

Horizontal Digitilt Inclinometer Probe

Applications

Horizontal inclinometers are used to obtain profiles of settlement or heave. Typical applications include monitoring settlement and heave under storage tanks, embankments, dams, and landfills.

Operation

The horizontal version of the Digitilt inclinometer system consists of inclinometer casing, a horizontal probe, control cable, pull cable, and a readout unit.

The inclinometer casing is installed in a horizontal trench or borehole with one set of grooves aligned to vertical. When the far end of the casing is not accessible, a dead-end pulley and cable-return pipe are installed along with the casing.

The probe, control cable, pull-cable, and readout unit are used to survey the casing. The initial survey establishes the profile of the casing, and subsequent surveys will reveal changes in the profile if ground movement occurs.

The horizontal inclinometer probe employs a force-balanced servo-accelerometer to measure tilt in the plane of the probe wheels.

During a survey, tilt measurements are obtained at half-meter or 2-foot



intervals as the probe is drawn from one end of the casing to the other. The probe is then reversed end-for-end and drawn through the casing a second time. Tilt measurements from the reversed probe are used to eliminate any error due to sensor bias and to generate checksums for validating the survey.

Settlement and heave are calculated as $L(\sin \theta_1 - \sin \theta_0)$, where L is the measurement interval, θ_1 is the current tilt, and θ_0 is the initial tilt.

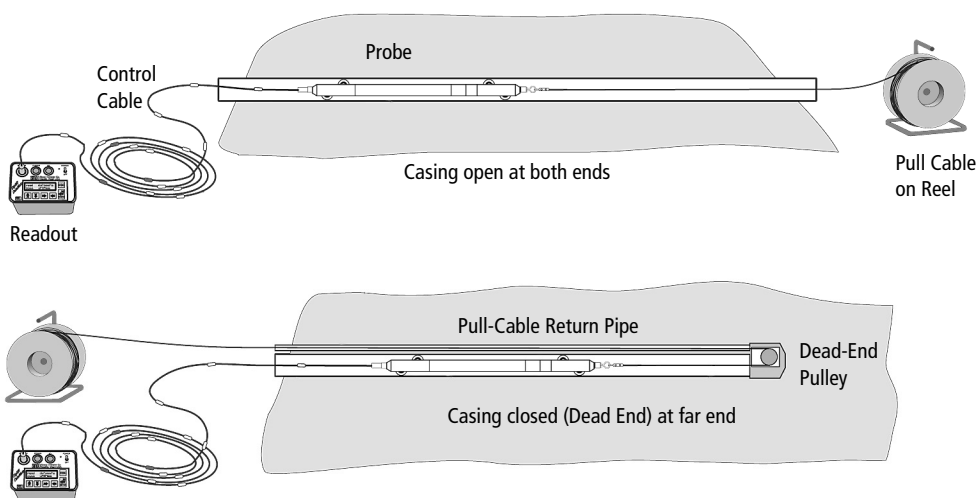
Settlement profiles are generated by summing displacements and plotting them.

Advantages

Full Settlement Profiles: Horizontal inclinometers provide complete profiles of differential settlements.

Simple Operation: Horizontal inclinometers are much easier to use than other types of settlement profilers. There are no liquid reservoirs or pressure sources to adjust and maintain.

Proven Reliability: The Digitilt inclinometer probe has earned a world-wide reputation for high precision and durability.



HORIZONTAL DIGITILT PROBE

Horizontal Probe, Metric-Units . . . 50303510

Horizontal Probe, English-Units . . . 50303500

Digitilt inclinometer probe includes a carrying case, accessories and an instruction manual. Control cable and readout are not included.

| | Metric | English |
|-----------------|---|---------------|
| Sensor Type | Analog force-balanced servo-accelerometer | |
| Wheel Base | 500 mm | 24 inch |
| Cal Range* | ±30° | ±30° |
| Sys Resolution* | 0.01 mm | 0.0006" |
| Sys Accuracy* | ±6 mm / 25m | ±0.3" / 100' |
| Precision | ±0.01% FS | |
| Temp | -20 to +50 °C | -4 to +122 °F |
| Size | 38x650 mm | 1.5 x 39" |
| Weight | 4.6 kg | 10.6 lb |
| Material | Stainless Ste | |
| Casing Req | 70 or 85mm | |

Calibrated Range: Metric and English unit probes are calibrated to ±30° and have an over-range to ±53° and ±42° respectively.

System Resolution: The resolution derived from a two-pass survey converted to mm and inches per standard interval.

System Accuracy: Specifications were derived empirically from the analysis of a large number of surveys and include errors introduced by casing, probe, cable, readout, and operator. Casing was installed within 3 degrees of vertical. Operators followed recommended survey practices. After correcting for systematic errors, the best accuracy obtainable is ±1.4 mm per 50 readings with metric systems and ±0.05 inch per 50 readings with English systems.

CONTROL CABLE

50m Control Cable, Complete . . . 50601050

100m Control Cable, Complete . . . 50601100

150 ft Control Cable, Complete . . . 50601003

300 ft Control Cable, Complete . . . 50601004

Depth Marks: Metric cable has 0.5m depth marks English cable has 2 foot marks. Marks are molded onto the cable jacket and cannot slip.

Construction: Cable is supplied with no splices or surface defects. Kevlar core provides tensile strength. Dacron torsion braid counters twist and provides dimensional stability. Polyurethane jacket resists chemicals and abrasions and stays flexible in cold temperatures.

Custom Length Cables: Lengths up to 300m (1000 ft) are available on special order. Extension cables are also available.

DIGITILT DATAMATE READOUT

Digitilt DataMate II 50310900

Readout includes hand switch, battery charger with international plugs, and USB cable for PC.

Compatibility: Digitilt probes, both vertical and horizontal, Digitilt tiltmeters, and spiral sensors.

Survey Types: 2-pass surveys for inclinometer probes; 4-pass surveys for spiral sensors.

Minimum Reading Interval: 0.5 m for metric systems and 12 inches for English systems.

Display: Two line backlit LCD shows readings in traditional sine units: 25000 sine (angle) for metric systems and 20000 sine (angle) for English.

Memory Capacity: 160 installations and 32000 A & B axis readings.

Battery: 6 volt, 6 Ah, lead-acid gell cell powers readout and probe up to 16 hours per charge.

Temp Rating: -20 to 50°C (-4 to 122°F).

Case: Aluminum case is splash proof. Connectors are waterproof when capped or in use.

Size & Weight: 127 x 178 x 178 mm at 3 kg. (5 x 7 x 7" at 6.5 lb).

DIGIPRO2 SOFTWARE

DigiPro2 Software Download

DigiPro2 License Key 50310101

DigiPro2 software is an essential component of the classic system. It has two modes, basic and advanced.

DigiPro2 Basic is free to use and provides all the functions necessary to retrieve surveys from the DataMate and make simple plots.

DigiPro2 Advanced provides correction routines, reports, and many other features that enabled by purchase of a license key. Features are described in a separate datasheet and on the website.

PULL CABLE

Pull Cable 50402310

Extra Carabiner 02750012

Extra Saddle Clamp 02700067

Pull cable is 1/8" stranded stainless steel cable and is used to draw probe to far end of casing. Order one pull cable for each casing installation. If using a dead-end pulley, length of pull cable should be at least twice the length of the casing.

A carabiner and saddle clamp are included with the probe. These are installed on the pull cable and left in the casing with the pull cable. Additional carabiners, saddle clamps, (and pull cable) should be ordered if there is more than one casing installation to be monitored.

DEAD-END PULLEY

Dead-End Pulley 50302951

Cable-Return Pipe 50711104

Coupling for Pipe 50711604

Dead-end pulley is required when far end of casing is not accessible. Rated for casing up to 60 m (200') long.

Cable-return pipe is used with dead-end pulley. 1/2" schedule 40 PVC pipe is supplied in 10" (3.05 m) lengths.

Couplings are used to join lengths of pipe. PVC cement is required for assembly.

SLIP-RING REEL

200 m (650') capacity 50503100

300 m (1150') capacity 50503300

Slip-ring cable reel allows the readout to remain connected while the reel is operated. Includes jumper cable to connect reel to readout.

STORAGE REEL

70 m (230') capacity 50502050

100 m (360') capacity 50502110

Sturdy storage reels have large diameter hub keeps cable neat when not in use. 30, 50, and 100 m reels are heavy-duty plastic. 200 m reel is steel.