Editorial

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The *Journal of Civil Structural Monitoring* was given birth, by the ISHMII Society and the publisher Springer Inc., about 2 years ago. Since then several volumes have been published. In these volumes, the papers describe processes of implementing a damage detection and characterization strategy for civil engineering structures. Here damage is defined as changes to the material and geometric properties of a structural system, including changes to the boundary conditions and system connectivity, which adversely affect the system's performance. Some papers have described the structural health monitoring (SHM) Systems involving the observation over time using periodically sampled dynamic response measurements from an array of sensors, the extraction of damage-sensitive features from these measurements, and the statistical analysis of these features to determine the current state of system health. Some papers have addressed long-term SHM, where the output of the process is periodically updated information regarding the ability of the structure to perform its intended function in light of the inevitable aging and degradation resulting from operational environments. Some papers have addressed extreme events, such as earthquakes or blast loading; SHM is used for rapid condition screening and aims to provide, in near real time, reliable information regarding the integrity of the structure. The journal has also published the monitoring papers on heritage structures such as Brooklyn Bridge.

The importance of SHM has increased because of the deterioration of constructed infrastructure systems. Typical sources of deterioration include environmental effects,

aging, and physical damage such as increased live loads, earthquakes and winds. The economic impact to society is significant. For example, a budget of \$188 billion may be required to replace the deteriorated bridges in the United States. Adequate monitoring of existing structural systems may save budgets for repairing structural members and ensure the safety of general public, provided that early detection of structural damage enables prompt technical action to resolve the problem.

The advantages of structural health monitoring include the convenience of structural assessment, prompt acquisition of on-site data, and early detection of structural damage. The initial cost of installing sensors may be high for large-scale structures, whereas the long-term monitoring expenses compensate for the initial costs. The research community is developing wireless sensing technologies that may reduce the installation costs. Although the sensing technologies include a number of benefits, applications for civil structures are still premature possibly due to the insufficient technology transfer, lack of standards, and reliability issues.

To address these important gaps in our knowledge, the journal is attracting many outstanding papers on the Structural Health Monitoring (SHM), Bridge Weigh in Motion (BWIM), Data Mining and Analysis, Economic Analysis of SHM system and Service Life Evaluation and Maintenance of Civil Infrastructures.

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