

Reclamation Building Seismic Safety Program

Guideline No. 3

Handbook for the Seismic Evaluation of Buildings: A Prestandard (FEMA-310)

Tier 2 Analysis—Special Procedure for Unreinforced Masonry Bearing Wall Buildings

Destructive and Non-Destructive Testing Program

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Background: The “Special Procedure” analysis method is for unreinforced masonry (URM) bearing wall buildings with a flexible diaphragms, which is outlined within FEMA-310, chapter 4, *Evaluation Phase (Tier 2)*, section 4.2, *Tier 2 Analysis*, subsection 4.2.6, *Special Procedure*. In-Place Masonry Shear Tests are conducted in accordance with the Uniform Code for Building Conservation Appendix (UCBC, 1997), chapter 1, section A106.3.3.1, page 19, which references the 1997 Uniform Building Code (UBC) Standard 21-6, page 3-351.

Policy: If a URM building is a single story structure with relatively light tributary top-of-pier gravity loading and the piers have reasonable pier aspect ratios, then the pier would most likely fail in the “Rocking Controlled Mode.” For this case, results of the analysis are independent of the bed-joint shear strength. Therefore, in lieu of material testing, default average bed-joint shear strengths shall be used in accordance with FEMA-273, *NEHRP Guidelines for the Seismic Rehabilitation of Buildings* (FEMA, 1997), chapter 7, section 7.3.2.4, page 7-3.

In a multi-story structure, depending on the top-of-pier gravity loading, the upper stories would most likely fail in the “Rocking Controlled Mode.” However, in a multi-story structure the lower stories could fail in “Shear Controlled Mode;” this can also be the case for light single-story buildings with piers having large aspect ratios. Therefore, consideration should be given to conducting In-Place Masonry Shear Tests during the evaluation process.

As directed by the evaluating engineer, the number of test specimens and test locations should conform to criteria presented in FEMA-273, chapter 7, section 7.3.2.7, page 7-4. The coefficient of variation in test measurements should not exceed 25 percent.