Experimental and numerical evaluation of base shear response of cylindrical steel tanks

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ABSTRACT

Observations from available field reports on the structural performance of liquid storage tanks during recent earthquakes indicate that steel tanks are more susceptible to damage and eventual collapse than concrete tanks. There is a wide variety of models for earthquake resistant designing of steel tanks. This paper compares the base shear response of cylindrical steel tanks under seismic records obtained from experimental tests with that obtained by numerical models based on discrete elements (mass-spring systems) and finite element approximation. To obtain a robust comparison, three aspect ratios of tanks and an ensemble including real acceleration time-histories with different characteristics were used. Results demonstrate some differences among the models studied.