

Influence of Prior Out-of-Plane Damage on the In-Plane Behavior of Masonry Infilled Frames

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Abstract:

In order to address the effect of prior out-of-plane damage on the in-plane behavior of unreinforced masonry infills, two full-scale, 22 ft tall (6.71 m) by 24 ft (7.32 m) long, structural clay tile infills and one frame-only (no infilling) were constructed and tested. The infilled frames were identical to many of the infills located at the Oak Ridge Y-12 National Security Complex. The infilled frame was tested out-of-plane under simulated seismic drift. Prior to the infill testing, a bare frame was loaded similarly in order to determine the behavior and stiffness contribution of the frame only. Following the out-of-plane test of the infilled panel, the structure was loaded in-plane to failure in order to ascertain residual strength. A second, identical infilled frame was then constructed and tested in-plane to failure. In this way, in-plane behavior with and without prior out-of-plane damage could be established and compared. For both out-of-plane and in-plane testing, reversed-cyclic quasi-static loading was used in order to obtain full tension/compression hystereses. Also, natural frequencies of the first infilled panel were determined before and after the out-of-plane testing. This paper describes the test series and discusses the conclusions pertinent to the effect of out-of-plane cracking on in-plane stiffness and behavior.

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