IART-052
Active Sensing Development for Infrastructure Online Monitoring

Hoon Sohn
Assistant Professor, Department of Civil and Environmental Engineering, Carnegie Mellon University, Pittsburgh, PA

David W. Greve
Professor, Department of Civil and Environmental Engineering, Carnegie Mellon University, Pittsburgh, PA

Industry Participants
Raymond A. Hartle
Michael Baker Jr., Inc., Pittsburgh, PA

Paul Majores
District 10 Bridge Engineer, PennDOT

Abstract
The primary goal of this project is to develop an online structural health monitoring (SHM) system for autonomously detecting crack and fatigue damage near the bolted/welded joints of a bridge structure. Often damage detection is based on the premise that deterioration of structural components results in changes in measured vibration signals. However, it has been reported that the measured vibration signatures can also be altered by natural operational and environmental variation of the structure. This issue makes it extremely difficult to deploy conventional monitoring techniques, which have been tested only in well controlled laboratory environments, to in-service civil infrastructure.

A practical monitoring system based on the active sensing will be deployed on real-world civil structures to explicitly address undesired operational and environmental variation of the structure. This project will also develop theoretical frameworks and methodologies needed for performing autonomous, online, continuous structural health monitoring for the bolted/welded steel joints of civil infrastructure.