

Improving the behavior of high-rise buildings by hybrid basement insulation system and rotational friction dampers

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ABSTRACT

Increased resistance to earthquake forces is not always a desirable solution for buildings which house contents that are irreplaceable or simply more valuable than the actual primary structure (e.g. museums, data storage Centre's, etc.). Base isolation and seismic dampers can be employed to minimize inter-story drifts and floor accelerations via specially designed Isolation and dampers System at the structural base, or at higher levels of the superstructure.

In this research we'll examine the response of buildings isolated using isolation hybrid system consisting of Lead-Rubber Bearings (LRB), Flat Sliding Bearings (FSB), with the addition of Rotation Fiction Damper (FD) at the base, and at the level of floors and compared with the response to the traditional foundations of buildings, in terms of the (period, displacement and distribution Shear Force and height of the building).

We will conduct seismic analysis of the twenty-story building height using non linear dynamic analysis", and using SAP2000, as well as Using a Registry Timetable for Earthquake El-Centro).

The results showed that the use of Rotation Friction Damper (STORY FD: SFD) at level floors of the building isolated by hybrid insulation and damping system (LRB + FSB + FD) has had a limited impact in improving the performance of building in terms of reduction (Displacements) and (Drift) with increasing height of the building, but had a negative impact on the (Base shear) which led to an increase in the Base shear with increasing the flexibility of building, While the use of Rotation Fiction Damper (STORY FD: SFD) at level floors of the building isolated by hybrid insulation system (LRB + FSB) without adding friction damper (FD) at the base had a significant impact in improving the performance of origin in terms of reducing the Drift, but had a negative impact on the Base shear and Displacements where this led to an increase in the Base shear and Displacements of origin.

KEY WORDS: Seismic isolation, basement isolation, response of buildings, the passive control, damping, drift.

For the paper in Arabic see pages (39-49).

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