

Analytical and Experimental Evaluation of Effects of Nonstructural Brick Walls on Earthquake Response of Reinforced Concrete Structures

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Abstract : The reinforced concrete (RC) framed structures composed of beams, columns, shear walls and the slabs. The other members are assumed to be nonstructural. Especially the brick infill walls which are used to separate the rooms or spaces are just handled as dead loads. On the other hand, if these infills are constructed within the frame bays, they also have higher shear and compression capacities. It is a well-known fact that, brick infills increase the lateral rigidity of the structure and thought to be a reserve capacity in the design. But, brick infills can create unfavorable failure or damage modes in the earthquake action such as soft story or short columns. The increase in the lateral rigidity also causes an over estimation of natural period of the structure and the corresponding earthquake loads in the design are less than the actual ones. In order to obtain accurate and realistic design results, the infills must be modelled in the structural design and their capacities must be included. Unfortunately, in Turkish Earthquake Code, there is no design methodology for the engineers. In this paper, finite element modelling of infilled reinforced concrete structures are studied. The proposed or used method is compared with the experimental results of a previous study. The effect of infills on the structural response is expressed within the paper.

Keywords : seismic loading, brick infills, finite element analysis, reinforced concrete, earthquake code

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