

Reliability of a 4-Story Steel Moment-Resisting Frame against Collapse Due to Seismic Excitations

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ABSTRACT

This paper illustrates how to estimate the reliability of a structural system against collapse due to seismic loading. The reliability estimate process is exercised on a 4-story steel moment-resisting frame structure model whose collapse prediction has been validated through a collapse test of a 1:8 scale model structure at the University of Buffalo's NEES Equipment Site. The 4-story prototype structure has been designed using International Building Code 2003 (IBC-2003), and American Institute of Steel Construction requirements AISC 360-05. The reliability study incorporates both stochastic (*aleatory*) and uncertainty (*epistemic*) types of variability in seismic loading and properties of the structural components. The results of this study provide a good estimate for the reliability of newly designed steel moment-resisting structures.

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