Title	Effective Modeling of Shear Walls in High Rise Buildings for Nonlinear Static and Dynamic Analysis
Year	2010
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Abstract

This study presents the various modeling techniques such as single column model, nonlinear link model and nonlinear shell model that are implemented for obtaining the nonlinear responses of RC shear walls against seismic loading. Three different configurations of shear walls are selected which are commonly used in medium to high rise buildings. These are 2D-Planar wall, 2D-Coupled wall and 3D-Core wall with three different numbers of stories (10, 20 and 30) to observe the variation in the nonlinear responses of these walls according to their total heights. Furthermore, this study also investigates the plastic hinge region in the shear walls by considering nonlinearities in three different proportions along the height of wall from the base. These nonlinearities include all stories nonlinear, bottom 30% of the total height of wall nonlinear and bottom 2 stories nonlinear. The nonlinear responses of shear walls are assessed by performing nonlinear static and nonlinear direct integration time history analysis. The analysis results obtained from all the analytical models are presented in terms of base shear time history, roof displacement time history, moment versus rotation curve of the first story; envelopes of story shear, story moment & story displacement and lastly these structural responses are compared together with the effectiveness of all the models including file size generated and computational time requirements. From the analysis results, it is found that there is significant increase in story shear and story moment demands above the plastic hinge region for the models considering few bottom stories nonlinear. This is the very significant result and illustrates the importance of considering nonlinearities along the height of wall.

Keywords Single column model, Nonlinear link model, Nonlinear shell model, 2D-Planar wall, 2D-Coupled wall, 3D-Core wall, Nonlinear static analysis, Nonlinear direct integration time history analysis, Plastic hinge region.