

SEISMIC PERFORMANCE STUDY OF UNREINFORCED AND MESH REINFORCED MASONRY BUILDINGS

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Masonry is one of the oldest and most widely used construction methods in the world due to low cost, wide access to materials, low demand to maintenance, experience and technology, isolation against temperature changes, fire resistance and construction easiness (Abrams, 2007). This research is a seismic performance study of common unreinforced masonry (URM) and retrofitted masonry buildings. The mesh-reinforced shotcrete method is selected for retrofitting of URM building.

Seismic performance study of the structural system includes: (i) investigation of the seismic demand to which the structure is subjected, and (ii) determination of seismic resistance of structures. The seismic demand is determined using response spectrum (Ghiassi et al., 2012). Numerical modelling based on the macro modelling was carried out, in order to estimate capacity of unreinforced and retrofitted masonry buildings (Lourenco, 1996). According to the nonlinear static procedure, static lateral forces are applied incrementally to analytical model of the structures until a target displacement is exceeded. Building deformations and internal forces are monitored continuously as the model is displaced laterally. Finally damage limit states and the expected seismic performance were compared.

A comparison between the results of models indicates that, using of mesh-reinforced layer improves the shear strength, ductility and the capacity of the building compare with URM building.

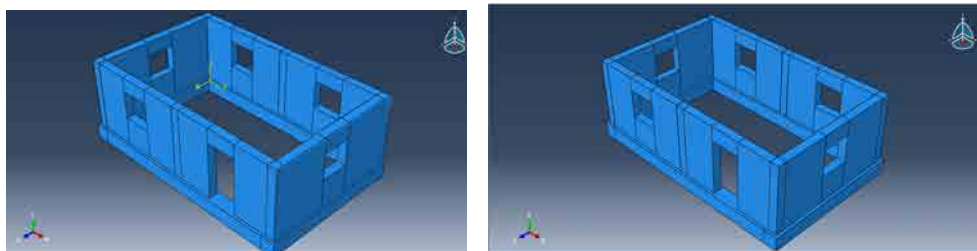


Figure 1. Nonlinear modelling of ordinary and retrofitted buildings

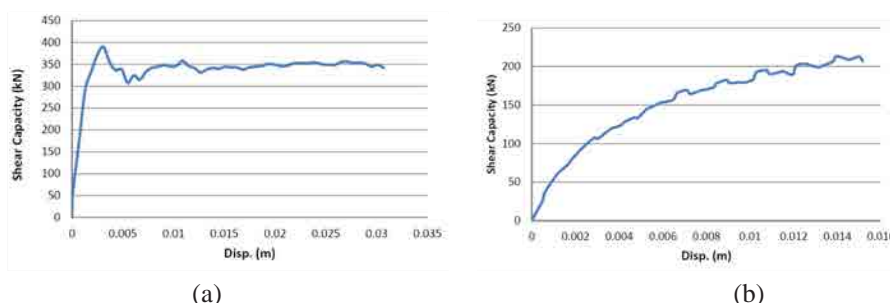


Figure 2. (a) Capacity curve of retrofitted building, and (b) Capacity curve of URM building

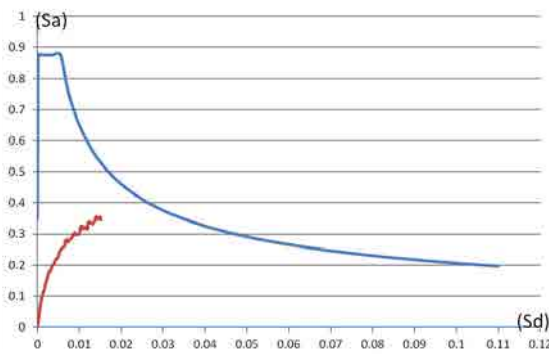


Figure 3. Capacity spectrum vs demand spectrum of URM building

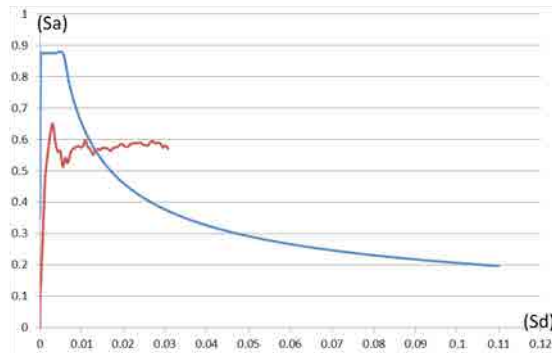


Figure 4. Capacity spectrum vs demand spectrum of retrofitted masonry building

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