World Academy of Science, Engineering and Technology
International Journal of Structural and Construction Engineering
Vol:10, No:03, 2016

Evaluating the Seismic Stress Distribution in the High-Rise Structures Connections with Optimal Bracing System

Authors : H. R. Vosoughifar, Seyedeh Zeinab. Hosseininejad, Nahid Shabazi, Seyed Mohialdin Hosseininejad

Abstract : In recent years, structure designers advocate further application of energy absorption devices for lateral loads damping. The Un-bonded Braced Frame (UBF) system is one of the efficient damping systems, which is made of a smart combination of steel and concrete or mortar. In this system, steel bears the earthquake-induced axial force as compressive or tension forces without loss of strength. Concrete or mortar around the steel core acts as a constraint for brace and prevents brace buckling during seismic axial load. In this study, the optimal bracing system in the high-rise structures has been evaluated considering the seismic stress distribution in the connections. An actual 18-story structure was modeled using the proper Finite Element (FE) software where braced with UBF, Eccentrically Braced Frames (EBF) and Concentrically Braced Frame (CBF) systems. Nonlinear static pushover and time-history analyses are then performed so that the acquired results demonstrate that the UBF system reduces drift values in the high-rise buildings. Further statistical analyses show that there is a significant difference between the drift values of UBF system compared with those resulted from the EBF and CBF systems. Hence, the seismic stress distribution in the connections of the proposed structure which braced with UBF system was investigated.

Keywords : optimal bracing system, high-rise structure, finite element analysis (FEA), seismic stress
Conference Title : ICCSEE 2016 : International Conference on Civil, Structural and Earthquake Engineering
Conference Location : Paris, France
Conference Dates : March 14-15, 2016