Design Considerations for Stability of Transversely-Loaded URM Walls

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Abstract:

Solutions for the critical axial load capacity Pc of transversely-loaded, slender, unreinforced masonry (URM) compression members at the limit of stable behavior are investigated. A practical formula is proposed on the basis of numerical and analytical solutions reported in a companion paper. The proposed formula is a modification of an equation used in United States (US) design practice for eccentrically compressed masonry members without transverse loading. The effects of out-of-plane bending from transverse loading are introduced by means of a flexural eccentricity term, and approximation error is shown to be acceptable in most cases. The proposed formula is also used to obtain an expression for out-of-plane moment capacity, M_{max}, under a known value of axial load, the resulting expression of which enables the expedient construction of P_c vs. M_{max} interaction curves. A parametric study of slender URM walls is conducted to evaluate the importance of buckling relative to other criteria used in US design practice, and buckling is seen to control wall capacity in many of the cases studied.

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