

Karma Tshering 2010: Effect of Infill Configurations on RC Frame Building under Earthquake Loading. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Mr. Piya Chotickai, Ph.D. 111 pages.

Unreinforced masonry infills are commonly used as partitions in frame buildings. The infills are considered as non-structural element and not considered to resist the applied loads. Due to the complexity introduced by infill walls, it is generally kept unaccounted during the analysis and design of building. The effects of non-structural masonry infills on the earthquake responses of reinforced concrete (RC) frame structures were investigated by using RC building models with various configurations of masonry infills. The diagonal strut model was employed to represent masonry infills. The RC buildings with three different numbers of storeys, including 4-storey, 8-storey and 12-storey, designed as per Indian Standard were considered. The effects of infill configurations on the seismic responses were studied with static nonlinear pushover analysis.

A comparison of the structural responses was made between the bare frames and infilled frames with various infill configurations. The results indicated that infills contributed to a large increase in initial stiffness of low rise building but as the building height increased, the effect of infills on the initial stiffness of buildings decreased. Consequently, neglecting stiffness and strength of infills may have undesirable effects such as soft story failure of buildings. The presences of infills in the building increase the performance of the building especially in the low rise buildings. The effect of masonry infills should therefore be considered in the performance analysis to obtain an accurate estimate of the responses for the buildings with high area of masonry infills.

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