

# Structural health monitoring for seismic protection of structure and infrastructure systems

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**Abstract** Structural Health Monitoring (SHM) of civil-engineering structures is becoming more and more popular both in Europe and worldwide mainly because of the opportunities that it offers in the fields of construction management and maintenance. More precisely, SHM offers several advantages in terms of reduction of inspection costs, because of a better understanding of the behavior of both structures and infrastructures under dynamic loads, seismic protection, observation in real or near real-time, of the structural response and of evolution of damage. Therefore, it is possible to produce post-earthquake scenarios and support rescue operations. In this context, this paper provides a review of different technical aspects of SHM summarizing some sensor validation methodologies for SHM. Following that, recent progresses on SHM of buildings subjected to seismic actions and relevant ways to detect damage are recalled. Moreover, some aspects of SHM of tunnels and bridges are covered. Some related applications that use sensor networks designed by the University of Trento and a startup are described, pointing out the solutions adopted to build reliable SHM systems. Finally, concluding remarks and promising research efforts are underlined.