Assessing modal property variation in an historical retrofitted masonry building

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Abstract

The research activity is focused on the assessment of modal property variation of an historical masonry building. After the 2009 L'Aquila earthquake, a lot of damages were found especially in masonry structures [1] probably due also to the presence of a large seismic vertical component. Among these buildings, "Palazzo Camponeschi", located in the historical center of L'Aquila, was seriously damaged during the earthquake. The insufficient performance was likely induced by the irregular geometrical plant responsible of the activation of important torsional effects. The building has been retrofitted using innovative interventions (steel helical bars, glass fiber bands and realization of a structural joint**).** For the new structural systems, two structural health monitoring systems using accelerometer sensors have been designed to carry out a continuous long-term experimental modal characteristic tracking. The last will be extracted using the measurements coming from both the monitoring systems and daily experimental dynamic campaigns. Different data-driven procedures as e.g. Stochastic Subspace Identification method (SSI), Principal Component Analysis (PCA) [2,3], Regression trees and Random Forests, Gaussian Process, etc. will be applied and compared to assess the correlation between the natural frequencies and the environmental parameters. The associated modal shape behavior will be described.

References

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