18TH WORLD CONFERENCE ON EARTHQUAKE ENGINEERING

WCEE2024

MILAN

MILAN, ITALY
30TH JUNE - 5TH JULY 2024

www.wcee2024.it

Session ID: SHM-2

Title

STRUCTURAL HEALTH MONITORING OF TRANSPORTATION INFRASTRUCTURE FROM A MULTI-HAZARD PERSPECTIVE

Convenors

F. Ubertini [1], W. Salvatore [2], S. Laflamme [3]

Description

Transportation infrastructure systems, including bridges and tunnels, are exposed to various hazards that include materials degradation, as well as natural and manmade hazards. The combination of different natural (e.g., seismic, hurricanes) and manmade (e.g., accelerated materials ageing, overloads) hazards increases the potential risk of failure, and it follows that the infrastructure system network requires assessment on a multi-hazard perspective.

In the context of multi-hazard risk assessment and mitigation strategies, Structural Health Monitoring (SHM) plays a key role, especially as a tool for rapid assessment of risks and decision making after critical events. SHM of transportation networks has gained significant popularity in recent years because of: (a) the urgent need for improving infrastructure resilience, especially in earthquake-prone regions; (b) the technological advances in sensing technologies including both contact and contactless solutions; (c) the rapidly growing field of artificial intelligence, including deep learning methods, yielding unmatched capabilities in signal processing.

This technical session focuses on recent developments of SHM strategies applied to transportation infrastructure in a multi-hazard perspective. Suitable topics include, but are not limited to:
- Rapid assessment of transportation networks based on monitoring data, including post-seismic structural assessment
- Physics-based Machine Learning and Artificial Intelligence methods for infrastructural health monitoring
- Remote sensing (e.g. InSAR) and innovative sensing technologies for multihazard infrastructure health monitoring
- Next-generation sensing technologies for structural health monitoring
- Advanced signal processing strategies for multihazard infrastructural monitoring

This technical session is organized under the auspices of FABRE Consortium (www.consorziofabre.it), the Italian scientific alliance on risk assessment and monitoring of civil infrastructural systems.

Invited Speakers

E. Chatzi [4], M.P. Limongelli [5], R. Betti [6], J. Conte [7], A. Cunha [8], A. Dall Asta [9], E. Garcia-Macias [10], M. Todd [7], F. Magalhaes [8], D. Ribeiro [8]

Affiliations

[1] University of Perugia, Perugia, Italy, [2] University of Pisa, Pisa, Italy, [3] Iowa State University, Ames, USA, [4] ETH Zurich, Zurich, Switzerland, [5] Politecnico di Milano, Milano, Italy, [6] Columbia University, New York, USA, [7] UCSD, San Diego, USA, [8] University of Porto, Porto, Portugal, [9] University of Camerino, Camerino, Italy, [10] University of Granada, Granada, Spain