

RETROFITTING USING BASE ISOLATION: EXPERIENCE IN RECONSTRUCTION AFTER THE 2009 L'AQUILA EARTHQUAKE IN ITALY

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Problem and Significance: After the earthquake striking the city of L'Aquila in Italy on April 6th 2009, a large amount of buildings resulted strongly damaged and were judged unfit for use. The design for the retrofitting of damaged buildings involves three aspects: the survey of damage and the works to repair the damage; the assessment of the vulnerability of building in its original structural configuration; the design of works allowing for an enhancement of the building vulnerability up to a conventional level. The paper deals with the direct experience of the authors in managing the actual design for the retrofitting of some buildings damaged by the quake. The paper focuses in particular on r/c (or masonry) buildings for which a base-isolation retrofitting has been designed and adopted.

Proposed Approach: The seismic vulnerability of the buildings in their original configuration is assessed assuming material parameters and load derived from on-site survey and accounting for relevant vulnerability factors not included in conventional modelling. A classification of the possible works concerning repair, retrofit, seismic enhancement can be carried out dealing with the structural effectiveness, impact, control in application and lifetime, related indirect works, cost. Information from the analyzed buildings allows to identify classes of problems related with the insertion of a base-isolation system below an existing framed building.

Results and Applications: The main result is a tentative classification of the issues related to the insertion of a base-isolation system below an existing building aimed at a seismic enhancement, avoiding or strongly limiting other works in the building elevation. The retrofitting strategies, the enhancement levels, the application solutions are critically discussed under the experience of the real cases faced with, paying a particular attention to the cost/effectiveness ratios.

