

Analytical Investigation on removable reduced link sections for EBFs

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Abstract

It has been four decades since the development and research works on eccentrically braced frame (EBF) started and more than two decades since the EBF is used as seismic load resisting system in a building structure. The seismic energy dissipation capacity of EBF is depend on the link beams as the energy is dissipated through inelastic deformation of links. Since the damages are concentrated at the link, the concept of replaceable links come up with to remove the damaged portion without affecting the remaining frame and replace it. However, in order to control the plastic rotation either the link strength is weaker or it has less cross-sectional area than the collector beam. The later phenomenon have a negative effect during construction of slab. In this study, replaceable link beam with perforated web was proposed where the link has equal cross-section (same depth) with collector beam but weaker in strength. This addresses the limitations of the existing replaceable link in unequal cross-section. In order to evaluate the deformation capacity under cyclic loading, non-linear finite element analysis was conducted considering the effect of percent of open areas as a main parameter. The obtained results shows that proposed link satisfies the plastic rotation limit required in AISC.

Keywords: EBF, Replaceable link, Perforation, Non-linear FEA, Plastic rotation.

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