Engineering Structures
Volume 23, Issue 12, December 2001, Pages 1568-1576

Non-linear dynamic design procedure of FV spring-dampers for base isolation - Frame building applications

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Abstract

The non-linear dynamic design procedure of fluid viscous spring-dampers proposed in the accompanying paper is applied to two selected case studies, represented by a reinforced concrete and a steel five-storey frame building with identical global dimensions. The fundamental vibration periods of the two structures in fixed-base conditions, equal to 0.58 s and 1.08 s, respectively, fall within the range of technical interest for use of base isolation. The reliability of the analytical relationship by which the damping coefficient is estimated in the preliminary design phase is further verified by comparing its predictions with the loss factor values calculated from the results of numerical integration of the equations of motion. The final verification phase of the procedure is then developed with regard to a double design performance objective, for which immediate occupancy and life safety levels are targeted under the "basic design" and "maximum considered" earthquakes, respectively.