

Study on numerical modeling of wood structure during earthquakes and its application

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Most previous seismic engineering research has focused on materials other than wood, namely steel and reinforced concrete in spite of the large damage to wood residential buildings which occurred during the past major earthquakes. To correct this imbalance, goals of a series of studies are determined.

The study consists of a hysteresis modeling of wood shear walls and a seismic modeling of whole structure for use in seismic response analysis. Two hysteresis models are proposed: one is a simple model combining the familiar bi-linear and slip model and a method for determining parameters using the shear load design value is defined. The other is a complex model modifying the evolutionary parameter hysteretic model and nonlinear characteristics, stiffness degradation and residual force are considered to track the response from small amplitude to the collapse. These models are compared to results from, for example, shaking tests, to confirm the accuracy of the proposal. Additionally, seismic behavior of vulnerable wood house, seismic design values of new construction and efficiency of retrofit measurement are examined by the parametric study using the model and shaking table testing.

This study must be providing valuable information which has the potential to significantly lower losses in future earthquakes.