

LONG-TERM SENSING SYSTEM FOR BRIDGE PIERS

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ABSTRACT

Structural instability of bridge piers resulting from scour or other natural hazards can lead to bridge collapse. As a result, a method of monitoring bridge piers is needed to evaluate long-term changes in structural conditions. This research project examines the use of an array of tilt sensors to monitor the structural behavior of bridge piers.

This thesis presents the results of efforts to design and test a tilt sensor system. Testing equipment, as well as sensor characterization, will be presented. In addition, the development of multi-sensor algorithms will be discussed, including the concepts of sensor consistency, sensor correlation, and fuzzy thresholds. Results from five laboratory tests of the multi-sensor system, including both pier rotation and superstructure displacement, will be explained. Lastly, the work remaining in the project will be discussed.