

# **MODELLING, MONITORING AND RETROFITTING STRATEGIES OF MASONRY STRUCTURES IN SEISMIC AREAS**

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Unreinforced Masonry (URM) constructions are widely spread, especially in European countries. They represent an invaluable part of the world's architectural and historical heritage, being distinguished by different geometric shapes, architectural details and mechanical properties. Due to the environmental actions, in many cases, masonry structures experienced severe deterioration processes which increased the structure vulnerability to seismic events. Several approaches have been proposed for the analysis of masonry structures, ranging from empirical to analytical and computational procedures. A suitable criterion for classifying masonry modelling approaches relies on the scale at which masonry is analysed, distinguishing between micromechanical, macromechanical, and multiscale models, but also other criteria can be adopted.

Structural Health Monitoring (SHM) plays a paramount role for the preservation of both existing masonry constructions composing urban environments and cultural heritage buildings. The use of advanced techniques and innovative instrumentations allow for identifying important parameters characterizing the dynamic response of these structures throughout non-invasive and expeditive procedures. The correct identification of these parameters allows to derive additional important information about the presence, location and extent of possible damages.

Due to both the actual health state of masonry constructions and the very high vulnerability against seismic actions, different seismic retrofitting and strengthening approaches have been developed and implemented in the past few decades. The primary concept of retrofitting methods is a) to reduce the impact of external loads (ii) to upgrade the load-bearing capacity of structural parts and (iii) to upgrade the structural integrity. These targets can be pursued through different traditional and innovative consolidation and strengthening interventions.

Based on the above premises, in the current Mini-Symposia, the following objectives will be achieved:

- to compare and assess the advantages and disadvantages of each analysis method of URM structures to identify the most suitable method in different cases.
- to focus on methodological aspects, recent developments and applications of vibration-based assessment and SHM of ordinary and historic structures.
- to provide some helpful guidance for the researchers in choosing an appropriate technique for strengthening/retrofitting URM structures.