level



A dumpy level, also known as an automatic level or builder's level, is a tool designed to find the height of land masses. Though these devices may look intimidating or confusing, dumpy levels are fairly easy to use once you know how to set them up and what kinds of measurements they provide.

How to Use a Dumpy Level

1. Find a benchmark location near the spot you want to measure.
2. Set your tripod up near the spot you want to measure
3. Connect your device to the tripod and position it over 2 leveling screws.
4. Level the device by adjusting the 2 leveling screws.
5. Turn your telescope 90 degrees and adjust the third leveling screw.
6. Check your level's calibration by turning it 180 degrees.
7. Remove your dumpy level's lens cap.
8. Adjust the eyepiece until you can see the device's crosshairs.
9. Twist the device's focusing knob until the image is clear.
10. Position an E staff on top of your benchmark spot.

11. Find the height difference between your level and the benchmark spot.
12. Calculate your level's actual height using the benchmark height.
13. Find the height difference between your level and the unmeasured spot.
14. Calculate the spot's actual height using your level's height.


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