

عنوان مقاله:

YIELDING-CURVED-BARS & HEMISPHERE CORE ENERGY DISSIPATING DEVICE AS THE CENTRAL SUPPORT OF REPAIRABLE BUILDINGS WITH SEESAW MOTION

محل انتشار:

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خلاصه مقاله:

Design of repairable buildings, whose structural systems can be easily repaired after a major earthquake, instead of demolishing and rebuilding, have been paid great attention by some researchers in recent decade. In this paper a study in which specific attention has been paid to the behavior of the central support which has a main role in creating the possibility of seesaw motion in the building's structural system, as well as creating some capacity of seismic energy dissipation is presented. The proposed device can be called briefly Yielding Curved Bars (YCB) energy dissipater. The YCB energy dissipater can act as the central support under the central main column of the building at lowest level. The clipped hemisphere carries the vertical load of the central column of the building with seesaw motion, and transfer it directly to its concave bed, while the curved bars around the clipped hemisphere act as yielding elements during the seesaw motion of the building which causes the central column to incline, and this inclination causes the rotation of the YCB device around a horizontal axis, resulting in large plastic deformations of curved rods, and therefore, large amount of energy dissipation during earthquake excitations. The YCB device was modeled by a powerful finite element analysis computer program and its hysteretic behavior under the simultaneous effects of vertical and horizontal loads was obtained. To investigate the efficiency of using the YCB device in reduction of seismic response of buildings a multi-story regular steel building was considered once with conventional design and once equipped with the YCB device and some similar yielding energy dissipaters under all circumferential columns and the seismic responses were calculated by time history analyses, employing a set of selected three-component accelerograms. Results show the high efficiency of the YCB devices in seismic response reduction of buildings.

کلمات کلیدی:

Repairable Buildings, See-Saw Motion, Finite Element Analysis, Hysteretic Behavior

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