

Dissipation panels for seismic retrofitting of buildings

Summary

Innovative Dissipation Panels that were conceived for the seismic protection and retrofitting of ancient buildings are under an experimental and numeric validation study. Application of passive energy dissipation systems, as they absorb a portion of the seismic energy input, lessens energy dissipation demand on primary resisting components. Damaging deformations in structural members and losses are thus reduced. The proposed technology was designed to improve the seismic energy dissipation capacity of ancient buildings as well as to minimize interfering with their original structural concept. Therefore, they can be easily integrated within and in respect of the existing structure. Besides the increase of damping, the herein presented system is aimed at enabling compatible, low intrusive and reversible retrofitting interventions. Main structural characteristics of the constructions are then preserved. Basic conception of the Dissipation Panels corresponds to an articulated supporting frame with an embodied replaceable central damper.

A series of full scale cyclic tests to evaluate the performance of prototypes of the Dissipation Panels, which take advantage of an incorporated metallic damper, have already been carried out. The inelastic behavior is limited to the damper, where plastic hinges are formed. Damage is thus concentrated in a device that can be easily replaced if necessary. Ductility of the structure is achieved through means of making the supplemental damping device to yield, so that the rest of the structure is protected from damage.

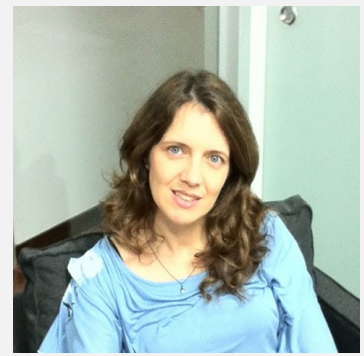
Extended comprehensive experimental tests and numerical simulations are in progress seeking to validate and optimize the performance of the proposed low intrusive seismic retrofitting technology. The seismic response of a case study building incorporating the Dissipation Panels is also being investigated.

Keywords

Dissipation panels, energy dissipation, seismic retrofitting, low intrusive technology, compatible interventions, replaceable dampers.



Cyclic test of a full-scale prototype of a Dissipation Panel.



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