

Modeling the Cyclic Behavior of High Damping Rubber Bearings

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Abstract : Bilinear hysteresis models are usually used to describe the cyclic behavior of high damping rubber bearings. However, they neglect a number of phenomena (such as the interaction between axial load and shear force, buckling and post-buckling behavior, cavitation, scragging effects, etc.) that can significantly influence the dynamic behavior of such isolation devices. In this work, an advanced hysteresis model is examined and properly calibrated using consolidated procedures. Results of preliminary numerical analyses, performed in OpenSees, are shown and compared with the results of experimental tests on high damping rubber bearings and simulation analyses using alternative nonlinear models. The findings of this study can provide an useful tool for the accurate evaluation of the seismic response of structures with rubber-based isolation systems.

Keywords : seismic isolation, high damping rubber bearings, numerical modeling, axial-shear force interaction

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