



# Cyclic Performance Evaluation of Steel Structures Retrofitted by Slit Dampers

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## ABSTRACT

*This study aims to assess the effect of slit dampers on chevron braced frame in steel structures with different number of stories under one-way and cyclic loadings. To assess and compare the results, a parametric research was performed on slit, non-slit and cavity dampers. 8 single-story and single-span frames in the form of moment frame, braced frame with non-slit damper, braced frame with slit damper, braced frame with cavity damper, and chevron 3-story frame with slit damper, chevron 5-story braced frame with slit damper and the 8-story chevron braced frame with slit damper were modeled and analyzed by ABAQUS finite element software. The results showed that the chevron braced frame with slit damper dissipated a large amount of earthquake input energy and reduced the base shear force with its behavior. Hysteresis curves with stability and without high dissipation indicated high energy absorption by the chevron braced frames equipped with slit dampers. In all chevron braced frames with slit damper, no plastic hinge was formed in the structural members, and the failure mode was concentrated in the slit damper element. Slit damper reduced the initial stiffness, secondary stiffness, and bearing capacity, which in addition to controlling the lateral displacement of the structure increased energy dissipation capability and ductility. The chevron braced frame with slit damper had a better ductility than other specimens and had a good seismic performance based on the results.*

## Keywords:

*Chevron braced frame, Slit damper, Hysteresis curve, Ductility, Plastic hinge.*