

Evaluation of 2011 MSJC Strength-Design Shear Provisions for Reinforced Masonry Shear Walls

Saleh Alogla¹, Farhad Ahmadi², Jaime Hernandez³, Richard E. Klingner⁴, and David I. McLean⁵

Abstract:

In this paper, the equations of the 2011 Masonry Standards Joint Committee (MSJC) Code for the nominal shear capacity of shear walls are evaluated using test results from 59 reinforced masonry shear walls, including fixed-fixed shear walls recently tested at the University of Texas at Austin. Ratios of tested capacity divided by predicted nominal capacity are calculated for each wall and are plotted versus different parameters from the 2011 MSJC Code equation for nominal shear capacity. The results of this comparison are consistent with previous conclusions that the MSJC strength equation is generally more accurate than those used in other codes. This paper is also intended to produce much-needed experimental data to refine our understanding of shear behavior, and to evaluate the relationship between the most important design parameters and the shear capacity of different type of shear-dominated masonry shear-walls. The results also show that the 2011 MSJC Code equation for nominal shear capacity corresponds to a relatively high fractile of test data in comparison to the fractile level typically used for structural design, thereby resulting in a relatively high probability of failure for ordinary and intermediate reinforced masonry shear walls. This high probability of failure can be reduced to a more consistent level by multiplying the computed nominal capacity, V_n , by 0.90. Because of the capacity design requirements of the 2011 MSJC Code for special reinforced masonry shear walls, those walls have a lower probability of failure, and the equation does not need to be reduced for such walls.

To purchase full article: Please use this direct link to purchase the TMS Journal Volume of this article, Volume 32, Issue 1: <https://masonrysociety.org/product/tms-ejournal-vol-32-no-1/>

Otherwise, consider becoming a TMS member for full access to all TMS Journal articles: <https://masonrysociety.org/membership/#join>

DOI: 10.70803/001c.138229

¹ Teaching Assistant, Qassim University, Saudi Arabia. Former Graduate Research Assistant, Dept. of Civil Engineering, The University of Texas at Austin, Austin, TX, s.alogla@yahoo.com

² Graduate Research Assistant, Department of Civil Engineering, The University of Texas at Austin, Austin, TX, farhad.ahmadi@utexas.edu

³ Project Engineer, Sismica Ingenieros Consultores, Former Graduate Research Assistant, Dept. of Civil Engineering, The University of Texas at Austin, Austin, TX, jhernandez@sic.com.ec

⁴ TMS Fellow Member, L. P. Gilvin Professor Emeritus in Civil Engineering, The University of Texas at Austin, Austin, TX, klingner@utexas.edu

⁵ TMS Fellow Member, Dean of the College of Engineering, Colorado State University, Fort Collins, CO, David.McLean@colostate.edu