Title Impact of reinforcement over design of seismic performance of RC buildings

Year 2012

Researcher Supamon Wongpiyaboworn

Research Supervisor Dr. Naveed Anwar

Abstract

More reinforcement than required for strength is one source of overstrength. The increasing reinforcement ratio has effect on increasing structural stiffness. Therefore, the reinforced concrete shear wall frame structure with various reinforcement ratios in members was determined through nonlinear time history analysis. The using one earthquake ground motion is applied for both directions (X and Y direction) simultaneously. This building is of twenty stories above ground level and three basements. There are seven cases which are normal reinforcement ratio, low and high reinforcement ratio in shear walls cases, low and high reinforcement ratio in beams cases and low and high reinforcement ratio in columns cases are analyzed. The performance of building is investigated in term of maximum roof displacement, inter-story drift, maximum base shear, maximum base moment, flexural deformation capacity and shears capacity in beams and column. Overall performance is generally good. The drift is within the acceptable range, specified in the performance criteria. For flexural responses, almost all the members are within the acceptable limits, except beams and columns that are at top part of the building seem to be inadequate capacity. In addition, in term of shear capacity, almost all of the members have sufficient shear strength, unless beams that are at bottom part of the building and columns that are at the last floor of the building seem to have insufficient in shear capacity. Finally, the results are slightly different although the reinforcement ratio in structural components changes.

Keywords Seismic performance, Over-reinforcement ratio, Shear capacity, Nonlinear time history analysis, Dual system structure, Reinforcement ratios.