عنوان مقاله:

Seismic Behavior of Direct Displacement-based Designed Eccentrically Braced Frames

محل انتشار:

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خلاصه مقاله:

Direct Displacement-Based Design (DDBD) is a performance-based seismic design method that has been proposed and well developed over the past two decades to design RC frame structures, shear walls and bridges. In this method, an equivalent single-degree-of-freedom (SDOF) substitute structure is utilized to estimate seismic displacement demands of a multi-degree-of-freedom (MDOF) system. Although this method has been used to design the above mentioned structures, however, there is just one comprehensive DDBD method to design steel eccentrically braced frames (EBFs) in the literature. The purpose of this study is to investigate nonlinear seismic behavior of the DDB designed EBFs with short, intermediate and long link beams and estimate their seismic demands. To this end, twelve 3, 5, 9 and 12-story EBFs were designed using the proposed DDBD method. To simulate the nonlinear cyclic behavior of link beams, a macro-model proposed in the literature was adopted and validated with the available tests results. In order to describe material nonlinearity of the framing members in the macro-model, distributed plasticity fiber based model was used. After validating the FEM macro-modeling technique of link beams, seismic behavior of the 2D EBFs was investigated with nonlinear time-history analysis under a set of selected earthquake records using the structural analysis software OpenSees (ver. 2.4.0). The results showed that the DDB designed EBFs generally can reach their anticipated performance level.

کلمات کلیدی:

Direct Displacement-based DesignNonlinear Dynamic AnalysisPushover AnalysisSteel Eccentrically Braced FrameSeismic Behavior