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USE OF REPLACEABLE SHEAR LINK IN STEEL STRUCTURES AS A LATERAL LOAD BEARING SYSTEM

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Heretofore, various lateral load bearing steel systems have been proposed and applied, including moment resisting frame system, a variety of braced frame systems and steel shear walls. Due to behavioral, structural, and architectural problems of each of the aforementioned systems, which could include high volume occupancy, construction difficulties, etc., researchers have always been looking for an ideal system to resist against lateral loads that, in addition to have appropriate stiffness, resistance, and ductility, they are not having the shortcomings of conventional lateral load bearing systems.

This study aims to introduce a lateral load bearing system that while having proper cyclic behavior, it can also be maintained. It is expected that the beams and columns will stay in the elastic region during an earthquake and energy absorption is perfumed through the shear link. In Figure 1, the studied system is schematically illustrated. As can be seen, the shear link is not directly connected to the beams and is connected through two boxes to the top and bottom beams. The main advantage of this system is that the shear link can be replaced after earthquake event. The beam and column connections in this system are pined type. In these studies, the cyclic behavior of the system and the effect of plastic shear capacity as well as its flexural strength on the ultimate strength of the structure are investigated. Moreover, the effect of shear or flexural behavior of the energy-absorber link on the behavior of the system is studied.

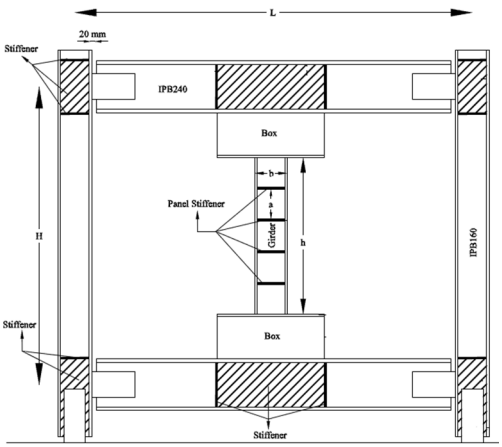

Figure 1. The studied system.

According to the numerical analysis carried out in the finite element software, ABAQUS, the system has an appropriate energy absorption and also the hysteresis curves are stable. Among other advantages of this system, it could be mentioned to the ability to embed openings and the ease of implementing seismic retrofitting of the structure after earthquake event.

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