World Academy of Science, Engineering and Technology
International Journal of Geotechnical and Geological Engineering
Vol:11, No:10, 2017

Cost Effectiveness of Slit-Viscoelastic Dampers for Seismic Retrofit of Structures

Authors : Minsung Kim, Jinkoo Kim

Abstract : In order to reduce or eliminate seismic damage in structures, many researchers have investigated various energy dissipation devices. In this study, the seismic capacity and cost of a slit-viscoelastic seismic retrofit system composed of a steel slit plate and viscoelastic dampers connected in parallel are evaluated. The combination of the two different damping mechanisms is expected to produce enhanced seismic performance of the building. The analysis model of the system is first derived using various link elements in the nonlinear dynamic analysis software Perform 3D, and fragility curves of the structure retrofitted with the dampers are obtained using incremental dynamic analyses. The analysis results show that the displacement of the structure equipped with the hybrid dampers is smaller than that of the structure with slit dampers due to the enhanced self-centering capability of the system. It is also observed that the initial cost of hybrid system required for the seismic retrofit is smaller than that of the structure with viscoelastic dampers. Acknowledgement: This research was financially supported by the Ministry of Trade, Industry and Energy(MOTIE) and Korea Institute for Advancement of Technology(KIAT) through the International Cooperative R&D program(N043100016_Development of low-cost high-performance seismic energy dissipation devices using viscoelastic material).

Keywords : damped cable systems, seismic retrofit, viscous dampers, self-centering
Conference Title : ICSDA 2017 : International Conference on Seismic Design and Analysis
Conference Location : Bali, Indonesia
Conference Dates : October 23-24, 2017