

Focus-Information

▼ Geotechnology ▼ Hydrogeology ▼ Monitoring
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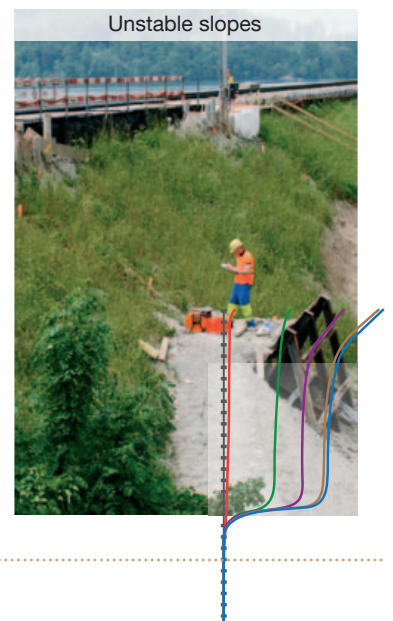
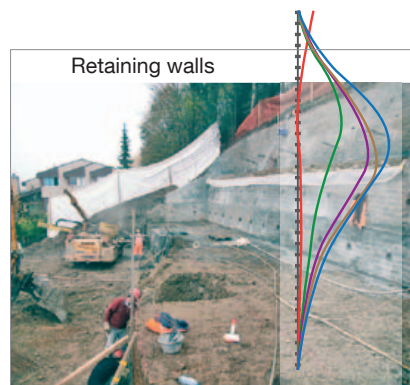
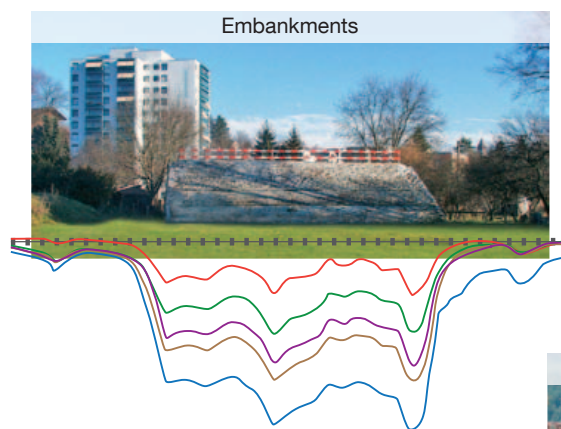
Geotechnology >> Line-wise displacement measurement

Inclinometer Measurements

For detection of deformation in boreholes and measurement casing along a profile

Applications

In Geotechnics, Inclinometer measurements are employed for a variety of applications. The measurement method employs the highly-developed tilt measurement technique to monitor structures such as deep excavations, as well as the stability of slopes.



Typical Applications

- Inclinometer measurements assist in determining magnitude and direction of displacement in potential or active landslides.
- Inclinometer measurements are frequently used to check calculations and monitor safety upon completion of excavations.
- Under embankment dams for roads and railway lines, and for soil consolidation

- tion (e.g. consolidation tests), vertical displacements under the embankment can be measured with horizontal and vertical borehole inclinometers. With these measurements, settlement and horizontal displacement are monitored and accurately localised.
- During Tunnel construction, especially in urban areas, Inclinator measurements

- provide crucial information about displacement. In addition, borehole Inclinator measurements prove useful during excavation beneath grout shields and collars.
- Ground freezing projects require frequent measurement of displacement which is another typical application for the borehole Inclinator.

Measurement and Interpretation

An experienced measurement technician performs the measurements in the field. Back at the office, the data are transferred to the office PC for interpretation and analysis. The results are presented in graphic and table form via the TRICAL software. Spiral effects on the inclinometer casing and displacements of the top or end of the inclinometer casing (e.g. measured with geodetic instruments) are included within data analysis. In addition, measurement casing which has been split into two parts (e.g. by tunnel excavation) can be analyzed using TRICAL software. The acquired displacements can be exported as an ASCII-File for further analysis (back calculation, import into CAD program, etc.).

Optimisation

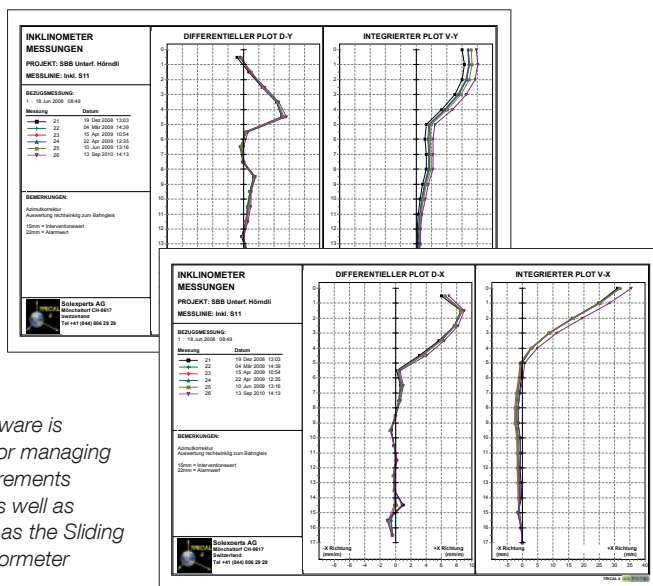
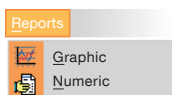
In many cases, it is beneficial to measure the axial displacement Z in addition to the horizontal displacements X and Y. For this situation, Solexperts has developed a measurement casing in which both the Sliding Micrometer and Inclinometer can be employed.

Data Visualisation

For complex construction and monitoring sites, the Solexperts DAVIS software provides a comprehensive overview of data from a variety of instruments and sensors. The Inclinometer measurements can be entered along with other measurements (manual or automatic) for easy display and analysis. The program provides a comprehensive overview of the site and the measured parameters, as well as offering advanced plotting and calculation options.

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Solexperts TRICAL software is specifically developed for managing and interpreting measurements from the Inclinometer as well as other instruments such as the Sliding Micrometer, Sliding Deformeter and TRIVEC.

Measurement Casing

Depending on the application and requirements, various measurement casings with guiding grooves can be installed:

- Standard Solexperts Inclinometer casing: constructed of PVC, outer diameter 70 mm, inner diameter 58 mm, selfcentering couplings every 3.05 m. If large displacement is expected in the direction of the casing, the casing is equipped with telescoping couplings.
- Combination casing: can also be used for Sliding Micrometer or Sliding Deformeter measurements, to detect vertical and horizontal directions.



Measuring Equipment

Measurements are carried out with a Glöttz vertical or horizontal Inclinometer probe. Measurements are always taken at two instrument positions in order to compensate for systematic errors of the sensor and to check the individual readings.

Measurement values are automatically recorded and checked on site by the URD (Universal Readout Device) and a Manual Readout Device.

