

Torsion in Base-Isolated Structures with Elastomeric Isolation Systems

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Today, due to the increasing application of elastomeric isolators in structures, torsion control investigation has gained great importance. Seismic isolator systems reduce destructive effects of earthquakes via defining a flexible relationship between main structure and foundation. Although there are relatively extensive analytical and experimental studies on the structures with vibrational isolators, in these investigations, the issue of torsion and its effect on isolated structures have not been considered. Therefore, in the present work, effect of different parameters on torsion in isolated structures was examined by an elastomeric isolator. In recent 25 years, torsion has been considered as a secondary effect in structures. Also, torsion is minimized in isolators, while being neglected in main structures, which has a destructive effect in some structures. In the present work, while investigating torsion and displacement in different structures, the ways of selecting isolators and calculating their hardness considering weight of buildings and geographical and environmental conditions of the construction site were taken into consideration. By comparing values of torsion and displacement in different structures in two modes of with and without an elastomeric isolator in different earthquakes, it was observed that structures with an isolator had very slight torsion compared with those without an isolator. Moreover, torsional values were equal on the ground and roof floors in the structures with an isolator; but, in the structures without an isolator, the ground floor was fixed and the roof floor had maximum torsion. Further, it was observed that, in the structures with an isolator, displacement had more considerable improvement than structures without an isolator.

Keywords: Seismic isolator, elastomeric isolator, torsion in structures, displacement in structures.