

Fiber Optic Grating Pile Foundation Monitoring



Overview

This paper proposes a method that integrates fiber optic grating sensors, pressure sensors, servo motors, and a PLC control system to achieve dynamic tracking and monitoring of the concrete level in underwater drilled and grouted piles. Imitation and simulation analysis of pile-soil interaction, through the analysis of simulation results, the optimal monitoring location of the fibre-optic sensor is determined. Finally, practical engineering applications and long-term monitoring were carried out to assess the health level of the pile. Paper presented at the The 34th International Ocean and Polar Engineering Conference, Rhodes, Greece, June 2024. Ai, Jingkun, Chen, Jiawang, Jin, Zhangyong, Ge, Yongqiang, Tan, Xinghui, Ren, Xveyu, and Qixiao Zhou. With these improved measurement techniques, detailed insights can be obtained into not just the geotechnical response of the pile, but.



Article Content

Apr 26, 2026

Strain monitoring system of pile foundation in Wharf siltation area ...

This paper introduces the design and implementation of a pile foundation strain monitoring system using Fiber Bragg Grating strain sensor. The overall structure.

Jan 23, 2026

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This paper proposes a method that integrates fiber optic grating sensors, pressure sensors, servo motors, and a PLC control system to achieve dynamic tracking and monitoring of the ...

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Our researchers monitored the strain of piles using FBG sensors during different time periods—when piles were pressed in, subgrade put in service, or collapsibility generated within the ...

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A comprehensive review of recent research and development activities in geotechnical health monitoring using FBG-based sensors including ground, slope, pile and pullout, moisture, ...

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Fiber Optic monitoring of base grouted piles

FiberBragg Grating sensing relies on discrete sensing points created within a fiber optic cable by creating evenly spaced etchings, referred to as gratings, within the fiber optic core.

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Monitoring System Design for Stress-Strain Analysis of Piled ...

en ABSTRACT This paper proposes a monitoring scheme using fiber bragg grating (FBG) sensors for pile foundation structures of marine ports and terminals which in service. The paper includes ...

Jan 14, 2026

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Presented in this paper is some first-hand fibre optic data collected from axial load tests on piles founded in dense to very dense sand, ranging from driven piles to screw displacement piles.

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This type of sensor, combined in appropriate topologies, gives rich information concerning the piles' behavior and soil properties. The monitoring method is presented and its performances through the ...

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