

How to measure speed on a high-speed highway using fiber optic sensors



Overview

Sensors embedded along highways or in traffic signals can collect data on vehicle speed, density, and occupancy, which is then transmitted through the fiber optic network for analysis and control of traffic signals or dynamic message signs. Fiber optics sensing technology can conquer this challenge with its ability to measure the vibration of passing objects along the length of a buried fiber cable. When optical pulses are injected from one end of the cable and transmitted to the other end, scattering occurs and generates. Fibre-optic sensing (FOS) is a new and cost-effective alternative technology that allows a seamless, real-time monitoring of the road traffic over large distances of up to 50 km, even in remote areas such as on critical coastal or mountain roads, using existing telecom fibre-optic cable. This paper introduces the basic principles of several commonly used optical fiber sensors and the progress of optical fiber sensors in the monitoring of physical, mechanical, and chemical parameters and demonstrates the applications of optical fiber sensors in infrastructure. We present first result of traffic speed estimation performed.

Article Content

Optical fiber sensors in infrastructure monitoring: a comprehensive ...

Abstract The purpose of this article is to review and further promote the application of optical fiber sensor technology in infrastructure monitoring. Compared with traditional sensors, optical

Overcoming Challenges of Distributed Fiber-Optic Sensing for Highway ...

Another application is highway monitoring system based on distributed fiber-optic sensor sensing (DFOS) like in where DFOS measures the vibration amplitude of passing vehicles every

Vehicle Speed Calculation Using Weigh-in-Motion

In the present study the authors are discussing the possibility of fibre optic sensor application for weighing road vehicles in motion (WIM - weight-in

Applications of fiber optic sensors in traffic monitoring: a review

Instrumenting pavement with fiber optic sensors has recently gained popularity as a part of the digital infrastructure transformation. In this survey, we present some of the recent real-world

Traffic flow and speed monitoring based on optical fiber distributed ...

This paper presents traffic flow monitoring method using optical fiber-based distributed acoustic sensors (DAS). An innovative vehicle trajectory extraction algorithm is proposed to derive

News | NSF

The U.S. National Science Foundation announced a new funding opportunity as part of an effort to enable all Americans to understand, apply and create with artificial intelligence. The NSF

Seamless Distributed Traffic Monitoring by Distributed ...

We present first result of traffic speed estimation performed on a real highway with DAS, over a distance of 19 km and compare them to reference measurements from induction loops.

Intelligent Highway Traffic and Incident Monitoring

Discover how turning existing fiber-optic cable into an array of intelligent sensors can deliver real-time, accurate traffic monitoring.

A Special Fiber Optic Sensor for Measuring Wheel Loads of ...

Received: 29 January 2008 / Accepted: 4 April 2008 / Published: 11 April 2008

Abstract: This paper presents results from an investigation on a special optical fiber as a load sensor for application in

Research of a Fiber Sensor Based on Fiber Bragg

This article is devoted to a detailed study of the use of fiber-optic sensors (FOS) based on fiber Bragg grating for road surface monitoring. Such a

Buried fiber-optic cable doubles as roadway sensor

Verizon and NEC tested how fiber-optic cables can collect and analyze data based on vibrations from vehicles on the road to determine vehicle

Overcoming Challenges of Distributed Fiber-Optic Sensing for

This work presents a wide-area highway monitoring system based on distributed fiber-optic sensing (DFOS) as a cost-effective way of gathering traffic information at numerous sensing points along a

Fiber Optic Sensing for Highway Traffic

While most modern highway roads have an existing fiber-optic buried, the fiber optics sensing technology utilizes the same fiber to measure the

Fiber Optics Sensors in Asphalt Pavement: State-of-the

Secondly for strain measurements, the stiffness of the sensors has to match that of the asphalt mixture in order to correctly measure the mechanical

Distributed fiber optic sensing: road traffic monitoring

Distributed acoustic sensing (DAS) is a relatively new technology that allows a seamless, realtime monitoring of the road traffic situation over large

Fiber Bragg Grating Optical Sensors Integrated into Smart Road ...

Abstract Smart sensing technology integration directly transforms how we perform road maintenance while promoting better safety outcomes. This research evaluates the use of embedded Fiber Bragg

Fibre-Optic Sensing for Road-Traffic Monitoring in

Often the high density of traffic sensors, needed to achieve an accurate real-time monitoring of important roads, is difficult to implement due to

Distributed Fiber-Optic Sensing based Single-Lane Abnormal Event ...

ABSTRACT Distributed fiber-optic sensing (DFOS) based traffic flow monitoring systems are a cost-effective wide-area traffic monitoring solution that utilize existing fiber infrastructure along

Overcoming Challenges of Distributed Fiber-Optic Sensing for Highway ...

Overcoming Challenges of Distributed Fiber-Optic Sensing for Highway Traffic Monitoring This work presents a wide-area highway monitoring system based on distributed fiber-optic sensing (DFOS) as

Fiber Monitoring for Transportation and Highway Networks

Sensors embedded along highways or in traffic signals can collect data on vehicle speed, density, and occupancy, which is then transmitted through the

Federal Highway Administration Research and Technology

A prototype sensor system using modulated light emitting diodes was designed to measure the speed and height of high and long trucks entering a curved freeway

Optical fiber sensors in infrastructure monitoring: a comprehensive ...

This paper introduces the basic principles of several commonly used optical fiber sensors and the progress of optical fiber sensors in the monitoring of physical, mechanical, and

Field-Deployable Fiber Optic Sensor System for

Structural health monitoring of highway bridges is a vital but currently challenging aspect of infrastructure engineering due to the number of sensors

Applications of Fiber Optic Sensors in Traffic Monitoring:

Applications of Fiber Optic Sensors in Traffic Monitoring: A Review Mustafa Tekinay, Tim Sylvester, Matthew Brunton, and Thiagarajan Ganesh friendly

First Field Trial of Sensing Vehicle Speed, Density, and Road ...

For the first time, we demonstrate detection of vehicle speed, density, and road conditions using deployed fiber carrying high-speed data transmission, and prove carriers' large-scale fiber

Monitoring a Railway Bridge with Distributed Fiber Optic

This article explores the use of distributed fiber optic sensing (DFOS) technology in monitoring civil infrastructure, with a concrete example of an

Use of Distributed Fiber Optic Sensors for the Monitoring of an ...

The results reveal that strains measured with this technology closely align with those obtained using traditional strain gauges. However, an advantage of fiber optics is that they enable

A review of railway infrastructure monitoring using fiber optic sensors

Fiber optic-based monitoring systems use quasi-distributed and continuously distributed sensing techniques for real time measurement and long term assessment of structural properties.

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://aitaf.it>

Email: info@aitaf.it

Phone: +39 331 847 2365

Address: Via Raffaello Sanzio 11, 20149 Milan, Italy

This document is for informational purposes only. Specifications subject to change without notice.

