



# The SMART Cable Bolt

The SMART (Stretch Measurement to Assess Reinforcement Tension) cable bolt combines the durability of a cable bolt with the sensory capabilities of a borehole extensometer. Determine the loads on your cable support to determine capacity, improve safety, and optimize cable support design.

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By measuring the stretch of a cable, the strain between the anchor locations can be determined, and the corresponding load inferred. These field-proven instruments allow our clients to optimize their ground support, creating cost-effective excavations at greater depth, while ensuring the safety of equipment and personnel. They can also be used in civil tie-back applications for design validation.

## Fabrication

For best results, your SMART Cables should match the other cable bolts in your support pattern. We will make the cables to match any 7-wire strand cable configuration, including plain strand, Garford bulb, bulge cable and others. We can even accommodate more sophisticated layouts, such as variable bulb spacing, de-bond sections, and even plating. The instrumentation process does not affect the physical appearance of the cable or its bond strength properties.

## Installation

All SMART Cables are shipped to your site ready to install. With minimal instruction, any cable bolt crew can install the SMART Cable bolt. The SMART Cable is designed for installation in regular cable bolt holes using routine installation procedures. End holding devices are supplied with each cable. The electronic readout head is sufficiently small that it can be recessed into the borehole, providing added protection for the instrument after grouting. All leadwires are protected in a UV sensitized high-density polyethylene (UV-HDPE) tube that can be shotcreted over for additional protection from flyrock or other damage.

For detailed installation information, check our website ([www.mdt.ca](http://www.mdt.ca)) under the Resources tab.

SMART Cables can be read using either our fully-regulated handheld readout unit or a data logger, such as our SMARTremote Instrument

Monitoring System. Using the SMARTremote system, the instruments can be monitored continuously, with data downloaded to the engineers' desktop in near-real time.

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## Data Analysis

Output data from the SMART Cables is easily analyzed using standard, commercially available spreadsheet programs. Alternately, all your SMART instrument data can be stored and analyzed in one location using our MineMonitor software.

The output for the instruments corresponds to the cable stretch at each of the 6 anchor locations. This information can be plotted against time to indicate how the cable is stretching in response to ground movement.

Based on these readings and the spacing of the nodal points, the strain between the anchors can be calculated, and the corresponding load determined.

From this information, it is possible to infer where fractures are opening. Armed with these details, it is possible to evaluate the support capabilities of the cable bolt, allowing you to evaluate the effectiveness of your support design, and to determine the support capacity remaining on the cable.

## The SMART Cable Specifications

**Length** up to 30 m

**Diameter** 33 mm

**Weight** 1.35 kg/m

**Borehole diameter** 50 mm minimum

**Transducer** Linear potentiometers

**Stroke** 63.5 mm to 254 mm

**Accuracy** +/- 2% full scale



SMART cables are indistinguishable from regular cable bolts in the bond section.

## Engineering Support

The engineering staff at MDT has extensive backgrounds in rock mechanics and geotechnical design, specializing in instrumentation and ground support, particularly cable bolting. MDT can provide complete service for our instrumentation, including recommendations for instrument configurations, design and implementation of instrumentation programs and data analysis and interpretation.

## To Order

To order, please specify:

- the type of cable bolt you require (plain, bulge, etc.)
- for modified geometries, the bulb size and spacing Potentiometer length
- the length of the cable bolt
- whether the cable is to be plated
- the location of the six anchor points relative to the instrument head or borehole collar
- leadwire length
- the type of end-holding device required

For more complex applications, please provide plans and/or sections so we can help determine the optimal configuration.