

“Evaluation of Practical Methods for Analysis of Reinforced Concrete Walls”

Authors:

B. Doepker, Graduate Student Researcher, University of Washington, Seattle, WA

L.N. Lowes¹, Assistant Professor, University of Washington, Seattle, WA

D.E. Lehman, Assistant Professor, University of Washington, Seattle, WA

Abstract:

The determination of loads and displacement demands for seismic design of reinforced concrete walls is typically accomplished in practice using elastic shell element models and response-spectrum analysis methods. Here, the results of a series of shake-table tests of reinforced concrete wall specimens are used to evaluate commonly used and newly proposed methods for determining the effective stiffness and damping ratio used in these analyses. These methods are evaluated on the basis of how accurately the initial period, building displacements, inter-story drifts, story accelerations and load distribution are simulated. Additionally, damage data from the shake-table tests are used to evaluate the application of these methods in conjunction with drift- and ductility-based damage prediction models. The results of this study include recommended methods for application of elastic, response-spectrum analysis for seismic design of concrete walls as well as recommendations for prediction of wall damage using this analysis method.