Experimental reliability based assessment of the effectiveness of friction dampers in structures under seismic excitations

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ABSTRACT

It is known that for purposes of seismic retrofitting and in new designs of building frames, external energy dissipation systems may be advantageously used. In this work, a new prototype friction damper is experimentally characterized and the improvement on the structural reliability achieved through use of this type of external dissipation system is assessed by experimental tests. To obtain robust estimators of the reliability, a database including acceleration records with markedly different characteristics was used in the experimental study.

On the premise that the efficiency of a damper system can best be assessed on a reliability basis, full reliability analyses of typical frame buildings are performed, showing that a five-fold reduction in the probability of failure may be achieved by introducing external friction dampers systems.