Special Issue

Advanced Prediction and Mitigation of Building Vibrations and Noise: Integrating Safety and Sustainability

Message from the Guest Editors

Advanced methodologies for predicting and mitigating vibrations and noise in building structures have become critical to addressing emerging challenges in urban environments. Structural vibrations—induced by traffic, construction operations, and mechanical systems—not only compromise human comfort but also accelerate material fatigue, posing latent threats to structural integrity.

The topics of interest include, but are not limited to, the following:

(1) Next-generation prediction models leveraging machine learning, wave propagation theory, and uncertainty quantification;
(2) Smart mitigation systems incorporating low-carbon damping materials and energy–noise co-optimization;
(3) Structural health monitoring (SHM) techniques using vibration signatures for early damage diagnosis;
(4) Lifecycle-oriented solutions evaluating the carbon footprints of vibration/noise control measures.

For more information, please click on the special issue link:
https://www.mdpi.com/journal/buildings/special_issues/PD8I3JD9GB

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About the Journal

Message from the Editor-in-Chief

Current urban environments are home to multi-modal transit systems, extensive energy grids, a building stock, and integrated services. Sprawling neighborhoods are composed of buildings that accommodate living and working quarters. However, it is expected that the cities and communities of the future will face complex and enormous challenges, including maintenance, interconnectivity, resilience, energy efficiency, and sustainability issues, to name but a few. A smart city uses advanced technologies and a digital infrastructure to improve the outcomes in every aspect of a city's operations. A smart building optimizes the experience of occupants, staff, and management by using a modern and connected environment. Innovations in technology that can bring dramatic improvements to design, planning, and policy are critical in developing the cities and buildings of the future.

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