

A Comparative Study on the Performance of Viscous and Friction Dampers under Seismic Excitation

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Abstract : Earthquakes over the years have been known to cause devastating damage on buildings and induced huge loss on human life and properties. It is for this reason that engineers have devised means of protecting buildings and thus protecting human life. Since the invention of devices such as the viscous and friction dampers, scientists/researchers have been able to incorporate these devices into buildings and other engineering structures. The viscous damper is a hydraulic device which dissipates the seismic forces by pushing fluid through an orifice, producing a damping pressure which creates a force. In the friction damper, the force is mainly resisted by converting the kinetic energy into heat by friction. Devices such as viscous and friction dampers are able to absorb almost all the earthquake energy, allowing the structure to remain undamaged (or with some amount of damage) and ready for immediate reuse (with some repair works). Comparing these two devices presents the engineer with adequate information on the merits and demerits of these devices and in which circumstances their use would be highly favorable. This paper examines the performance of both viscous and friction dampers under different ground motions. A two-storey frame installed with both devices under investigation are modeled in commercial computer software and analyzed under different ground motions. The results of the performance of the structure are then tabulated and compared. Also included in this study is the ease of installation and maintenance of these devices.

Keywords : friction damper, seismic, slip load, viscous damper

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