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The Use of FBG Sensor to Determine the Fracture Energy Properties of UHPFC

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This paper discusses the results of an experimental investigation on the fracture properties of Ultra-High Performance Fiber Reinforced Concrete (UHPFC), using fiber optics bragg grating, FBG, strain gauges rather than the conventional mechanical accelerometer. FBG sensors are one of many fiber optic sensor technologies that are currently being used in structural health monitoring systems. The sensors operate by detecting a shift in the wavelength of the reflected maximum due to applied strain. Structurally, each conventional strain gauge has two wires serving as input and output ports respectively, unlike fiber Bragg grating based sensors where several sensors can be multiplexed onto the same optical fiber. Consequently, FBG sensors could allow for a larger and a more accurate measurement for the fracture and cracking response of concrete members. The fracture energy, G_F , is defined as the area under the stress-strain curve per unit fractured surface area, is experimentally determined for the UHPFC. Fracture energy is important in determining design parameters such as shear strength and tensile strength, obtained by the work-of-fracture method, and is used in the development of models useful in engineering practice.

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Ключевые слова:

Содержание

Abstract

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