

A Test Program to Determine the Structural Properties of Unreinforced Hollow Clay Tile Masonry Walls at the DOE Oak Ridge Plants

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Abstract:

The recent Department of Energy (DOE) Order 6430.1A "General Design Criteria" has emphasized the importance of determining the adequacy and safety of both new and existing facilities to natural phenomenon hazards. Many of the buildings at the DOE Oak Ridge facilities are constructed with unreinforced masonry hollow clay tile infill walls - in some cases these walls comprise a substantial part of the lateral force resistance for a building. In order to perform a realistic assessment of the strength of the buildings to seismic events it is important to accurately predict the behavior of these walls. Very little information is currently available on hollow clay tile masonry, its structural properties and behavior, especially in an infill condition. As the in-situ condition of these walls throughout the plants is suspect due to their age and exposure to numerous chemicals, a test program was begun at the Oak Ridge plants to obtain material properties for use in the natural phenomena hazards analysis of the facilities. This paper presents results from the initial part of the testing program and discusses the course that the project has taken in the past fifteen months. the initial testing program has been greatly expanded and now includes in-situ in-plane and out-of-plane full-scale tests, in-situ normal stress and deformability behavior tests using flatjacks, prism compression and flexural tests, bond wrench tests, an in-house shake table program, a non-destructive evaluation program, and a comprehensive parallel analytical modeling effort.

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