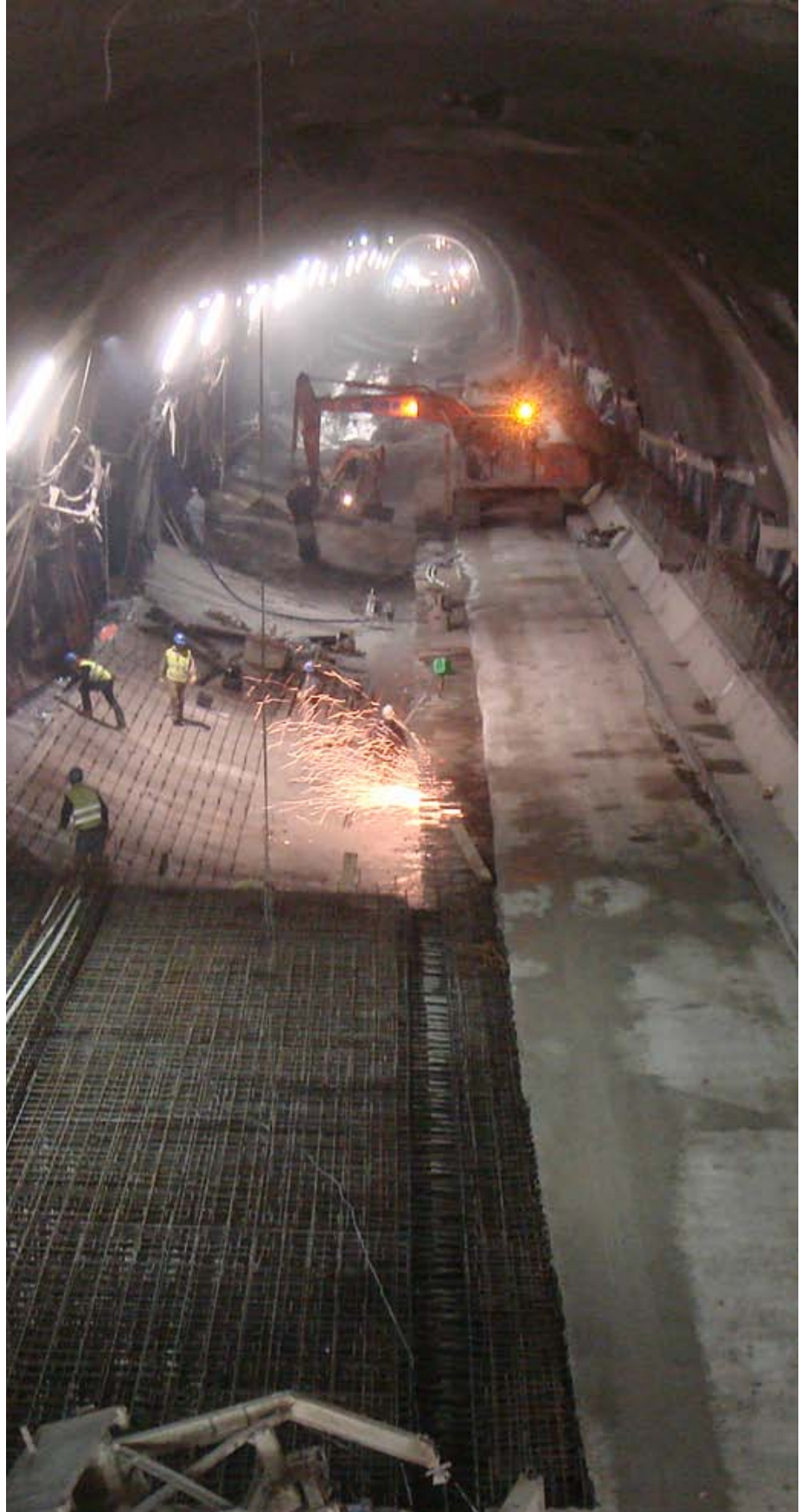
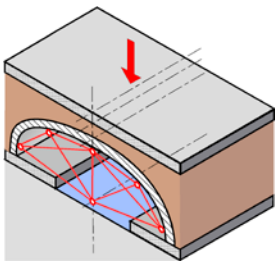
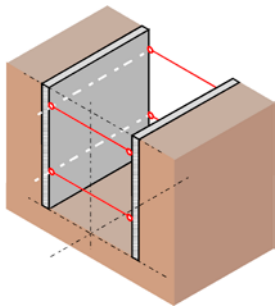
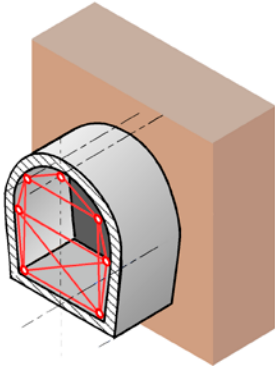


Distometer ETH

**Precision Instrument for
Measuring Length Deviations
using INVAR wire.**

Developed by the Swiss Federal
Institute of Technology, Zurich (ETH)





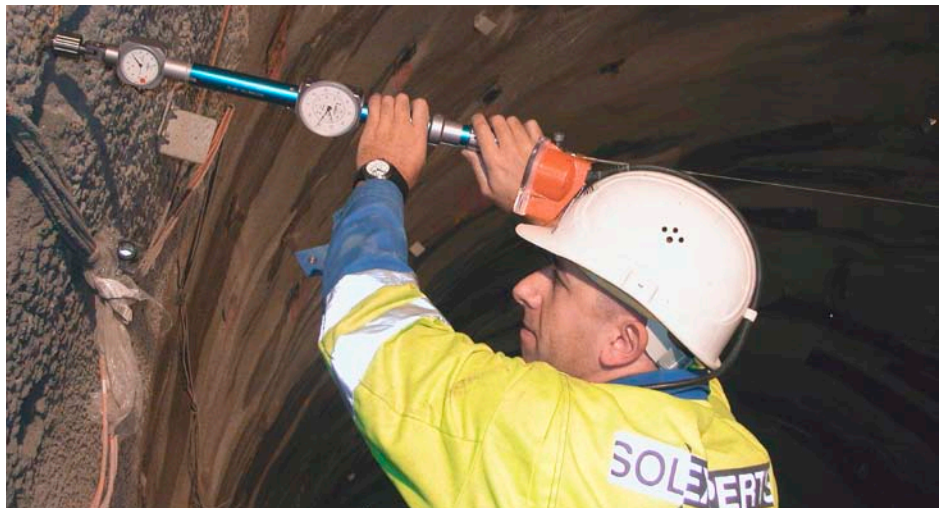
The Distometer ETH is the ideal instrument for measuring convergence with high precision and reliability in situations where optical methods are not applicable. The instrument is suitable for difficult measurement conditions, poor visibility, or situations where a higher accuracy (1/10 mm) is required. The Distometer ETH has been proven in projects throughout the world - it is easy to use, robust and adaptable to many applications.

Typical Applications

- Deformation measurements of tunnel walls
- Monitoring wall displacement in excavations
- Deformation measurements of vaults affected by load types 1 and 2

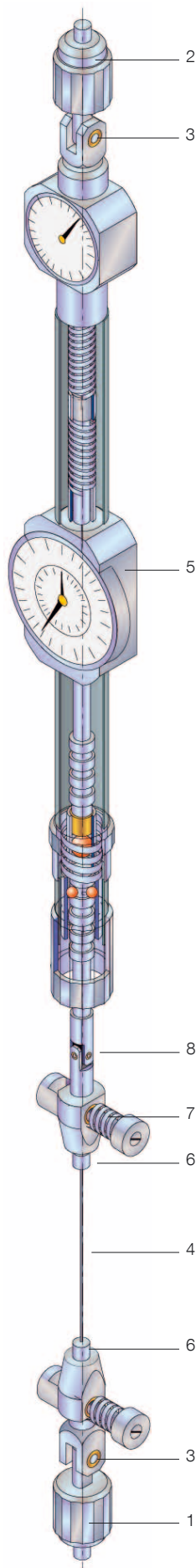
Special Features

- Precise
- Portable, lightweight
- High measurement accuracy and reproducibility
- No electronics or electrical cable
- Lengths of any inclination can be measured (including vertical)



Advantages

- Easy, quick application
- High degree of measurement certainty
- calibration possible at all times



The «Distometer chain» consists of these main components

Invar wire

An Invar wire (4) which, under a constant preset tension, provides a stable, uniform length largely independent of temperature. The wire is equipped with two couplings (6) which attach with special adaptors (7) to swivel joints (3, 8) for precise connection to the Distometer on one end and to a secured point on the other.

Setting Bolts

Two Setting bolts (1) and (2), to secure the reference points at the objects to be measured. Various types of measurement bolts are provided. For every type of measured object there is an appropriate setting bolt for grouting or adhering to concrete, brick, etc., for welding to steel surfaces, or for use in shotcrete linings.

Tension Gauge and Displacement Gauge

A Distometer (5) which contains a Tension Gauge and a Displacement Gauge: During measurement, the tension gauge holds the invar wire under the required tension. It consists mainly of a precision steel spring whose elongation is a measure of the tension affecting the invar wire. The desired tension (elongation) can be preset to a required value on the gauge. The displacement gauge measures the distance between the distometer and the attached end of the invar wire.



Types of setting bolts

The individual Invar wires of successive lengths are stored on spools in a storage case



Calibration

The lengthwise consistency of the Distometer can be verified on site with the calibration unit at any time.

Technical Specifications

- Length of measured distance: ... min. 1 m to max. 50 m
- Distance deviation: 0 to 100 mm
- Sensitivity: $\pm 0,01$ mm
- Accuracy (average deviation): up to 20 m length: $\pm 0,02$ mm
greater length than 20 m: $\pm L \times 10^{-6}$
- Invar wire (conditioned): $\varnothing 1$ mm
- Wire tension strength: $80 \text{ N} \pm 0,15\%$
- Setting bolts: M8
- Wire spools: $\varnothing 330$ mm
(Transport case for 15 spools)
- Weight:
 - Distometer with swivel-joint connectors: 2,300 kg
 - Separate swivel-joint connector: 0.300 kg
 - Calibration unit: 4,200 kg
 - Calibration standard weight: 8,000 kg
 - Wire spool: 0,250 kg

Technical specifications subject to change

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