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Mechanical Properties of Hybrid Friction-viscoelastic Damping

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Abstract

Viscoelastic dampers (VEDs) are one of the most common passive control devices used in new and retrofit building projects which reduce the structure responses and dissipate seismic energy during an earthquake. This study is about the idea of passive damping devices for solving challenging problems across failure of RC beam-column joints. Passive damping devices aid to dissipate input energy and consequently limit the damage. In this study, a new type of hybrid friction-viscoelastic damping device using steel plates with rubberized cork interface material is proposed to study the damping properties of damper under cyclic loading in order to determine the damping coefficient and energy dissipation. Seismic dampers permit the structure to resist severe input energy and reduce harmful deflections, forces, and accelerations to structures and occupants. Dampers cannot bear static loading. Each type of damper has its features and simultaneous usage of different dampers helps compensation of demerits. Mechanical property analysis of the components of damping devices is to be focussed on stiffness ratio, damping coefficient, and multiple response history which ensures the dissipation of energy of seismic waves moving through a building structure to heat. Many studies have been conducted using different type of dampers on structural elements and tested under cyclic loading.

Keywords: Friction-viscoelastic damping device, hysteresis curve, rubberized cork