SEISMIC RISK REDUCTION FOR SOFT-STORY WOODFRAME BUILDINGS IN THE UNITED STATES

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Soft-story woodframe (light-frame wood) buildings have been recognized throughout California as a disaster preparedness problem particularly in the San Francisco Bay Area and Los Angeles. These buildings typically have large openings at the first story for automobile parking and storage resulting in the soft (and weak) story condition and number in the tens of thousands throughout California with hundreds of thousands of tenants. Further, they were constructed between the 1920's and 1960's and have wall layers of both brittle and ductile wall finish materials making them quite complex to analyze and subsequently retrofit effectively. The NEES-Soft project was a multi-university industry-collaborative project that had three major objectives: (1) experimentally validate a bottom-story-only retrofit guideline published by the U.S. Federal Emergency Management Agency as FEMA P-807; (2) experimentally validate the application of performance-based seismic retrofit (PBSR) procedures developed as part of the project; and (3) quantify the collapse limits and mechanisms for these types of soft-story buildings when the building is not retrofitted. In this presentation, Professor van de Lindt will provide a summary of the entire project scope and then turn the focus to the full-scale four-story shake table test program results for both FEMA P-807 retrofits and PBSR. Finally, the collapse test planning and results will be presented which confirmed that these types of buildings can undergo more than 10% to 12% inter-story drift prior to collapse, provided it is isolated at one story.