Detection of fiber fracture
in Unidirectional Fiber Reinforced Composites
using an In-Plane Fiber Optic Sensor
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## ABSTRACT

Fiber reinforced polymers (FRP) are an efficient and inexpensive method of repairing deteriorating infrastructure. FRP sheets can be applied to spalling bridge sections and columns to prevent further deterioration and increase stiffness. However, the effect of the environment on the long-term durability of FRP and how the various damage mechanisms initiate and develop are not known. Systems for structural health monitoring are being sought as a means of managing important components in transportation systems as assets in light of modern life cycle cost concepts. This study characterizes a fiber optic sensor for use in detecting acoustic emissions (AE) in FRP. The results of AE analysis (signal amplitude, frequency spectra, MARSE, and in-plane displacement) caused by simulated fiber fracture experiments and other types of mechanical loading in FRP test coupons are reported. The applications to the development of FRP structural health monitoring systems are also discussed.