

IART-070
Development of Sensor Self-Diagnosis for Structural Health Monitoring

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Abstract

The primary goal of this project is to develop a theoretical framework and methodology for autonomously inspecting the functionality of an active sensing device and monitoring its bonding condition to the host structure. Structural Health Monitoring (SHM) is a process of assessing and evaluating the safety and integrity of a structural system based on sensor measurements. Within our society (especially in the Pittsburgh area due to many aging bridges), there are increasing demands to adopt SHM technologies for civil infrastructure monitoring and maintenance.

Because typical civil infrastructure systems are typically designed to last over 10 to 50 years, the sensors used for an online SHM system must also operate reliably with the lifespan similar to, or preferably exceeding, that of the structures. (Or at least, the sensors' functionality needs to be continuously inspected.) Therefore, this study proposes to systematically and thoroughly investigate the long-term reliability and robustness of the sensors so that the sensors do not become a weak point in the overall SHM system. In particular, this project will develop a sensor self-diagnosis methodology for active sensing devices that have been investigated by the PIs other projects.