

Dissipative Bracing-Based Seismic Retrofit of R/C School Buildings

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Abstract: A dissipative bracing system incorporating pressurized fluid viscous spring-dampers has been studied for many years by the authors as an alternative seismic protection strategy for new and existing frame structures. As a concluding stage of this activity, a set of demonstrative case studies was examined to illustrate the enhancement of seismic performance and the economic advantages guaranteed by the system in actual design applications. The paper offers a selection of two among these case studies, both concerning retrofit interventions of reinforced concrete school buildings designed with earlier Seismic Standards editions, representative of a large stock of similar edifices built during the 1970s and earlier 1980s. The following aspects are presented and discussed in detail: the mechanical parameters, layouts and locations selected for the constituting elements of the system; the architectural refurbishment projects developed to properly incorporate the structural interventions and improve the appearance of the buildings; highlights of the installation works completed in one of the two case studies; and a synthesis of the performance assessment analyses in original and rehabilitated conditions, developed according to a full non-linear dynamic approach. The results of the analyses show a remarkable enhancement of the seismic response capacities of both structures. This allows reaching the high performance objectives postulated in the retrofit designs, with much lower costs and architectural intrusion as compared to traditional rehabilitation interventions designed for the same objectives.