The sliding micrometer, developed at the institute for road, railway and rock construction of the Technical University of Zurich, Switzerland, is a probe extensometer of high precision. The instrument is used to continuously determine the axial displacement components along bore holes in rock, concrete or soil. High precision measurements are achieved by using the cone-sphere principle for tensioning the portable sliding micrometer in the measuring marks.

Metallic measuring marks, connected with each other by a plastic protective casing, are firmly grouted in bore holes with a diameter of approx. 100 mm or any pre-cast tube-like opening in concrete. Before injecting we recommend to control the proper installation of the protective casings by a sliding micrometer measurement.

The probe, weighing about 3 kg, is inserted into the casing and moved in a step-by-step fashion between the measuring marks which are at 1.0 m intervals. Both the spherically shaped probe heads and the measuring marks are provided with recesses which enable the probe to slide along the casing from one measuring mark to the next (sliding position). By rotating the probe 45 and pulling back on the guide rods, the probe’s two heads are tensioned between two adjacent measuring marks (measuring position).

A linear displacement transducer inside the sensor head is activated, and the measured values are transmitted by a cable to the digital readout unit with internal data memory.

In vertical or strongly inclined measurement casings (with depths up to approx. 30 m) the probe can be brought into measuring position and tensioned with only the aid of guide rods. For depths greater than 30 m, the movement and tensioning of the probe is accomplished by a winch and the reinforced electric cable. The probe is still positioned by guide rods. If horizontal or slightly inclined measuring casings are used, it is possible to measure straight lines up to a length of 100 m without a winch.

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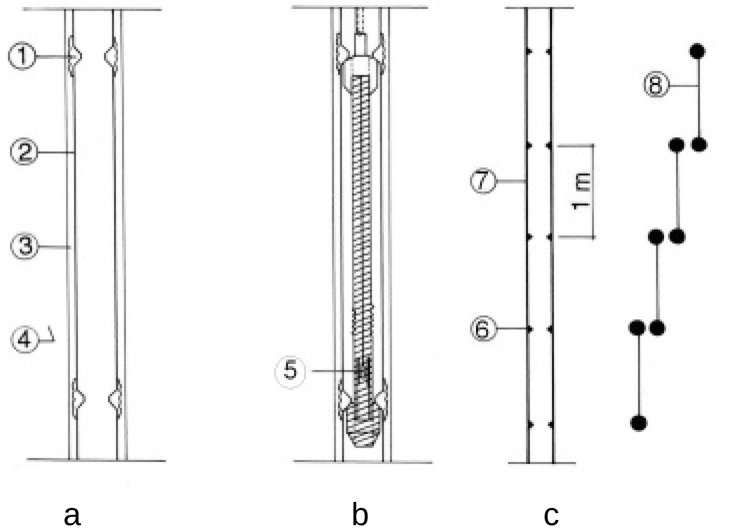

Fig. 1 Sliding micrometer ISETH (according to THUT, 1985)

a) Measuring tube cemented in the borehole
1 Conic measuring marks, 2 HPVC casing, 3 Injection medium, 4 Rock, concrete or soil

b) Sliding micrometer in measuring position
5 electric displacement transducer

c) Measuring method for sliding micrometer and Trivec
6 Measuring marks, 7 Measuring casing, 8 Step-by-step setting of the probe

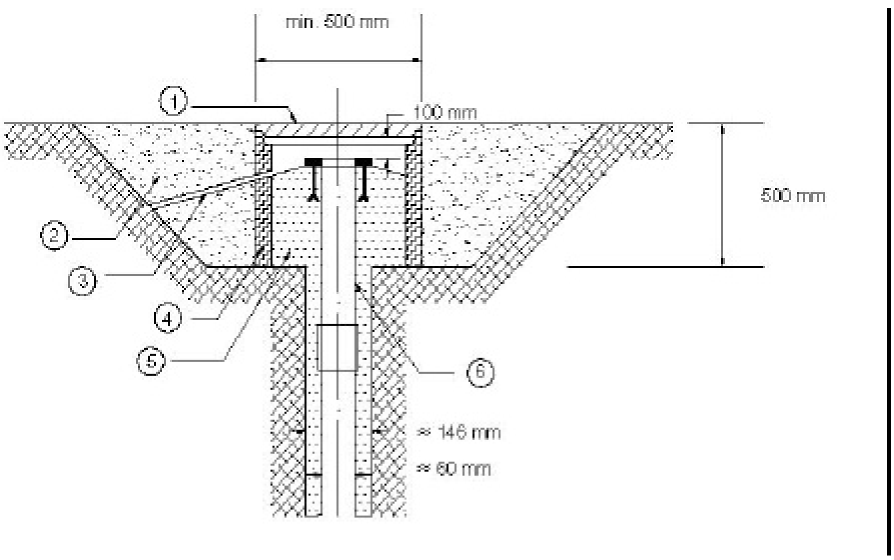

Fig. 2 End shaft for sliding micrometer and Trivec

1	Cover	2	Backfill
3	Drainage	4	Cement shaft
5	Mortar	6	Sliding micrometer or Trivec measuring tube

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High precision measurements can be achieved due to the excellent reproducibility of placing the probe. In the calibration frame an accuracy of $\pm 1 \mu m$ and under field conditions $\pm 2\ \mu m$ are attained. The high precision is due to the cone-sphere principle which defines the exact position of the sensor heads with respect to the measuring marks. The sensitivity of the instrument in terms of strain amounts to $1 \cdot 10^{-6}$, the measuring range is 10 mm. Probe and the calibration device are provided with a temperature sensor to compensate length changes of the measured distance influenced by temperature.

We realise sliding micrometer measurements and installation of the protective casing to customer's order. If desired we evaluate the measuring results, also in diagrams, and we formulate geotechnical statements.

Sales Information

2.4.1.1 Sliding micrometer measuring tubes
base length 1.0 m made of HPVC
outer diameter 60 mm, inner diameter 50 mm
with telescopic coupling and conic
accurate stop

2.4.1.2 Cover made of HPVC for measuring tube, below,
with telescopic coupling and 0.5 m measuring tube

2.4.1.3 Cover made of HPVC for measuring tube, above,
with flange d = 150 mm to fix the cable winch
and 0.5 m measuring tube

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