

عنوان مقاله:

The Advantages of Reducing the Length of Yielding Segment in Seismic Performance of Buckling Restrained Braced Frames

محل انتشار:

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خلاصه مقاله:

Due to their better seismic performance, Buckling Restrained Braces (BRBs) have been widely replaced the conventional braces in Concentric Braced Frames (CBFs) in recent years. BRBs benefit from symmetric and stable hysteretic behavior in comparison with the normal braces and as a result have a higher energy absorption capacity. Nevertheless, the stiffness of a BRB frames degrades to a great extent when the core segments yield. Considering the high capacity of steel in the post-elastic region, the idea of reducing the length of the yielding segment of the BRBs is proposed and investigated. This leads in overstrength development in the structure and an increase in the post-yield stiffness of the braces and compensates the lack of high post-elastic stiffness of conventional BRBs. Reducing the length of core segment has other advantages such as simpler detailing for the restraining mechanism. Nevertheless, reducing the yielding length imposes large strain demands on this segment which pose some concerns about low-cycle fatigue failure. In this research a seven story building which is a benchmark example of BRBF is redesigned based on the proposed idea. The design procedure includes a special step for preventing the low-cycle fatigue failure. Nonlinear static analyses are conducted on the two buildings using the open source finite element platform, OpenSees (2007). The results show that the BRB with limited yielding length provides proper overstrength and facilitate the plasticity distribution in the structure. Moreover the pattern of story drifts does not change, but the deformation and residual displacements are reduced

کلمات کلیدی:

Buckling Restrained Braced Frame, Yielding Segment, Low-Cycle Fatigue, Pushover Analysis, OpenSees

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