

GEOSIGMA

Boltometer

An effective method for non-destructive quality control of fully grouted rock bolts

Boltometer is an effective method for non-destructive quality control of fully grouted rock bolts, thoroughly modernized by Geosigma.

Testing

Boltometer testing is performed to check the quality of the cement grout along a fully grouted, rebar, rock bolt.

Measurement method

Before the measurement, any plate and nut are removed. The end of the bolt is then mechanically ground to obtain a plane and smooth surface. Then the Boltometer measurement is performed.

The measured bolt is classified into one of four categories:

A = Approved bolt

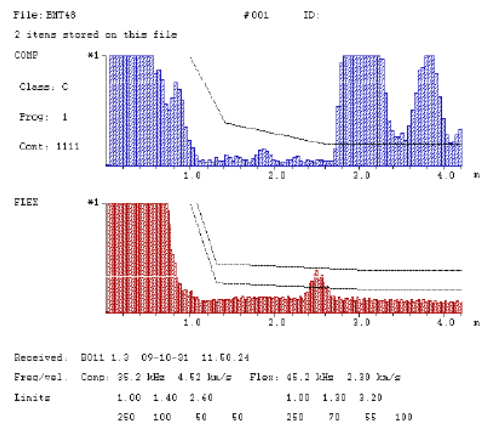
B = Possibly approved bolt (project specific requirement)

C = Unapproved bolt

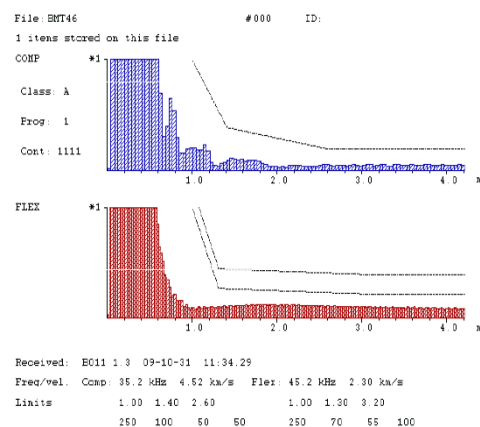
D = Unapproved bolt, the bolt inside the borehole is loose or the grouting is missing.

An acoustic bolt echogram is obtained by means of the Boltometer. The bolts are automatically evaluated based on a pre-set classification system applied to the echogram.

Certain adjustments can also be made to the classification based on the measurement results from reference bolts at the current site.



Echogram from a poorly grouted rock bolt.



Echogram from a well-grouted rock bolt.

Geosigmas equipment

To streamline measurements, Geosigma has modernized a previous version of the Boltometer.

The new instrument has built-in computer and keyboard. A built-in Lithium-Ion battery gives the instrument an operating time of a full working day.

The advantages of Geosigma's modernized instrument are:

- » All measurements are stored digitally in the instrument
- » There is no built-in printer
- » The enclosure has IP65 adapted for tunnel environment
- » Measurements are quick and efficient
- » Readings can be done quickly from a color display
- » The battery operating time is longer than 12 hours.

Flat grinding of rock bolt ends

To ensure good measurement results, Geosigma has also designed a grinding machine that can be attached onto the protruding end of a rock bolt.

This makes the grinding surface of the bolt flat and perfectly perpendicular to the axis of the bolt. Normally, the grinding of a bolt end only takes about one minute.

Quick measurements

Under normal conditions, about 70 to 100 rock bolts can be measured in a working day. The productivity might increase to more than 100 bolts per day depending on the access.

The effectiveness and the number of the measurements in one working day largely depends on the availability of other supporting equipment (e.g. lifting platforms), on the preparation of the rock bolt (e.g. removed plates and nuts) and on the distance between the rock bolts at the site.

Fast reporting

The Boltometer measurements result in an acoustic echogram for each rock bolt. The results can be also summarized in a table where the Boltometer's automatically performed classification of each bolt is shown.

Customer references

Get in touch with us if you want references from previous Boltometer customers.

Some examples are:

- » *Skanska*
- » *ODEN*
- » *Hochtief Oden Tunneling*
- » *YIT Sverige*
- » *Bergteamet*
- » *NCC*
- » *Bilfinger Berger*
- » *Veidekke*
- » *Implenia*
- » *Subterra*
- » *SKB*

Contact

Flavio Lanaro, Head of Unit for Rock Engineering

Phone: 010-482 88 95

E-mail: flavio.lanaro@geosigma.se

More about the Boltometer on geosigma.se

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