

A Proposed Seismic Design Approach for Masonry Shear Walls Incorporating Foundation Uplift

David K. Nakaki¹ and Gary C. Hart²

Abstract:

Foundation rocking and intermittent uplift can occur in shear wall structures under seismic excitation. The effect of the foundation uplift can, in some cases, be beneficial in reducing the forces experienced by the superstructure. In this paper, a simplified model, suitable for design applications, is used to include the effects of soil flexibility and foundation uplift. The response of an example masonry shear wall which undergoes yielding and foundation uplift is evaluated. The structure is subjected to the 1940 El Centro NS ground acceleration component. By allowing uplift, the ductility demand on the shear wall is reduced. However, large lift-off displacements can occur. It is found that by reducing the yielding capacity of the shear wall the lift-off displacements can be reduced while also keeping the ductility demand on the wall within an acceptable range.

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DOI: 10.70803/001c.140472

¹ Graduate Student, Department of Civil Engineering, University of California, Los Angeles.

² Professor, Department of Civil Engineering, University of California, Los Angeles.