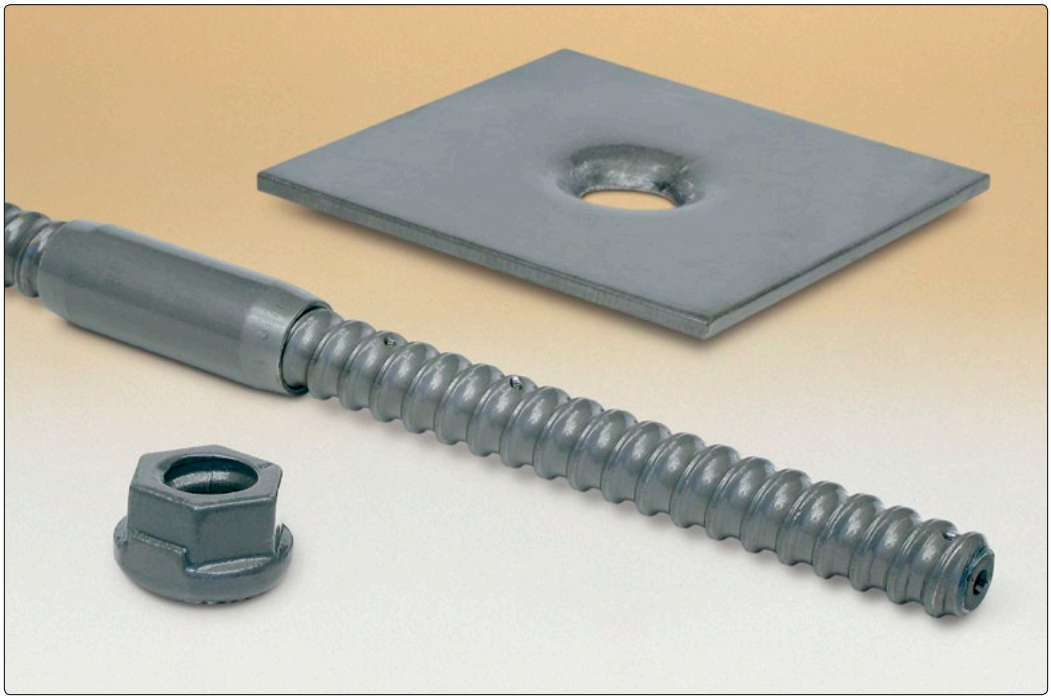
Instrumented Rockbolt

Applications

The model 4910 Instrumented Rockbolt is designed to measure loads in…

- **Ungrouted rockbolts**
- **Tiebacks used to stabilize the ground around excavations**
- **Tiebacks used in the support of retaining walls**



Model 4910 Instrumented Rockbolt components (front to back: nut, rockbolt and mounting plate).

Operating Principle

The Model 4910 Instrumented Rockbolt is made by inserting a vibrating wire strain gage inside a short length of standard threaded rockbolt or rebar. This short length can then be connected via a rod connector to a longer length of the same bolt material. The rockbolt is installed in the normal manner, making sure that the strain gage remains located within the loaded part of the rockbolt.

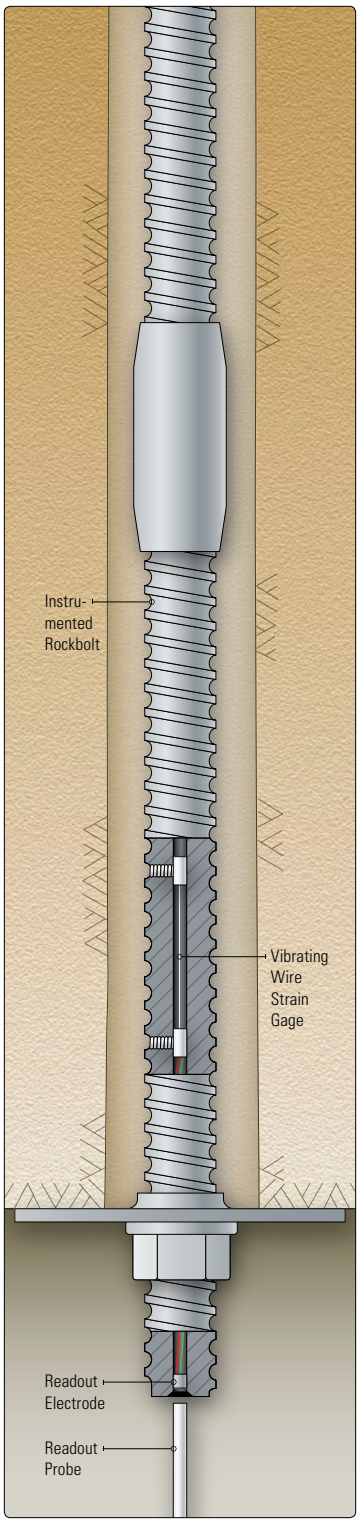
The strain gage is read by means of a portable probe, the tip of which is inserted inside the end of the rockbolt to contact an electrical terminal connected to the strain gage. Strains in the rockbolt are converted to equivalent loads using calibration coefficients supplied with the equipment.

Advantages and Limitations

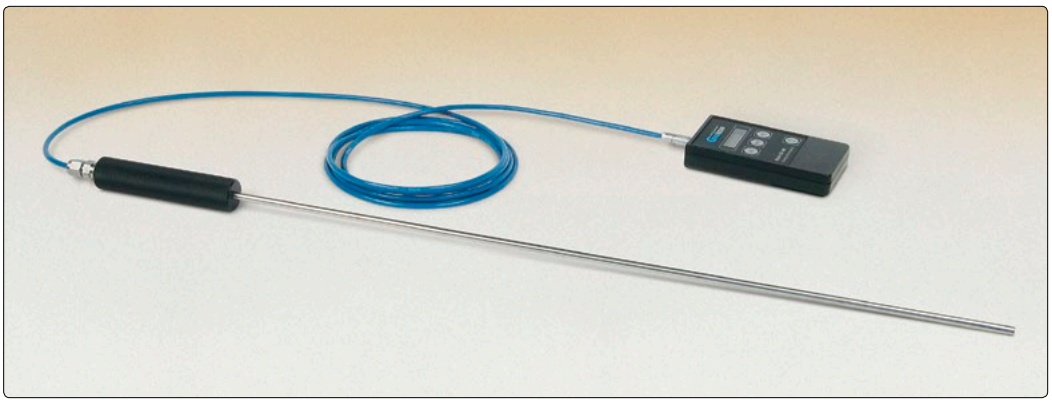
The Model 4910 Instrumented Rockbolt is very robust and requires no special handling beyond normal care. Since the vibrating wire gage is completely recessed inside the rockbolt, it can be left exposed and unattended for long term monitoring since is not likely to be vandalized.

The single vibrating wire strain gage is located along the axis of the rockbolt and hence is not affected by bending of the rockbolt.

The use of a vibrating wire strain gage provides long-term stability and accuracy.



● *Model 4910 installation.*



● *Model 4910 Probe shown with the Model GK-404 Vibrating Wire Readout.*

System Components

The standard length of the Model 4910 Probe is one meter (1 m). However, optional lengths sufficient to reach rockbolts located in the roofs of tunnels, etc., are available. The probe is supplied with a one meter (1 m) connecting cable with mating connector for the type of readout being used.

Readout of the Model 4910 Instrumented Rockbolt is accomplished by using the Model GK-404 or GK-405 Readouts.

Rod connectors of the appropriate size are required.

Technical Specifications

Standard Range	2500 με, equivalent to around 27,215 kg in a 25 mm diameter bolt
Resolution	0.5 με, equivalent to around 5 kg in a 25 mm diameter bolt
Accuracy[1]	±0.25% F.S.
Linearity	±0.5% F.S.
Output	1400-3000 Hz
Temperature Range[2]	–20 to +80°C
Bolt Sizes	25 mm, #8 rebar, and larger
Length	300 mm (standard)

[1]Accuracy established under laboratory conditions.
[2]Other ranges available on request.

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