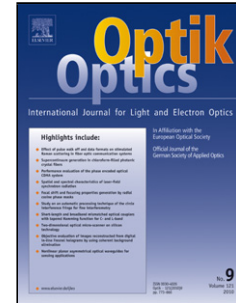


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Singlemode-Multimode-Singlemode Fiber Structure as Compressive Strain Sensor on a Reinforced Concrete Beam

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Abstract

In this paper, we demonstrate a single-mode–multimode–single-mode (SMS) fiber structure to measure compressive strain in the elastic regime of a reinforced concrete beam. The fabrication method used to produce a 3.12 m reinforced concrete beam that met the Euro code (EC2) requirements was also demonstrated in this work. Strain measurement via the SMS sensor was calibrated using an electrical resistance strain gauge and a data logger to obtain accurate measurements of the strain. A linear transmission spectral red shift was observed as the strain value was increased from 0 mm/mm to 0.116 mm/mm. Hence, the SMS sensor could provide a sensitivity of 3.7781 nm/ (mm/mm) with a linearity of 0.96606.

Keywords: Reinforced Concrete Beam; strain measurement; singlemodemultimode-singlemode (SMS) fiber structure

Introduction

The term structural health monitoring (SHM) refers to the process used to investigate the protocol of the damage mode in many structural or infrastructural buildings, aerospace, and so on[1]. After extreme events, such as landslides and earthquakes, SHM is used to monitor conditions and targets in real time and produce valid information about the structural integrity of buildings. The sensor is the most crucial component in SHM because it detects local damage,

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