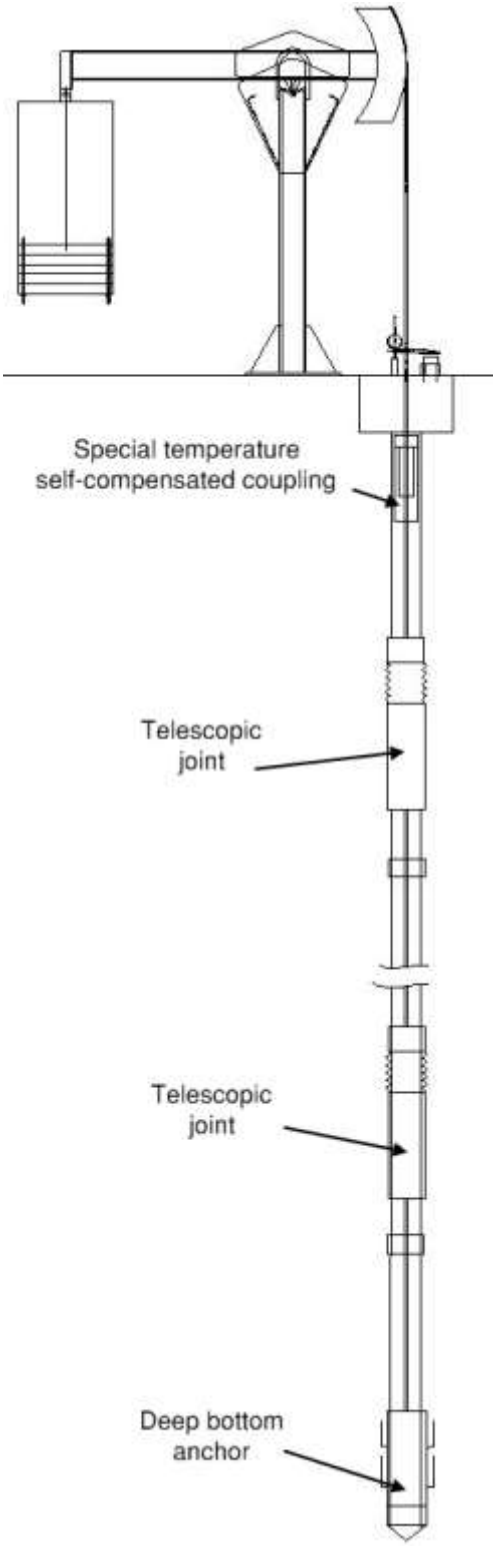
DEEP ROD EXTENSOMETER

EU patented

Deep rod extensometers are devices used to measure soil settlements at different depths.

The system is basically made of a specially shaped deep bottom anchor, a steel measuring rod rigidly fixed to the deep anchor and an outer protective sleeve casing.

This instrument can be used at any depth; however it is most suitable for depths exceeding hundreds of metres or even depths of 1000 metres or more with excellent results.



The operating principle is based on the following assumption: the bottom anchoring point is fixed and its position is carried to the surface by the rigid inner rod. This rod is kept free to slide by the outer rigid protective sleeve casing which prevents friction from the soil.

Periodic measurements are made between the upper rod head and ground level: the distance variation between the ground level and the deep anchoring point is gathered by measuring the difference referenced against an initial zero reading.

The inner measuring rod is protected by an outer sleeve casing jointed by special couplings and equipped with telescopic joints to absorb compaction from the surrounding soil.

Telescopic joints are spaced roughly every 10-30 metres depending on the geology of the site.

For deeper installations (more than 500 metres) stronger materials would be used as the system is subjected to increasingly heavy stresses.

DISPLACEMENT

ADVANCED GEOTECHNICAL INSTRUMENTATION SYSTEMS AND CONSULTING

In the upper section (roughly the first 15 metres) which is most affected by thermal variations, the steel inner rod is replaced by small invar rods to minimise the deformation along the rod due to temperature gradient.

To further improve the instrument's behaviour in its upper section, special self-compensating couplings are used.

The system, widely tested in several applications, is based on the principle of differing thermal expansion of physical materials

The resulting accuracy of thermal compensation is extremely high: around 1/10 mm along the entire temperature measuring range.

To avoid friction between the inner rod and the outer sleeve casing, especially in systems like these which are heavily subjected to both bending and compressive stresses, a number of ball bushing spacing collars are mounted along the inner rod.

In addition to avoid inertia between the inner measuring rod and the outer sleeve casing, the rod string is kept taut by a special mechanical cantilever system with counterweights. The applied force has an upwards direction and a modulus slightly higher than the overall weight of the rod string, thus keeping the rod perfectly centred and upright in respect to the surrounding soil. By so doing the instrument results very accurate and extremely sensitive.

The readings are usually taken both manually and automatically. In both cases we measure the settlement of the cantilever system in respect to the inner rod.

Manual readings are taken with a centesimal dial gauge with accuracy of about 0.01 mm.

Automatic readings are taken with electrical contactless-type transducers acquired by an automatic data unit. The system overall accuracy is of 1/10 of 0.1mm and sensitivity of 0.10mm.

This system is EU patented (n. EP 2275642 A1)

TECHNICAL SPECIFICATIONS

DEEP ROD EXTENSOMETER	
Inner rods	Steel - Invar
Outer sleeve casing	PVC - steel
Mechanical tensing system	Stainless steel
Telescopic couplings	Stress resistant steel with ball bearing bushes
Displacement transducer	Inductive-type, F.S. 50 mm
Accuracy	0.1 mm on the entire measuring range
Temperature range	-20° ÷ +80°C

Agisco reserve the right to change their products and specifications without notice

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