

## Performance Evaluation of Reinforced Concrete Framed Structure with Steel Bracing and Supplemental Energy Dissipation

**Authors :** Swanand Patil, Pankaj Agarwal

**Abstract :** In past few decades, seismic performance objectives have shifted from earthquake resistance to earthquake resilience of the structures, especially for the lifeline buildings. Features such as negligible post-earthquake damage and replaceable damaged components, makes energy dissipating systems a valid choice for a seismically resilient building. In this study, various energy dissipation devices are applied on an eight-storey moment resisting RC building model. The energy dissipating devices include both hysteresis-based and viscous type of devices. The seismic response of the building is obtained for different positioning and mechanical properties of the devices. The investigation is carried forward to the deficiently ductile RC frame also. The performance assessment is done on the basis of drift ratio, mode shapes and displacement response of the model structures. Nonlinear dynamic analysis shows largely improved displacement response. The damping devices improve displacement response more efficiently in the deficient ductile frames than that in the perfectly moment resisting frames. This finding is important considering the number of deficient buildings in India and the world. The placement and mechanical properties of the dampers prove to be a crucial part in modelling, analyzing and designing of the structures with supplemental energy dissipation.

**Keywords :** earthquake resilient structures, lifeline buildings, retrofitting of structures, supplemental energy dissipation

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