World Academy of Science, Engineering and Technology
International Journal of Bioengineering and Life Sciences
Vol:9, No:05, 2015

Advanced Seismic Retrofit of a School Building by a DFP Base Isolation Solution

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Abstract : The study of a base isolation seismic retrofit solution for a reinforced concrete school building is presented in this paper. The building was assumed as a benchmark structure for a Research Project financed by the Italian Department of Civil Protection, and is representative of several similar public edifices designed with earlier Technical Standards editions, in Italy as well as in other earthquake-prone European countries. The structural characteristics of the building, and a synthesis of the investigation campaigns developed on it, are initially presented. The mechanical parameters, dimensions, locations and installation details of the base isolation system, incorporating double friction pendulum sliding bearings as protective devices, are then illustrated, along with the performance assessment analyses carried out in original and rehabilitated conditions according to a full non-linear dynamic approach. The results of the analyses show a remarkable enhancement of the seismic response capacities of the structure in base-isolated configuration. This allows reaching the high performance levels postulated in the rehabilitation design with notably lower costs and architectural intrusion as compared to traditional retrofit interventions designed for the same objectives.

Keywords : seismic retrofit, seismic assessment, r/c structures, school buildings, base isolation
Conference Title : ICBB 2015 : International Conference on Bioinformatics and Biomedicine
Conference Location : Istanbul, Türkiye
Conference Dates : May 21-22, 2015