RETRIEVABLE BOREHOLE EXTENSOMETER

Model BOF-EX

APPLICATIONS

The borehole extensometer Model BOF-EX is the most significant development in the field of borehole extensometry applied to rock and concrete structures. Its unique design includes a comprehensive list of outstanding features which make the instrument usable in a wide range of civil and mining engineering projects.

Accuracy & Adaptability

Above all, the BOF-EX is characterized by its high accuracy and its great environmental adaptability.

The BOF-EX lends itself to applications such as:

- Monitoring of underground vaults for nuclear waste disposal
- Assessment of stability of internal cracks in concrete dams

And to more traditional uses such as:

- Monitoring of rock slope stability
- Measurement of rock displacement around tunnels and shafts

FEATURES

- **In-the-hole watertight movement sensing modules**
- **Adapts to any linear displacement transducers (Vibrating wire, Potentiometer, LVDT and Fiber optic)**
- **Capacity of 10 modules in series in an "N" size borehole**
- **Special mechanical anchor permits complete retrievability**
- **No protruding part above rock surface**
- **Excellent mechanical stability to blast vibrations**
- **Allows for remote reading and datalogging**
- **Modular system easily and rapidly installed**
- **High accuracy**

DESCRIPTION

The BOF-EX is best described as a multiple-point single tube extensometer. It consists of four main components: the mechanical anchor, the measurement module, the extension tubing and the centralizers. An installation consists of a number of measurement modules, in series in a borehole, each one being mounted on the length of extension tubing required to span a lower and upper mechanical anchor. Displacement measurement is therefore made in the hole, in sections distributed along the borehole length.

The mechanical anchor

The special design of the BOF-EX mechanical anchor allows complete system retrievability. The anchor consists of a cylindrical body and three contacting shoes spaced at 120° angle. Using the installation tool and rods, the anchor is screw-actuated from the collar of the hole until the shoes make contact with the borehole walls.

The anchoring capacity is very high and the contacting shoes are designed to adjust to small borehole deformations while still exerting the anchoring force.

The measurement module

The measurement module of the BOF-EX is a water-tight capsule in which a spring-loaded linear displacement transducer is mounted. The moving spindle of the measurement module comes in contact with the lower anchor of each monitoring section.

The extension tubing

The extension tubing is made of individual lengths of flush-coupled tubes bridging the two mechanical anchors of each monitoring section.

Centralizers are mounted at regular spacing over the extension tubing to prevent sagging.

INSTALLATION

The BOF-EX is designed to be installed in an "N" size 76 mm (3 in.) borehole using an installation rod. However, it can be easily adapted to larger boreholes. The installation procedure is simple and straightforward due to the modular design of the instrument. The BOF-EX can also be fully grouted in a borehole. In unstable, poor quality rock, a BOF-EX can be installed using the telescoping plastic tubing previously grouted in the hole.

SPECIFICATIONS

Borehole diameter (standard)			76 mm	
Number of measuring modules			1 to 10	
Minimum distance between anchors with standard 25 mm range transducer			30 cm	
TRANSDUCER	**VIBRATING WIRE**	**POTENTIOMETER**	**LVDT (DC)**	**FIBER OPTIC**
Ranges	25–50–100 mm	25–50–100 mm	5–25–50–100 mm	20 mm
Accuracy	±0.25% F.S.	±0.5% F.S	±0.5% F.S.	±0.1% F.S.
Resolution	0.02% F.S.	0.01 mm	0.01 mm	0.002 mm
Operating temperature	–20 to +80°C	–20 to +80°C	–20 to +80°C	–40 to +80°C
Thermistor	3kΩ (see model TH-T)	—	—	—
Readout unit	MB-6T(L)	PALMETO P5	ACCULOG-iX	FTI-10, UMI
Data acquisition system	SENSLOG	SENSLOG	SENSLOG	BUS, DMI
Cable	IRC-41	IRC-41	IRC-41	CFO-3ST

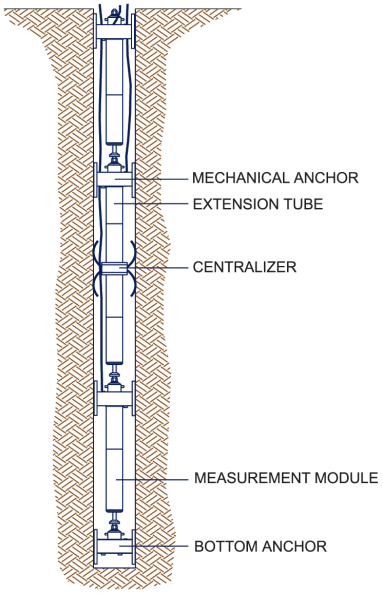
ACCESSORIES

- Installation tool
- Collar-mounted fine adjustment tool, for transducer positioning
- Pneumatic single or straddle packers, for injection or water tests

ORDERING INFORMATION

Please specify:

- Borehole diameter
- Number of measuring modules
- Depth of each anchor
- Range and type of transducers
- Type of material (aluminum, stainless steel)
- Accessories



BOF-EX in a borehole

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