

Seismic Performance of Reinforced Concrete Frame Structure Based on Plastic Rotation

Authors : Kahil Amar, Meziani Faroudja, Khelil Nacim

Abstract : The principal objective of this study is the evaluation of the seismic performance of reinforced concrete frame structures, taking into account of the behavior laws, reflecting the real behavior of materials, using CASTEM2000 software. A finite element model used is based in modified Takeda model with Timoshenko elements for columns and beams. This model is validated on a Vecchio experimental reinforced concrete (RC) frame model. Then, a study focused on the behavior of a RC frame with three-level and three-story in order to visualize the positioning the plastic hinge (plastic rotation), determined from the curvature distribution along the elements. The results obtained show that the beams of the 1st and 2nd level developed a very large plastic rotations, or these rotations exceed the values corresponding to CP (Collapse prevention with $q_{CP} = 0.02$ rad), against those developed at the 3rd level, are between IO and LS (Immediate occupancy and life Safety with $q_{IO} = 0.005$ rad and $q_{LS} = 0.01$ respectively), so the beams of first and second levels submit a very significant damage.

Keywords : seismic performance, performance level, pushover analysis, plastic rotation, plastic hinge

Conference Title : ICCEAE 2019 : International Conference on Civil, Environmental and Architectural Engineering

Conference Location : Paris, France

Conference Dates : December 30-31, 2019