

Title The Seismic Performance of High-Rise Buildings Designed Using Various Codes in High Seismic Zone

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Abstract

Earthquake does cause buildings, bridges and other structures to experience sudden lateral acceleration. It sets the building in motion which in turn induce forces that can produce damage. Every country uses the codes different than one another to resist lateral loads and it should also be noted that satisfying a structure from one code may not compliance with the design provisions given by another code.

There must be comparative seismic assessment designed to various codes will help to identify the code which will be having better performance as compared to others. A 40-story dual system, reinforced concrete (RC) case study building is selected to evaluate the seismic performance, located in a highly active seismic region, designed according to various building codes. In dual systems, the lateral load is mainly resisted by a combination of reinforced concrete core wall and the special moment resisting frame.

The linear elastic model created in ETABS will be used to perform code-based design. For Code Based design, response spectrum analysis will be conducted, using the Design base Level response spectrum. Design parameters obtained from three widely used building codes (ACI 318/ASCE 7-10, BS 8110 and EC-2/EC-8), is compared in terms of their adequacy for providing better seismic resistance as well as economic considerations. The detailed performance evaluation of case study building will be carried out using nonlinear dynamic analysis to estimate structural performance and expected level of inelastic action. Evaluation will be based on both responses i: e Local and Global responses by subjecting the case study building to a site-specific suit of ground motion records. Average of seven ground motion records will then be used to determine actual response of building.

It has been found that in almost all codes have their own definition for calculation of base shear scaling in Response spectrum methods. Hence it is quite obvious that difference in performance can be expected.

Keywords High-rise buildings, dual system, Code-based design, Non-Linear dynamic analysis, Seismic evaluation, comparison, base shear scaling