

Seismic Behavior of Reinforced Concrete Masonry Shear Walls as Governed by Flexure

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Abstract:

Experimental data on the nonlinear behavior of reinforced masonry shear walls is very limited, and mostly gathered between the mid-1980s and the early 1990s. The experimental data produced in the research described here is very useful for verifying and refining current design provisions for flexure-dominated walls. The main objective of this paper is to evaluate the relationship between key design parameters for reinforced concrete masonry shear walls (aspect ratio, axial load, and percentage and arrangement of vertical and horizontal reinforcement) and the nonlinear hysteretic behavior of those walls (ductility, plastic-hinge length, flexural and shear capacities, and inelastic deformation capacity ratios). At the University of Texas at Austin, fifteen fully grouted, reinforced concrete masonry shear-wall segments, each representing a flexure-dominated segment of a perforated shear wall, were tested as cantilevers under in-plane, reversed cyclic loads. In general, specimen behavior was in good agreement with that reported in previous research work. The provisions of the 2011 MSJC Code (MSJC 2011a) gave conservative (low) predictions of flexural capacity, and the plastic hinge length for the cantilever wall specimens ranged from 17% to 41% of the plan length of each wall.

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