

Fiber Optic Grating Force Transmission Anchor Rod



Overview

The fiber grating force-measuring anchor rod device comprises an optical fiber, a rod beam and a hollow anchor rod, wherein at least one grating is arranged on the optical fiber, gratings are adhered onto the rod beam, the rod beam penetrates through the hollow anchor. The fiber grating force-measuring anchor rod device comprises an optical fiber, a rod beam and a hollow anchor rod, wherein at least one grating is arranged on the optical fiber, gratings are adhered onto the rod beam, the rod beam penetrates through the hollow anchor. ABSTRACT This paper presents a novel anchor rod force sensor based on fiber Bragg grating (FBG) for accurate anchoring force measurement. A special FBG strain sensor with enhanced sensitivity has been designed and embedded in the centre line of an elastic structural body, which forms the main body. The invention relates to a fiber grating force-measuring anchor rod device. This study investigated the feasibility of applying the fiber Bragg grating (FBG) sensing technology to monitor the strain of the GFRP anchor. In this paper, a smart rod equipped with fiber Bragg grating with strain sensitivity enhanced structure is proposed to detect the strain of key rods of large-span power transmission towers on the southeast coast of the Yangtze River.



Article Content

Jun 08, 2026

A New Self-Sensing Fiber Optic Anchor to Monitor Bolt

The above research creates a new application of optical fiber to the monitoring of anchor axial force, which has a positive effect on the analysis of the stress on

Dec 25, 2025

Measurement of Cable Force through a Fiber Bragg Grating-Type Thin Rod ...

In this study, based on the engineering background of cable force monitoring of Xiangsizhou Bridge, we first developed a fiber grating-type thin rod vibration sensor with no mass block, and which as such

Jun 24, 2026

Design and characteristic research of smart rod based on optical fiber ...

Abstract The safety of the power transmission towers is the basis for the reliable operation of the power grid. Real-time monitoring of the strain of the key rods of the power transmission tower can reflect the

Jan 24, 2026

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.

Oct 19, 2025

Bolt axial force monitoring based on fiber grating technology

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

Mar 21, 2026

Design and Application of a Fiber Bragg Grating Tension Sensor for ...

A fiber Bragg grating (FBG) tension sensor for anchor rope has been proposed and implemented in the full-scale impact test of rockfall protection barriers in this paper.

Jun 20, 2026

Fiber Optic Rod / Fiber Rod

Multi fiber rods are also suitable for use as an image conduit for applications requiring transmission of an image. To learn more about fiber optic tapers, click here. Fiber Optic Rod, and related tapered

Jul 08, 2025

A Fiber Bragg Grating Anchor Rod Force Sensor for Accurate

The mechanical structure design and measuring principle of the proposed anchor rod force sensor have been presented detailedly. Then a sensor prototype has been manufactured and

Feb 13, 2026

Design and Application of a Fiber Bragg Grating Tension

Abstract and Figures A fiber Bragg grating (FBG) tension sensor for anchor rope has been proposed and implemented in the full-scale impact test of

Nov 13, 2025

Anchor Clamps for Fiber Optic Installations: A Buyer's Guide for ...

Types of Anchor Clamps for Fiber Optic Installations Anchor clamps have different types for the optical ground wires. There are two peculiar types of anchor clamps to know. Wedge-Type

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Experimental study of anchor bolt stress evaluation with hybrid optical ...

This work proposes a unique fiber optic temperature compensator and strain transmission coefficient analysis method to promote the evaluation quality of anchor bolt stress behaviors, which

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Fiber Bragg Grating Sensors: Design, Applications, and

Fiber Bragg grating (FBG) sensors have emerged as advanced tools for monitoring a wide range of physical parameters in various fields, including

Apr 09, 2026

Design and characteristic research of smart rod based

The safety of the power transmission towers is the basis for the reliable operation of the power grid. Real-time monitoring of the strain of the key

May 31, 2026

CN103207037A

The fiber grating force-measuring anchor rod device comprises an optical fiber, a rod beam and a hollow anchor rod, wherein at least one grating is arranged on the optical fiber,...

Jan 05, 2026

CN202471318U

The utility model relates to a fiber bragg grating force-measuring anchor rod apparatus comprising an optical fiber, a rod beam, and a hollow anchor rod; the optical fiber is...

Sep 04, 2025

A novel durable intelligent fiber reinforced polymer anchor with ...

Anchors are the key members of the geotechnical anchorage engineering, it is urgent to monitor their behavior in service for preventing the potential risks. This paper proposes a novel

May 31, 2026

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

Oct 03, 2025

Measurement of Cable Force through a Fiber Bragg

In this study, based on the engineering background of cable force monitoring of Xiangsizhou Bridge, we first developed a fiber grating-type thin rod

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A Fiber Bragg Grating Anchor Rod Force Sensor for Accurate

Given these concerns, this paper introduces our work on an novel FBG-based anchor rod force sensor for accurate force measuring. The mechanical structure design, measuring principle, and...

Mar 03, 2026

Bolt axial force monitoring based on fiber grating technology

In this paper, a mine-used fiber Bragg grating anchor sensor technology is proposed. The Bragg grating chain is connected and embedded into the anchor rod, which solves the problems that the surface

Apr 01, 2026

Design and characteristic research of smart rod based on optical fiber ...

In this article, a smart rod equipped with an FBG strain sensor with an enhanced sensitivity structure was proposed to monitor the strain of the power transmission tower. The structure can be directly

Mar 12, 2026

Load Transfer Law of Anti-Floating Anchor With GFRP

In this study, the feasibility of installing FBG sensors in GFRP anchor in the process of anchor manufacturing was investigated.

Feb 07, 2026

A New Self-Sensing Fiber Optic Anchor to Monitor Bolt

This new self-sensing fiber optic anchor was first applied to an open TBM tunneling project in an inclined shaft in the Kekegai coal mine, and

Jun 05, 2026

A Fiber Bragg Grating Anchor Rod Force Sensor for Accurate

A novel anchor rod force sensor based on fiber Bragg grating (FBG) for accurate anchoring force measurement and better applicability in the health monitoring of large civil engineering structures is

Sep 09, 2025

Experimental study of anchor bolt stress evaluation with hybrid optical ...

In this study, we introduce an innovative hybrid monitoring system based on strain gauges, Fiber Bragg Gratings (FBG), and Brillouin Optical Time Domain Analysis (BOTDA). A specialized

Jul 29, 2025

Application of fiber Bragg grating sensors in anchor rods

Based on the optical fiber Bragg grating (FBG) sensor, with the experiment of the FBG sensor and the common sensor stuck on the anchor rod compared, the results show that the FBG

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