

Case Study of Italian Fiber Optic Sensors



Overview

The paper presents a study about the monitoring of a pre-stressed reinforced concrete viaduct in Bari (Italy), by means of an optical fiber system embedded into the structural elements. The application case had two objectives: controlling the structural efficiency during the phases of construction. In this work, we focused on the use of Distributed Fiber Optic Sensors (DFOS) based on Stimulated Brillouin Scattering (SBS) technology for monitoring water pipeline networks. We worked on High-Density Polyethylene (HDPE) pipes, today the most widely used for creating water pipelines. The. ABSTRACT: In the last few years, the real-time monitoring of civil infrastructures has become an essential tool for the safety inspection, the design and planning of maintenance. In this context, the implementation of optic fiber sensors within the structural elements is particularly useful in. When using distributed optical fiber sensors (DOFS) on reinforced concrete structures, a compromise must be achieved between the protection requirements and robustness of the sensor deployment and the accuracy of the measurements both in the uncracked and cracked stages and under loading, unloading. Leading Italian multi-service company, AGSM AIM Spa, designs, implements and manages a proprietary fiber-optic network in the municipalities of Vicenza (around 250 km of fiber) and Verona (around 400 km). The fiber-optic cables in Vincenza were deployed in 2002.



Article Content

Distributed fiber optic sensors for tunnel monitoring: A

This study presents a state-of-the-art review of the DFOS applications for monitoring and assessing the deformation behavior of typical tunnel

Railway monitoring and train tracking by Fiber Bragg Grating sensors:

The aim of this work is to demonstrate the efficiency of Fiber Bragg Grating (FBG) sensors to be used as technological platform for railway monitoring and train tracking in transportation ...

The Role of Fiber Optic Sensors for Enhancing Power System

The integration of low carbon technologies and more efficient power system operation are key components in the transition to a sustainable future. To support this, power system operators

AROONA breathes new life into obsolete fiber-optic cables

Leading Italian multi-service company, AGSM AIM Spa, designs, implements and manages a proprietary fiber-optic network in the municipalities of Vicenza

Embedded Distributed Optical Fiber Sensors in Reinforced Concrete ...

With this in mind the authors have carried out an experiment where polyimide-coated DOFS were installed on two concrete beams, both embedded in the rebar elements and also bonded to the

(PDF) Fiber Optic Sensors and Their Applications

Rockbolts instrumented with distributed fiber optic strain sensors were used to study rockbolt strain distribution, load mobilization, and localized

Unlocking the Potential of Advanced Fiber Optic Sensors ...

This Special Issue aims to gather original research articles, reviews, and case studies that delve into the innovative applications of fiber optic sensors in sustainable energy.

Session.PDF

The paper presents a few significant case studies in which fibre optic sensors have proven their effectiveness. Implementation of the sensory system as well as data analysis and interpretation are

Fiber Optic Sensors: A Leading Trend in Sensor

Fiber optic sensing is a field in which multi-parameter measurements are made by either using optical fiber itself or with the help of an external

A review of previous studies on the applications of fiber optic sensing ...

Recently, fiber optic sensing technologies have been successfully applied in geotechnical monitoring due to the significant advantages of anti-electromagnetic interference, stable signal long

Experimental Investigations of Distributed Fiber Optic Sensors for ...

In this work, we focused on the use of Distributed Fiber Optic Sensors (DFOS) based on Stimulated Brillouin Scattering (SBS) technology for monitoring water pipeline networks. We worked

Bridge monitoring by fiber optic deformation sensors: a case study

After a short overview of optic fiber sensors and the related state of the art the application on the case study will be presented, describing the main features of the system and discussing the ...

Optical Fibre-Based Sensors—An Assessment of

Abstract Optical fibre sensors are an essential subset of optical fibre technology, designed specifically for sensing and measuring several physical parameters.

Case Studies: AI-Enhanced Optical Fiber Sensors in ...

Sensors that make use of the unique properties of optical fiber and AI trained on studies and previous case studies can provide greater comfort to users and improve quality of life. These sensors can be

Fiber-Optic Underground Sensor Networks: Distributed Fiber-Optic

The first case study presents the results of strain development in the sprayed concrete lining (SCL) of a new Crossrail station tunnel during excavation of a cross-passage.

Structural monitoring using fiber optic sensors of a pre-stressed ...

The paper presents a study about the monitoring of a pre-stressed reinforced concrete viaduct in Bari (Italy), by means of an optical fiber system embedded into the structural elements.

Fiber Optic Shape Sensors: A comprehensive review

Abstract Fiber Optic Shape Sensing is an innovative Optical Fiber Sensing Technology that uses a fiber optic cable to continuously track the 3D shape and position of a dynamic object (with

The Role of Artificial Intelligence in Enhancing Optical Fiber Sensors ...

The integration of artificial intelligence (AI) with optical fiber sensors (OFSs) represents a paradigm shift in sensing technology, offering unprecedented improvements in sensitivity, accuracy, and data

Structural monitoring using fiber optic sensors of a pre

The paper presents a study about the monitoring of a pre-stressed reinforced

Recent Advances in Machine Learning for Fiber Optic Sensor

Over the last three decades, fiber optic sensors (FOS) have gained a lot of attention for their wide range of monitoring applications across many industries, including aerospace, defense, security, civil

Fiber Optic Sensors: Short Review and Applications

Abstract An extensive review of optical fiber sensors and the most beneficial applications is presented in this chapter. Although electrical sensing technologies have been successfully deployed in countless

COHERENT FIBER OPTIC TEMPERATURE SENSOR

A fiber optic sensor is a sensor that uses optical fiber either as the sensing element ("intrinsic sensors"), or as a means of relaying signals from a remote sensor to the electronics that process the signals

Special Issue "Fiber Optic Sensors and Applications": An Overview

We present here the recent advance in exploring new detection mechanisms, materials, processes, and applications of fiber optic sensors. Keywords: fiber optic sensors, detection mechanisms, materials,

Fiber Optic Sensors: Short Review and Applications

Extracting from an ample amount of research and case studies, the successful design and deployment of optical fibre sensors in detecting disaster

Embedded Distributed Optical Fiber Sensors in

When using distributed optical fiber sensors (DOFS) on reinforced concrete structures, a compromise must be achieved between the protection

Somni Solutions Designs Fiber Optic Sensors for the

Somni Solutions met this unique challenge by designing sensors that are able to measure any changes in the position of the bridge's pillars at a rate

Application of Fiber-Optic Sensors to Monitor Concrete

Fiber-Optic Sensors (FOSs) offer unprecedented performance for Structural Health Monitoring (SHM) of concrete dams, addressing the critical

Bridge monitoring by fiber optic deformation sensors: A case study

In this paper, it is presented a methodology aimed at the control of the safety and serviceability level for a Prestressed Reinforced Concrete viaduct. The procedure is based on information acquired by an

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