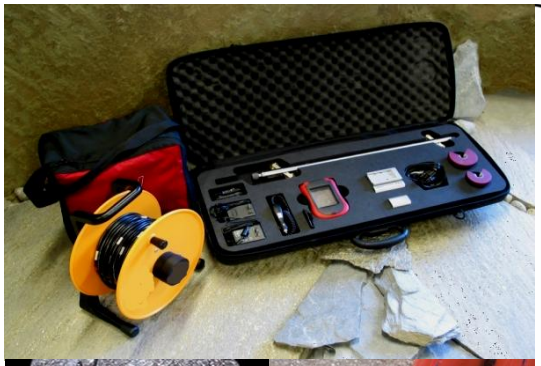
VERTICAL INCINOMETER



Systel Inclinometer Probe is used in conjunction with inclinometer casing for the measurement of lateral earth movements which might occur in unstable slopes, landslides, dam and roadway embankments, and landfills. They are also used to measure deflections in

- Dams
- Tunnels
- Deep Excavations
- Retaining Walls
- Embankments
- Piles

The inclinometer system consists of inclinometer casing and a chain of inclinometer sensors. The inclinometer casing is installed in a vertical borehole that passes through a suspected zone of movement. The chain of sensors is positioned inside the casing to span the zone of movement.

The inclinometer probe is inserted into specially designed and installed inclinometer casing. The casing has two pairs of alignment keyways in which the probe guide wheels run. The accelerometers measure the angular difference between the probe's axis and the vertical planes. The angles are converted to horizontal displacement in millimeters over the probe gauge length of 500mm. The casing can be grouted into a borehole formed in natural ground, embedded in fill material of an embankment or the concrete of a pile or diaphragm wall, or secured to the surface of a structure to be monitored. The two pairs of guide wheels on the probe, in conjunction with the casing keyways, ensure coaxial alignment of the probe relative to the casing and orientation control measurement axis.

Telescoping couplings are used to accommodate compression or extension of the casing where settlement or heave may occur in the ground hosting the installation. If these are not installed, compressive or extensive forces could deform the inclinometer casing to failure point preventing further inclinometer probe passage.

The configuration of both the probe and the casing therefore enables lateral movements at depths to be monitored with a high degree of sensitivity and accuracy. For borehole or embedded installations the base of the casing should be firmly founded in stable strata beyond the zone of anticipated movement, as any lateral movement is assumed relative to a fixed datum point. If this is not possible, the top of the casing may be measured topographically and movements calculated relative to that point

Taking Reading

The sensors measure the inclination of the casing which is installed. The changes found in the inclination readings indicate that the casing has been displaced by ground movement. The total amount of displacement is calculated by finding the difference between the current inclination reading and the initial reading and then converting the result to a lateral distance.
Displacement readings are taken at regular intervals (0.5m) within the casing; this is measured and controlled by graduation markers on the cable. An initial or 'base' set of inclinometer readings are obtained at each increment along the casing. Summation of each incremental reading provides a profile of horizontal displacement of the casing as a function of depth. Subsequent readings are taken at identical depths. Comparison of successive casing profiles indicates the depth, direction, magnitude and the rate of change of movement, the clearest indication of this is given by plotting the change in displacement of the casing against depth using In-site inclinometer processing software.
In most applications the inclinometer sensors are connected to a data acquisition system which continuously monitors movements and can be pre-programmed to trigger an alarm when it detects a change, or rate of change, that exceeds a preset value.

SPECIFICATION

Standard Range ±53°
Resolution ±0.025 mm/500 mm (±10 arc seconds) (Metric)
Total System Accuracy ±6 mm/30 m (Metric)
Temperature Range 0°C to +50°C
Length × Diameter 750 × 35 mm, 1200 × 25 mm (Metric)
Wheelbase 0.5 m, 1 m (Metric)
Casing Size I.D. 51 to 89 mm (2 to 3.5 in)
MEMS Inclinometer Probes