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Seismic Protection of Reinforced Concrete Structure Using Combined Passive Vibration Controlling Device

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Abstract

Current earthquake resistant philosophy leads to damage of structure during moderate seismic event results into loss of life and economy. Whereas, important structure like hospital, bridges, water-tank, dams, power transmission towers etc. should be workable after such catastrophic event. It is accepted that, the vibration controlling instrument mainly isolation devices are highly effective during seismic event. Therefore, current work consists of seismic analysis and design of G+4 R.C. structure with and without isolation system. The seismic performance of the structure is evaluated by using time history analysis (THA). For THA four scaled historical devastating ground motion records are considered namely 1940 EL Centro imperial valley, 1989 Loma prieta, 1994 Northridge and 1995 Kobe earthquake. From the THA result it is observed that use of isolation system is highly effective in reducing base shear, storey drift and overturning moment of the structure with a cost of high displacement in isolators. A comparative study considering combination of base isolated system is also done and response of structure to combined base isolation system were recorded. From the result it is observed that use of combined devices is highly effective.

Keywords: Isolation system, LRB, FPS, Time history analysis