Evaluation of Design Provisions for In-Plane Shear in Masonry Walls

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Abstract:

This research investigated current and proposed design procedures for in-plane shear in masonry walls. Procedures considered include both strength design and allowable stress design provisions in the 2008 MSJC Building Code Requirements and Specifications for Masonry Structures, the New Zealand masonry design standard NZS 4230:2004, the Canadian masonry design standard CSA S304.1-04, provisions in the 1997 Uniform Building Code, and proposed design equations developed by Shing et al. in 1990 and by Anderson and Priestley in 1992. Predicted shear strengths from the various procedures were compared with results from a wide range of tests of masonry walls failing in in-plane shear. The test data encompassed both concrete masonry walls and clay masonry walls, all of which were fully grouted. Statistical analyses were performed to compare the overall effectiveness of each set of provisions or proposed equation. Parametric studies were also performed to evaluate the ability of the provisions and equations to account for the effects of specific parameters. The current MSJC strength design provisions were found to provide the best shear predictions over a wide range of wall parameters. Based on the results of this study, recommendations are made to improve the current MSJC strength design and allowable stress design provisions.

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