

Kelman, I. and R. Spence. 2003. "A Limit Analysis of Unreinforced Masonry Failing Under Flood Water Pressures". Masonry International, vol. 16, no. 2 (Summer/May), pp. 51-61.

Paper abstract:

This paper defines, and offers a solution to, the general problem of failure in unreinforced masonry walls from combined hydrostatic and hydrodynamic lateral pressures. This issue is important for assessing the height to which homeowners should seal their properties against flood waters. Yield line analysis theory is refined and used. With static flood water, many walls would fail when the flood depth differential between the inside and outside of a dwelling is approximately 1.0-1.5 m. With flood velocities which could arise in realistic situations, this depth differential for collapse can drop below 0.5 m. The most effective means of strengthening walls is to increase the density or thickness of the masonry units. Other concerns may preclude such action. Despite uncertainties in the calculations, the method is validated by comparison with the literature and supports advice that sealing should not be completed above 0.9-1.0 m above ground level.