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Seismic Analysis of URM Buildings in South Africa

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Abstract : South Africa has some regions which are susceptible to moderate seismic activity. A peak ground acceleration of between 0.1g and 0.15g can be expected in the southern parts of the Western Cape. Unreinforced Masonry (URM) is commonly used as a construction material for 2 to 5 storey buildings in underprivileged areas in and around Cape Town. URM is typically regarded as the material most vulnerable to damage when subjected to earthquake excitation. In this study, a three-storey URM building was analysed by applying seven earthquake time-histories, which can be expected to occur in South Africa using a finite element approach. Experimental data was used to calibrate the in- and out-of-plane stiffness of the URM. The results indicated that tensile cracking of the in-plane piers was the dominant failure mode. It is concluded that URM buildings of this type are at risk of failure especially if sufficient ductility is not provided. The results also showed that connection failure must be investigated further.

Keywords : URM, seismic analysis, FEM, Cape Town
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