



Whither EBFs Instead of CBFs for EQRD?

Prateek Narayan Panda¹, Vipul Prakash², Anupam Chakrabarti²

¹Research Scholar, Department of Civil Engineering, IIT Roorkee

²Professor, Department of Civil Engineering, IIT Roorkee

Abstract

Earthquake cause major non-structural, if not structural, damage in buildings. This damage increases with increase in inter-storey drift ratio (ISD). Bracings increase the lateral stiffness and thereby reduce ISD. In this study, a review of existing literature on Eccentric Braced Frames (EBFs) is presented, particularly focusing on literature showing EBFs superior to Concentric Braced Frames (CBFs). Here the issues in EBFs such as rather limited energy dissipation through ductile behavior of links, large floor deflections, adverse effect on beam adjacent to the link element, and the damages to Non-Structural Elements (NSEs) due to large ISD are clearly discussed. To evaluate the performance of the structure, two steel chevron (inverted V) braced frames (one for CBFs and another for EBFs with active link of 0.4m) have been developed in SAP 2000 and designed using IS 800 2007. The systems have been evaluated based upon two parameters – (a) ISD and (b) energy dissipation. Non-Linear Time history Analyses (NLTHA) have been performed to evaluate the performance of the above systems. On these basis, CBFs are found to be superior over EBFs for resisting lateral load.

Keywords: Earthquake resistance, Inter-storey drift, Energy dissipation, Serviceability