

The Effect of Vertical Shear-link in Improving the Seismic Performance of Structures with Eccentrically Bracing Systems

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Abstract : Passive control methods can be utilized to build earthquake resistant structures, and also to strengthen the vulnerable ones. One of the most effective, yet simple passive control methods is the use of vertical shear-links (VSL) in systems with eccentric bracing. In fact, vertical shear-links dissipate the earthquake energy and act like a ductile fuse. In this paper, we studied the effect of this system in increasing the ductility and energy dissipation and also modeled the behavior of this type of eccentric bracing, and compared the hysteresis diagram of the modeled samples with the laboratory samples. We studied several samples of frames with vertical shear-links in order to assess the behavior of this type of eccentric bracing. Each of these samples was modeled in finite element software ANSYS 9.0, and was analyzed under the static cyclic loading. It was found that vertical shear-links have a more stable hysteresis loops. Another analysis showed that using honeycomb beams as the horizontal beam along with steel reinforcement has no negative effect on the hysteresis behavior of the sample.

Keywords : vertical shear-link, passive control, cyclic analysis, energy dissipation, honeycomb beam

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