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A CASE STUDY ON STRUCTURE OF ATIEH GHARB 2 HOSPITAL PROJECT EQUIPPED WITH ROTATIONAL FRICTION DAMPING SYSTEM

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Supplying a safe Seismic Force Resisting System-SFRS with an advance and efficient mechanism especially for the buildings with high importance or large scale or for tall buildings in high seismic zone area has always been a main goal of engineers and various type of SFRSs are invented and employed. Utilizing advance and effective advantageous of modern systems such as Damping Systems-DS and Isolating Systems-IS can help to improve seismic performance of buildings of high importance level and to prevent them from significant damages. On the other hand, high demand on buildings with complicated geometry and tall in height in high seismic zone area is making it necessity to apply these modern systems in equipping seismic force resisting systems. Hospitals are buildings categorized as special in importance level in codes and are so important to maintain in occupancy immediately after earthquake. In these buildings, base isolation systems can be used efficiently to reduce inter-story drift ratios floor accelerations to keep the building in occupancy.

In some cases, especially in high-rise buildings, buildings with too many undergrounds stories, or depends on other technical or financial issues, applying base isolations systems are not practical. Hopefully, equipping the structure of these buildings can be used as an effective and practical way to use as a modern technology to control seismic vibration of the building to help convincing the required performance levels of the codes for hospital buildings. Atieh Gharb 2 hospital is a building with 9 stories underground and 26 stories above ground level constructing in Tehran, Iran. The building is probably the highest hospital in the world and is a national important medical center in the country. In this paper, structural system of Atieh Gharb 2 hospital project is introduced and some of the obtained results of the nonlinear static and also time history analysis is represented. In Figure 1, a photo of the constructed structure and a 3D schematic view of the building are shown.

Figure 1. (left) Schematic 3D view of the building, and (right) a photo of constructed structure.

Nonlinear static analysis and also time history analysis are conducted to show seismic performance of the structure and effectiveness of equipping the structure with DS. Obtained results of nonlinear static analysis show a significant effect of equipping the structure with DS in reducing inter-story drift ratios in both DBE and MCE level of earthquake loading. In Figure 2, a sample of inter-story drift results of comparative study between the structures with/without DS is shown. Other criterion in seismic evaluation of the building such as energy flux of the structure are extracted from time history analysis and effectiveness of the DS in improving seismic behavior of the building is studied and represented in full paper.

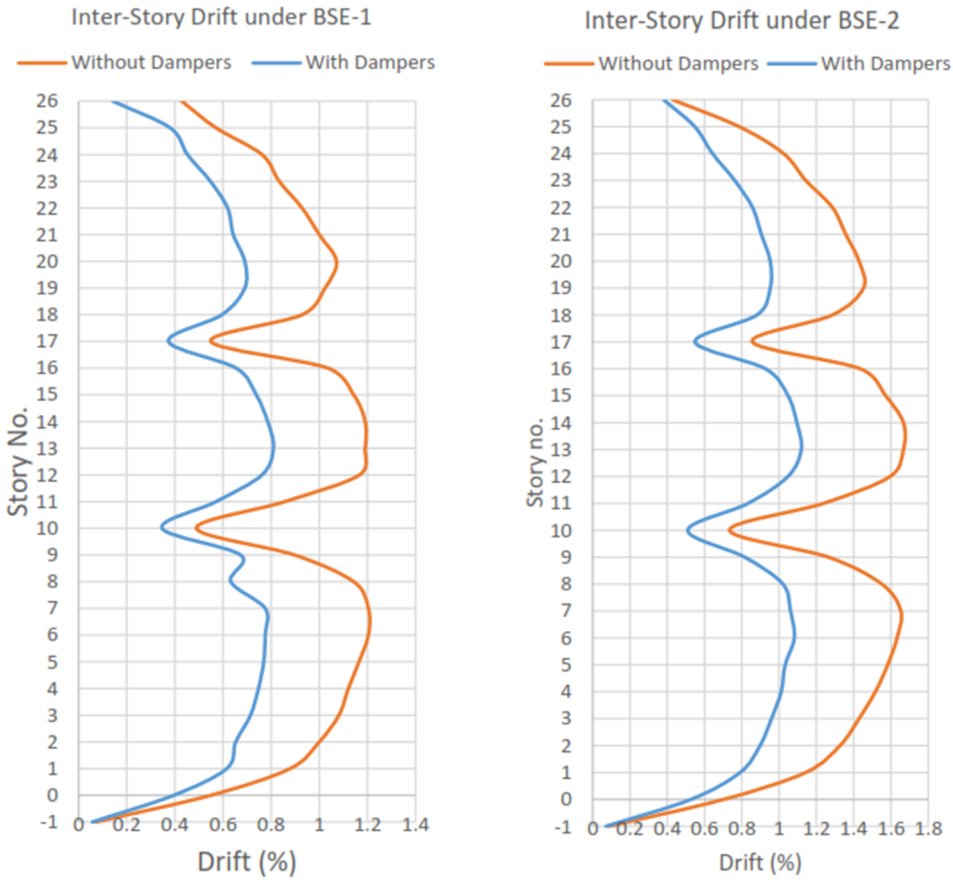

Figure 2. Inter-story drift ratio of the structure with and without DS under (left) BSE-1 and (right) BSE-2 earthquake excitation.

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