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Effects of Using Gusset Plate Stiffeners on the Seismic Performance of Concentrically Braced Frame

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Abstract : Inelastic deformation of the brace in Special Concentrically Braced Frame (SCBF) creates inelastic damages on gusset plate connections such as buckling at edges. In this study, to improve the seismic performance of SCBFs connections, an analytical study was undertaken. To improve the gusset plate connection, this study proposes using ‎edge’s stiffeners in both sides of gusset plate.‎ For this purpose, in order to examine edge’s stiffeners effect on gusset plate connections, two groups of modeling with and without considering edge’s stiffener and different types of braces were modeled using ABAQUS software. The results show that considering the edge’s stiffener reduces the equivalent plastic strain values at a connection region of gusset plate with beam and column, which can improve the seismic performance of gusset plate. Furthermore, considering the edge’s stiffeners significantly decreases the strain concentration at regions where gusset plates have been connected to beam and column. Moreover, considering 2t_{pl} distance causes reduction in the plastic strain.

Keywords : special concentrically braced frame, gusset plate, edge's stiffener, seismic performance
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