
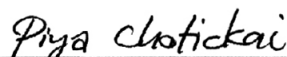


Meena Shrestha 2008: Effects of Openings in Shear wall on Seismic Response of Frame-Shear wall Structures. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Assistant Professor Piya Chotickai, Ph.D. 106 pages.

The study investigated the accuracy of a simplified method in evaluating the stiffness of shear wall with opening. By comparing the stiffnesses of single story rectangular shear walls of size 5 m × 3 m with different opening sizes and locations, the difference in stiffnesses obtained from the simplified method and finite element method was found less than 20% for the shear wall with opening area of 10 % at the base, regardless of the opening aspect ratio (h_o/b_o). Additionally, finite element models of 6- and 12-story 7 × 3 bays apartment buildings with typical floor plan of 35 m × 15 m and floor height of 3 m with different opening sizes and locations in shear walls were developed. Equivalent static analyses as per IS 1893 (part 1): 2002, were performed for all developed models. Top displacement and base shear in shear walls were compared for all developed structures to evaluate the effects of openings sizes and locations in shear walls, on stiffness of the system. In addition to that, coupling ratio (CR), maximum absolute principal stress, maximum principal stress (S_{max}) in shear walls and vertical stress (S_y) at opening level in shear walls were compared to evaluate the effects of openings on seismic responses of the structures as well as on behavior of the shear walls. The results reveal that the stiffness as well as the seismic responses of the structures is more affected by the size of the openings than their locations in shear wall, for opening area $\leq 20\%$. However, it is significantly affected by openings configurations, for opening area $> 20\%$. In addition to that, it has significant effects on behavior of shear wall.



Student's signature



Thesis Advisor's signature

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