

NON-DESTRUCTIVE TEST METHODS FOR THE EVALUATION OF STRUCTURES

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Description:

The research involves an ongoing project at Tulane University that is concerned with the non-destructive evaluation of structural components. The transportation infrastructure is decaying at an alarming rate, and the Federal Highway Administration estimates that 30 percent of all bridges in this nation are structurally deficient. Several new materials have been proposed for use in highway bridges. These include fiber reinforced polymers, high strength steels and high performance concrete. The research at Tulane concerns the durability of all construction materials, but has a specific focus on fiber reinforced polymers. These materials have a very high strength to weight ratio and are resistant to fatigue and most chemical environments. In addition, they will not corrode in the presence of moisture.

Acoustic emission monitoring is one way in which structures can be monitored to determine their long-term suitability in the constructed environment. As damage takes place within a structure, stress waves are generated that can be detected on the surface of a structure with a piezo-electric crystal. The interpretation of these captured waves is then used to determine the level damage that has occurred internally to the structure.

Objectives:

The acoustic emission technique will be applied to fiber reinforced polymer specimens. The specimens will be loaded under a controlled loading environment to determine the nature of the acoustic emission activity. The emissions will be captured and analyzed. Specimens to be tested are small scale sections (1' x 1' x 6' long) of fiber reinforced polymer bridge decks. The objective of the project is to determine the suitability of these newer materials for long-term use in the transportation infrastructure.

Prerequisites or experience required:

No prerequisites or experience is required. An interest in structural or materials engineering will be helpful.