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## Civil Structural Health Monitoring

**Edited by: Fei Kang and Yonglong Li**

Civil structures and infrastructures, such as bridges, high-rise buildings, towers, dams, tunnels, and so forth, occupy a major position in the economy and play a vital role in facilitating daily life for the world population. However, accidental structural damage can cause significant economic and human casualties. Thus, structural health monitoring is necessary for the longevity of the building and the safety of the public. Structural health monitoring is the process of implementing a damage detection and characterization strategy for engineering structures. Structural health monitoring pertains to the life of a structure and diagnoses the “state” of the constituted materials in different parts of the structure. Recent advances in monitoring systems, sensor technologies, and artificial intelligence have promoted the integration of multi-source data and the adoption of intelligent algorithms, positioning structural health monitoring (SHM) at the forefront of addressing these challenges. By synthesizing advanced sensing, numerical simulation, and machine learning, SHM systems establish an intelligent feedback loop of sensing–diagnosis–prediction, substantially improving monitoring efficacy and proactive maintenance. This Reprint is dedicated to presenting the latest research progress in civil structural health monitoring, encompassing areas such as damage detection, data processing algorithms, modeling and simulation, sensor development, and experimental validation.



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