ROCKING OF BRIDGE PIERS SUBJECTED TO MULTI-DIRECTIONAL EARTHQUAKE LOADING

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ABSTRACT
Rocking as an acceptable mode of seismic response has been extensively studied and has been shown to potentially limit local displacement demands. Rocking can act as a form of isolation, reducing displacement and force demands on a bridge, thereby allowing for design of smaller footings and members. As part of a larger, Caltrans-funded investigation to develop guidelines for the design of bridges supported on piers that rock on their foundations, a series of preliminary shaking table tests of a simple inverted pendulum reinforced concrete bridge column was conducted. These tests are among the first to consider the effects of three components of excitation. For the shaking table tests, the underlying soil is modeled by a neoprene pad, upon which the pier is allowed to rock. Preliminary results from these tests comprise the focal point of this paper. To supplement the idealized conditions employed in these tests, bidirectional tests on smaller-scale models are being conducted on a geotechnical centrifuge at UC Davis. These shaking table and centrifuge experiments provide data to validate analytical models that are in turn used to assess and improved design guidelines related to rocking foundations.