International Journal of Civil and Environmental Engineering
Vol:8, No:6, 2014

Analytical Evaluation on Hysteresis Performance of Circular Shear Panel Damper

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Abstract : The idea of adding metallic energy dissipaters to a structure to absorb a large part of the seismic energy began four decades ago. There are several types of metal-based devices conceived as dampers for the seismic energy absorber whereby damages to the major structural components could be minimized for both new and existing structures. This paper aimed to develop and evaluate structural performance of both stiffened and non stiffened circular shear panel damper for passive seismic energy protection by inelastic deformation. Structural evaluation was done using commercially available nonlinear FE simulation program. Diameter-to-thickness ratio is employed as main parameter to investigate the hysteresis performance of stiffened and unstiffened circular shear panel. Depending on these parameters three different buckling mode and hysteretic behavior was found: yielding prior to buckling without strength degradation, yielding prior to buckling with strength degradation and yielding with buckling and strength degradation which forms pinching at initial displacement. Hence, the hysteresis behavior is identified, specimens which deform without strength degradation so it will be used as passive energy dissipating device in civil engineering structures.

Keywords : circular shear panel damper, FE analysis, hysteretic behavior, large deformation
Conference Title : ICCSEE 2014 : International Conference on Civil, Structural and Earthquake Engineering
Conference Location : Toronto, Canada
Conference Dates : June 16-17, 2014