

Stability of Hollow Masonry Walls

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Abstract:

The stability of hollow unreinforced masonry is investigated and stability reduction factors are developed for hollow and partially grouted walls that relate the buckling load of these non-solid sections to the buckling load of a solid section of the same overall thickness. It is assumed that the wall is bent in single curvature with equal end eccentricities and there is no sidesway between top and bottom supports. The wall is also assumed to have zero tension strength. Moment-curvature relations are developed for hollow or partially grouted masonry walls, based on an approximate relationship for the uncracked depth of the section. The accuracy of this approximation with respect to computed moments of inertia is discussed. The effects of secondary bending are considered and predictions of cracked moment of inertia values obtained for 4 unit thicknesses, with 6 grouting conditions and 7 values of end eccentricity. Regression analyses are performed yielding relations for the reduction in buckling capacity for hollow and partially grouted masonry construction, that depend on the magnitude of the end eccentricity.

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