

Earthquake Resistant Sustainable Steel Green Building

Authors : Arup Saha Chaudhuri

Abstract : Structural steel is a very ductile material with high strength carrying capacity, thus it is very useful to make earthquake resistant buildings. It is a homogeneous material also. The member section and the structural system can be made very efficient for economical design. As the steel is recyclable and reused, it is a green material. The embodied energy for the efficiently designed steel structure is less than the RC structure. For sustainable green building steel is the best material nowadays. Moreover, pre-engineered and pre-fabricated faster construction methodologies help the development work to complete within the stipulated time. In this paper, the usefulness of Eccentric Bracing Frame (EBF) in steel structure over Moment Resisting Frame (MRF) and Concentric Bracing Frame (CBF) is shown. Stability of the steel structures against horizontal forces especially in seismic condition is efficiently possible by Eccentric bracing systems with economic connection details. The EBF is pin-ended, but the beam-column joints are designed for pin ended or for full connectivity. The EBF has several desirable features for seismic resistance. In comparison with CBF system, EBF system can be designed for appropriate stiffness and drift control. The link beam is supposed to yield in shear or flexure before initiation of yielding or buckling of the bracing member in tension or compression. The behavior of a 2-D steel frame is observed under seismic loading condition in the present paper. Ductility and brittleness of the frames are compared with respect to time period of vibration and dynamic base shear. It is observed that the EBF system is better than MRF system comparing the time period of vibration and base shear participation.

Keywords : steel building, green and sustainable, earthquake resistant, EBF system

Conference Title : ICGBMCE 2018 : International Conference on Green Building, Materials and Civil Engineering

Conference Location : London, United Kingdom

Conference Dates : February 15-16, 2018