

**Integration of Seismic Protection Systems in Performance-Based
Seismic Design of Woodframed Structures**

by

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ABSTRACT

The application of seismic protection systems in light-framed wood structures is virtually non-existent within the U.S. as woodframed construction has generally been considered to perform well during earthquakes. However, the 1994 Northridge Earthquake clearly demonstrated the vulnerability of such construction in that extensive, and in many cases unreparable, damage occurred in thousands of woodframed buildings. As a result, a research project (the NEESWood project) was initiated with an emphasis on developing a seismic design approach that considers multiple levels of performance. As part of this project, the application of seismic protection systems (seismic damping and isolation systems) to woodframed buildings was investigated. The research focused on the unique characteristics of woodframed structures that affect the design and implementation of seismic protection systems and approaches used to increase the performance reliability of woodframed structures in regions of high seismic intensity. In addition, simplified nonlinear analysis and design procedures for structures that incorporate seismic protection systems were developed. The results from experimental shaking table tests and nonlinear dynamic response-history analyses were used to demonstrate the improved seismic performance that can be achieved via application of seismic protection systems to woodframed structures.