World Academy of Science, Engineering and Technology
International Journal of Geotechnical and Geological Engineering
Vol:11, No:05, 2017

A Numerical Study on the Seismic Performance of Built-Up Battened Columns

Authors : Sophia C. Alih, Mohammadreza Vafaei, Farnoud Rahimi Mansour, Nur Hajarul Falahi Abdul Halim

Abstract : Built-up columns have been widely employed by practice engineers in the design and construction of buildings and bridges. However, failures have been observed in this type of columns in previous seismic events. This study analyses the performance of built-up columns with different configurations of battens when it is subjected to seismic loads. Four columns with different size of battens were simulated and subjected to three different intensities of axial load along with a lateral cyclic load. Results indicate that the size of battens influences significantly the seismic behavior of columns. Lower shear capacity of battens results in higher ultimate strength and ductility for built-up columns. It is observed that intensity of axial load has a significant effect on the ultimate strength of columns, but it is less influential on the yield strength. For a given drift value, the stress level in the centroid of smaller size battens is significantly more than that of larger size battens signifying damage concentration in battens rather than chords. It is concluded that design of battens for shear demand lower than code specified values only slightly reduces initial stiffness of columns; however, it improves seismic performance of battened columns.

Keywords : battened column, built-up column, cyclic behavior, seismic design, steel column
Conference Title : ICUEES 2017 : International Conference on Urban Earthquake Engineering and Seismology
Conference Location : Barcelona, Spain
Conference Dates : May 26-27, 2017

Open Science Index, Geotechnical and Geological Engineering Vol:11, No:05, 2017 publications.waset.org/abstracts/71139.pdf