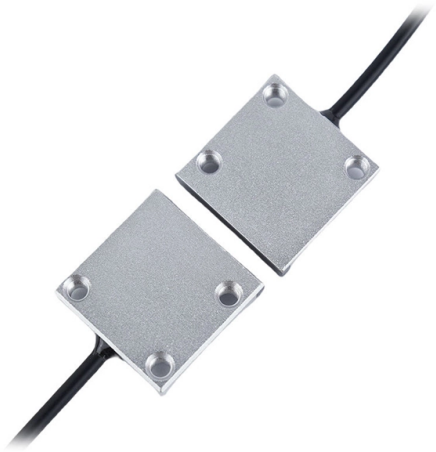
Fiber Optic Grating Anchor Bolt Testing Method



Overview

This paper proposes a new approach to detecting bolts' anchoring qualities based on the fiber Bragg grating sensing principle. A fiber-optic monitoring test platform of anchor bolt. Glass fiber-reinforced polymer (GFRP) bolts have been widely used in some applications of grouted anchors because of the advantages of better resistance to corrosion, high strength-to-weight ratio, low electromagnetic properties, and so on. Continuous dynamic monitoring of the internal force distribution in a high-precision roadway bolt support structure. The Fiber Optic Smart Bolt is an intelligent structural component that utilizes Fiber Bragg Grating (FBG) technology to measure internal strain through spectral variations. It enables real-time monitoring of bolt preload, deformation, loosening, fatigue, and other key parameters. Passive operation. This paper presents a new self-sensing anchor with embedded optical fibers (made using an improved stirrer) and proposes an intelligent tunnel rock monitoring system.

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Article Content

Bolt axial force monitoring based on fiber grating technology

To better study the force variation patterns at different parts of the bolt body, the author proposes a rock bolt sensor detection system based on FBG technology.

Strain-Sensing Mechanism and Axial Stress Response

This paper proposes a new approach to detecting bolts'' anchoring qualities based on the fiber Bragg grating sensing principle. Moreover, it studies

A fiber-optic monitoring approach for safety assurance of anchor bolt ...

These findings elucidate the mechanical response of anchorage systems under confining pressure, providing a fiber optic monitoring approach for safety assurance of anchor bolt support in

(PDF) Strain-Sensing Mechanism and Axial Stress Response ...

This study provides an important basis for improving the understanding of a bolt anchoring mechanism and the stability control of a roadway''s surrounding rock.

(PDF) Anchor test and long-term monitoring of grouted anchors ...

This article deals with anchor tests instrumented with FBG deformation gauges of the root and the tendon of the pre-stressed strand anchor in a test field in the Central Bohemian Region.

Stress Monitoring on GFRP Anchors Based on Fiber Bragg Grating

This study presents a field test to assess the feasibility of fiber Bragg grating (FBG) sensors in monitoring the stress profile of GFRP anchors during pulling test. Two GFRP anchors

Monitoring rock bolt safety based on FBG sensors

A bolt fiber Bragg grating (FBG) stress sensor is developed based on FBG sensor technology, providing a data-driven analysis tool for monitoring the bolt stress in the working face.

fiber-bragg-grating-fbg-fiber-optic-smart-bolt

Description The Fiber Optic Smart Bolt is an intelligent structural component that utilizes Fiber Bragg Grating (FBG) technology to measure internal strain through spectral variations. It

A New Self-Sensing Fiber Optic Anchor to Monitor Bolt Axial Force

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This article proposes a new self-sensing optical fiber anchor, made by improving the stirrer, to monitor the axial force on the bolt and the loose zone of surrounding rock.

Utilizing a novel fiber optic technology to capture the axial responses ...

Rock bolts are one of the primary support systems utilized in underground excavations within the civil and mining engineering industries. Rock bolts s

(PDF) Anchor test and long-term monitoring of grouted anchors ...

Geotechnical monitoring of anchors provides fundamental data for analysis and evaluation to ensure safe environment. The use of optic fiber sensing technology, especially Fiber Bragg

Bolt tension monitoring with reusable fiber Bragg-grating sensors

While the inherent small size of the fiber Bragg-grating provides precise monitoring without significant effect on the intrinsic properties of the bolt, the embedding of an fiber Bragg

Application of fiber grating sensing technology in pull-out test on ...

The results showed that the fiber grating sensing technology was able to accurately record the strain change of GFRP anti-floating anchor in the entire duration of the pull-out test.

Stress Monitoring on GFRP Anchors Based on Fiber Bragg Grating

Glass fiber-reinforced polymer (GFRP) bolts have been widely used in some applications of grouted anchors because of the advantages of better resistance to corrosion, high strength-to

Bolt axial force monitoring based on fiber grating technology

Abstract Optical fiber sensors are widely used in long-term monitoring in complex environments due to their advantages of anti-electromagnetic interference, high temperature resistance and corrosion

Testing Mechanical Properties of Rock Bolt under Different Supports ...

Fiber Bragg grating (FBG) sensors, which can accurately measure strain, can be integrated with rock bolts with small fingerprints. In this paper, according to the force mechanism of prestressed anchor

A load measuring anchor plate for rock bolt using fiber optic sensor

Therefore, it is very important to monitor the load level of the rock bolts. In this short communication, we propose a smart anchor plate, a simple but effective device that uses fiber Bragg

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A fiber-optic monitoring approach for safety assurance of anchor bolt ...

Pull-out tests show that distributed fiber optics can monitor minute strains in anchor rod bodies. Based on the monitored changes in anchor bolt strain, it is possible to identify areas of

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