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A Review of Structural Health Monitoring Techniques for Bridges

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Abstract

Structural health monitoring evaluates the condition of structures, enabling increased safety, improved performance, and structural reliability. Bridges, as a group of essential transport infrastructures, are exposed to widespread failures. This issue has highlighted the significance of an efficient monitoring system for bridges. Bridge structural health monitoring system, by incorporating advanced sensor technologies with data acquisition, presents additional information about the design and performance of bridges during the life cycle. Sensor technology is utilized to monitor displacements, deformations, strains, stresses, acceleration forces, and dynamic characteristic changes in structures. There is a wide range of sensors for monitoring the structural health of bridges. Specifying a proper sensor technology is significant to reach the desired outcome. This paper reviewed some of the principle sensors and the conclusions of past research about using these sensors' implementation in bridges. Sensor technology is constantly evolving. The sensor data processing method is also significant and challenging for the accuracy of the results. The sensor's resistance for installation in the bridge, including resistance to signal degradation or changes in cable, high sensitivity, high reliability, long-term stability, and simple installation, are some of the significant characteristics for appointing a valid sensor. The conditions of climate and the ground surface over which the bridge passes are also important points that must be considered while determining a sensor.

Key words: Structural Health Monitoring, Bridge, Sensor technology, Signal