

Evaluation of the Seismic Response Parameters for Infilled Reinforced Concrete Frame Buildings

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Abstract

RC frames with unreinforced masonry infill walls are a common form of construction all around the world. Often, engineers do not consider masonry infill walls in the design process because the final distribution of these elements may be unknown to them, or because masonry walls are regarded as non-structural elements. Separation between masonry walls and frames is often not provided and, as a consequence, walls and frames interact during strong ground motion. This leads to structural response deviating radically from what is expected in the design. The presence of masonry infills can result in higher stiffness and strength and it is cheap and built with low cost labor. Under lateral load, Masonry walls act as diagonal struts subjected to compression, while reinforced concrete confining members (Frames) act in tension and/or compression, depending on the direction of lateral earthquake forces. The main objective of this research is to develop a realistic matrix for the response modification factors for medium-rise skeletal buildings with masonry infills. In this study, the contribution of the masonry infill walls to the lateral behavior of reinforced concrete buildings was investigated. For this purpose, a five, seven and ten stories buildings are modelled as bare and infilled frames. The parameters investigated were infill ratio, panel aspect ratio, unidirectional eccentricity, bidirectional eccentricities. A Parametric study was developed on the behavior of medium rise infilled frame buildings under lateral loads to investigate the effect of these parameters as well as infill properties on this behavior.

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