Dissipation of Energy in Structures Due to Earthquakes

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**EXTENDED ABSTRACT**

Design criteria for bridge foundations as well as pier and wharf type structures are based on a performance driven design procedure that allows the design professional to detail piles based on their anticipated level of inelastic behavior during an anticipated earthquake. More specifically related to this study, the design professional provides an appropriate amount of spiral reinforcing to ensure that plastic hinges which develop in the pile are capable of adequate rotation as required by a pushover or time history analysis. It is often assumed that pushover results are conservative as compared to those obtained from time history analysis. However, experimental testing of precast prestressed piling has shown hysteretic curves are pinched in many instances and the loss of energy dissipation may make pushover analysis non-conservative for design of such structures. The purpose of this research is to analyze an actual bridge in Dorchester County with pinched and fully developed hysteretic curves using time history analysis and to compare these results to those obtained from pushover analysis to determine the applicability of the method.