World Academy of Science, Engineering and Technology
International Journal of Civil and Architectural Engineering
Vol:10, No:06, 2016

Story-Wise Distribution of Slit Dampers for Seismic Retrofit of RC Shear Wall Structures

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Abstract : In this study, a seismic retrofit scheme for a reinforced concrete shear wall structure using steel slit dampers was presented. The stiffness and the strength of the slit damper used in the retrofit were verified by cyclic loading test. A genetic algorithm was applied to find out the optimum location of the slit dampers. The effects of the slit dampers on the seismic retrofit of the model were compared with those of jacketing shear walls. The seismic performance of the model structure with optimally positioned slit dampers was evaluated by nonlinear static and dynamic analyses. Based on the analysis results, the simple procedure for determining required damping ratio using capacity spectrum method along with the damper distribution pattern proportional to the inter-story drifts was validated. The analysis results showed that the seismic retrofit of the model structure using the slit dampers was more economical than the jacketing of the shear walls and that the capacity spectrum method combined with the simple damper distribution pattern led to satisfactory damper distribution pattern compatible with the solution obtained from the genetic algorithm.

Keywords : seismic retrofit, slit dampers, genetic algorithm, jacketing, capacity spectrum method
Conference Title : ICACE 2016 : International Conference on Advances in Civil Engineering
Conference Location : Venice, Italy
Conference Dates : June 13-14, 2016