

# Theoretical Prediction and Experimental Measurement of Embedded Optical Fiber Strain Sensors

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(Received December 24, 2013; accepted March 6, 2014)

**Key words:** optical fiber strain sensor, Mach-Zehnder interferometer, strain transformation, embedded-fiber length

A theoretical prediction of the strain transferred from a host material to an embedded optical fiber was presented to reveal the differential strain between the optical fiber sensor and host material. Experiments using the Mach-Zehnder interferometric-type fiber-optic sensor were conducted to measure the strain in the embedded optical fiber sensor induced by the host structure. Experimental results show that the strain measured in the optical fiber is less than the true strain in the host structure. The percentage of strain in the host structure which actually transferred to the optical fiber is dependent on the length of the embedded optical fiber. The general trend of the strain transformation obtained from the experiments shows that the longer the embedded optical fiber, the greater the strain that is transferred to the optical fiber.

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