

The Simultaneous Effect of Horizontal and Vertical Earthquake Components on the Seismic Response of Buckling-Restrained Braced Frame

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Abstract : Over the past years, much research has been conducted on the vulnerability of structures to earthquakes, which only horizontal components of the earthquake were considered in their seismic analysis and vertical earthquake acceleration especially in near-fault area was less considered. The investigation of the mappings shows that vertical earthquake acceleration can be significantly closer to the maximum horizontal earthquake acceleration, and even exceeds it in some cases. This study has compared the behavior of different members of three steel moment frame with a buckling-restrained brace (BRB), one time only by considering the horizontal component and again by considering simultaneously the horizontal and vertical components under the three mappings of the near-fault area and the effect of vertical acceleration on structural responses is investigated. Finally, according to the results, the vertical component of the earthquake has a greater effect on the axial force of the columns and the vertical displacement of the middle of the beams of the different classes and less on the lateral displacement of the classes.

Keywords : vertical earthquake acceleration, near-fault area, steel frame, horizontal and vertical component of earthquake, buckling-restrained brace

Conference Title : ICESE 2018 : International Conference on Earthquake and Structural Engineering

Conference Location : Rome, Italy

Conference Dates : May 03-04, 2018