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Bracing Applications for Improving the Earthquake Performance of Reinforced Concrete Structures

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Abstract : Braced frames, besides other structural systems, such as shear walls or moment resisting frames, have been a valuable and effective technique to increase structures against seismic loads. In wind or seismic excitations, diagonal members react as truss web elements which would afford tension or compression stresses. This study proposes to consider the effect of bracing diagonal configuration on values of base shear and displacement of building. Two models were created, and nonlinear pushover analysis was implemented. Results show that bracing members enhance the lateral load performance of the Concentric Braced Frame (CBF) considerably. The purpose of this article is to study the nonlinear response of reinforced concrete structures which contain hollow pipe steel braces as the major structural elements against earthquake loads. A five-storey reinforced concrete structure was selected in this study; two different reinforced concrete frames were considered. The first system was an un-braced frame, while the last one was a braced frame with diagonal bracing. Analytical modelings of the bare frame and braced frame were realized by means of SAP 2000. The performances of all structures were evaluated using nonlinear static analyses. From these analyses, the base shear and displacements were compared. Results are plotted in diagrams and discussed extensively, and the results of the analyses showed that the braced frame was seemed to capable of more lateral load carrying and had a high value for stiffness and lower roof displacement in comparison with the bare frame.

Keywords : reinforced concrete structures, pushover analysis, base shear, steel bracing
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