

Seismic Analysis of Masonry-Infilled Reinforced Concrete Frames

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Abstract:

In this paper, a response spectrum analysis method is presented for evaluation the inelastic performance of multi-story, masonry-infilled reinforced concrete frame structures. In this method, the structure is idealized as an equivalent single-degree-of-freedom system whose inelastic load resistance characteristics are deduced from those of a single-story frame based on an assumed collapse mechanism of the entire structure. The load resistance characteristics of the single-story infilled frame can be obtained experimentally or computed with the analytical methods presented in this paper. With this method, the seismic performance of several six-story, threebay, masonry-infilled reinforced concrete frames is evaluated. The reinforced concrete frames considered in this study were designed with and without the consideration of earthquake loads. In this study, the properties of the corresponding single-story, single-bay infilled frames were obtained from the tests conducted on half-scale infilled frame specimens. Using the proposed method, the maximum ground accelerations that can be resisted by bare and infilled frames without collapse are calculated. For the frame designs considered, the results indicate that the addition of infill panels can improve the seismic resistance and ductility of a reinforced concrete frame.

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