Abstract:
This paper presents studies to compute fragility functions for low-rise (two to four storeyed structures) reinforced concrete (RC) buildings. Three-dimensional mathematical models of twelve existing buildings were developed and subjected to adaptive pushover analysis. The mathematical models were developed with and without infill to examine the influence of infill on the nonlinear response and fragility functions. The nonlinear responses of the structures without infill indicated on average global drifts at yield and ultimate as 0.30 percent and one percent, respectively. Average base shear coefficients at yield and ultimate were found to be 0.14g and 0.22g, respectively. It was noted that presence of infill in the structures reduces the global drifts at yield and ultimate by nearly eighteen percent and forty-five percent, respectively. On the other hand, the base shear coefficient increased by one hundred thirty six percent and seventy-eight percent, respectively, at yield and ultimate. Median spectral displacement corresponding to slight, extensive and collapse damage states were evaluated as 16 mm (0.6 in.), 37.62 mm (1.5 in.) and 83.69 mm (3.3 in.) for the structures without infill. The median spectral displacement corresponding to slight, extensive and collapse damage states were found to be 12 mm (0.5 in.), 23.62 mm (0.9 in.) and 46.86 mm (1.8 in.) for structures with infill.

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