RECENT ADVANCES IN INDIRECT STRUCTURAL HEALTH MONITORING

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MINISYMPOSIUM

Aging transport infrastructure presents a growing challenge for modern societies. Many of world's bridges, roads, dams, and tunnels were constructed decades ago, and they are now showing signs of wear and tear. To ensure the safety and prolong the service life of these critical assets, there is a growing need for Structural Health Monitoring (SHM) systems. SHM involves the continuous assessment and analysis of a structure's condition and performance, using a variety of sensors and data analytics. By monitoring factors like vibrations and temperature, SHM enables researchers and stakeholders to detect subtle signs of deterioration or damage at the early stage to allow for more informed maintenance and repair decisions.

Conventional SHM methods (also known as "direct") use data from sensors placed directly on the structure. Such SHM systems require complex installation, maintenance and continuous power supply. To overcome these issues, an alternative approach which relies on data from sensors mounted on a vehicle passing over a monitored structure, has evolved. Such approach is known as indirect SHM or a "drive-by" inspection. In the recent years, numerous studies have been presented to highlight the potential of the indirect SHM to gain widespread adoption and to overcome such challenges as its sensitivity to road roughness, vehicle parameters and environmental effects. Rapid development in the field is also fuelled by the fast progress in sensor and IoT technologies, smart vehicle technologies, data acquisition and transfer systems.

In this mini-symposium we invite researches to discuss the recent progress in the field of indirect SHM. Topics include, but not limited to, signal processing, machine learning methods, vehicle-bridge interaction models, system identification, data-driven and physics-based methods.