

Name: Muhammad Musaib
Contact No: 03459208928

SURVEY LAB INSTRUMENTS FOR COMMERCIAL USE

Automatic Level Machine

Automatic level is an optical instrument used to establish or verify points in the same horizontal plane. It is used in surveying and building with a vertical staff to measure height differences and to transfer, measure and set heights.

The level instrument is set up on a tripod and, depending on the type, either roughly or accurately set to a leveled condition using foot screws (leveling screws). The operator looks through the eyepiece of the telescope while an assistant holds a tape measure or graduated staff vertical at the point under measurement. The instrument and staff are used to gather and/or transfer elevations (levels) during site surveys or building construction. Measurement generally starts from a benchmark with known height determined by a previous survey, or an arbitrary point with an assumed height.

An Auto Level is a Professional Leveling Tool used by Contractors, Builders, Land Surveying Professionals, or the Engineer who demands accurate leveling every time. Auto Levels set up fast, are easy to use, and save time and money on every job.

It covers the following topics:

- Carrying of road alignment project
- Carrying of canal alignment project
- Carrying of drainage alignment project
- Shifting of benchmark (fly leveling)
- To complete cross sectional and longitudinal surveys
- To determine the design levels



Fig 1: Auto Level

Theodolite Machine

A theodolite is a precision instrument for measuring angles in the horizontal and vertical planes. Theodolites are used mainly for surveying applications, and have been adapted for specialized purposes in fields like metrology and rocket launch technology. A modern theodolite consists of a movable telescope mounted within two perpendicular axes the horizontal axis, and the vertical axis. When the telescope is pointed at a target object, the angle of each of these axes can be measured with great precision.

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 the horizon. The graduated circles, one vertical and one horizontal, allow the user to actually survey for angles.

It covers the following topics:

- Triangulation survey
- Carrying of road alignment project
- Area measurement
- To find out horizontal angles
- To find out vertical angles
- To plot traverse
- To set out curves
- To draw contour maps
- Meteorology
- Laying out building corners and lines
- Measuring and laying out angles and straight lines
- Plumbing a column or building corner
- Ranging

- Leveling
- Optical distance measurement
- Controlling verticality



Fig 2: Theodolite

Total station

A **total station** or **TST (total station theodolite)** is an electronic/optical instrument used in modern surveying and building construction. The total station is an electronic theodolite (transit) integrated with an electronic distance measurement (EDM) to read slope distances from the instrument to a particular point, and an on-board computer to collect data and perform advanced coordinate based calculations.

It covers the following topics:

- Slope Staking
- Topographic surveys
- Construction project layout
- Building corners
- Control and offset lines
- Leveling
- Traverse surveys and adjustments
- Building Face Surveys
- Resections
- Areas Intersections
- Point Projections
- Taping from Baseline
- Road (Highway) Surveys



Fig 3: Total Station

Structural Engineering lab Tests

Structural Engineering Lab of Abasyn University Peshawar has Universal Testing Machine for testing of Concrete and Steel strengths. The capacity of the UTM in Abasyn University Peshawar is 1000 KN.

Following tests can be conducted using UTM

1. Compressive Strength of Concrete Cylinders, Blocks and Brick
2. Tensile Strength of Steel



Figure 01: Universal Testing Machine

Commercial Equipment List

1. Mix Design of concrete



Concrete mixers (manual and automated)



Workability apparatus (slump cone, Compacting factor, Vebe) And Air content apparatus

- Specification-ACI practices 211.1
- Workability (ASTM C-143)
- W/c ratio
- Water and Air content
- Aggregate gradation
- Cement properties

2. Compressive strength of concrete test



Compressive testing machine

- Load capacity -650000psi (3000KN)
- Compressive strength test of concrete cubes, cylinders
- ASTM C39 / C39M

3. Non destructive test for compressive strength of concrete



Schmidt Hammer (MATEST)

- Load capacity -8500 psi
- Non-Destructive Compressive strength test of concrete cubes, cylinders
- ASTM C805 / C805M

Equipment for Highway & traffic Engineering

Following is the list of equipment that can be used for commercial testing of Highway & Traffic Engineering



Loss-Angel's Abrasion Test



Marshall Stability Tester



CBR Apparatus



PENETROMETER



Ring & Ball Apparatus

Equipment for Foundation Engineering:

Following are the pictures of apparatus that can be used in determining bearing capacity of different types of soil.



Figure 1: Triaxial Testing Machine



Figure 2: Consolidation test Apparatus



Figure 3: Shear Box Test Apparatus



Figure 4: Speedy Moisture Apparatus