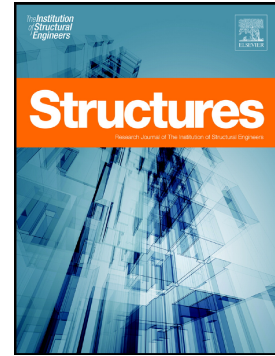


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A suggested method for improving post buckling behavior of concentric braces based on experimental and numerical studies

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Abstract

Concentrically braced structures are one of the most common resistant systems in steel buildings due to their high stiffness and lateral strength. These systems have a good performance under mild earthquakes that behave in the elastic range. However, when these structures are subjected to moderate and severe earthquakes, their main weakness is being revealed. Under these earthquakes, the structure enters the inelastic zone and thus the braces that are pressurized begin to buckle. This makes it impossible to use the full capacity of braces in the energy dissipation exerted on the structure. In the past decades, researchers have conducted a variety of studies to improve the behavior of concentric bracing systems. This paper introduces a method for improving the post-buckling behavior of concentric braces. In this method, a side-mounted fuse is used in the middle of the brace to modify the post-buckling behavior of concentric braces. The results of experimental and numerical researches of this study indicate the better performance of this structural system in terms of ductility and energy dissipation capacity compared to the common concentric braces. The suggested system can be utilized to reduce the capacity of bracing connection which results in reduced costs of the project.

Keywords: Local fuse, auxiliary element, concentric bracing, cyclic loading, ductility, energy absorption capacity, load bearing capacity, hysteresis curve, steel structures.

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