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PEER 2012/05 - Development of Simplified Analysis Procedure for Piles in Laterally Spreading Layered Soils Christopher R. McGann, Pedro Arduino, and Peter Mackenzie﷯Helnwein - Report (3.2 MB)

PEER 2014/10 - Evaluation of Collapse and Non-Collapse of Parallel Bridges Affected by Liquefaction and Lateral Spreading Benjamin Turner, Scott J. Brandenberg, and Jonathan P. Stewart - Report (5.3 MB)

PEER 2014/04 - Effect of Vertical Acceleration on Shear Strength of Reinforced Concrete Columns Hyerin Lee and Khalid M. Mosalam - Report (19.6 MB)

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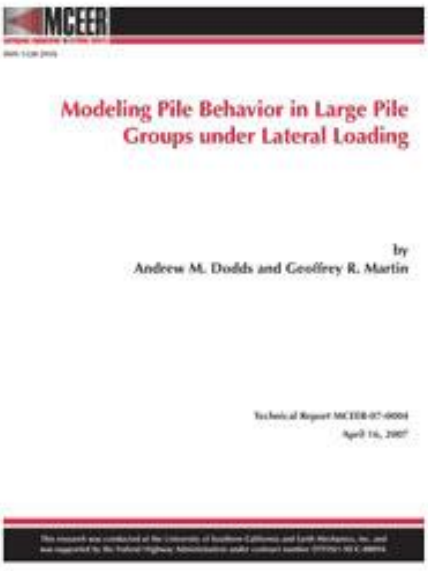
Geotechnical Engineering

Publications relevant to geotechnical engineering focus on liquefaction remediation, bridge foundation design and retrofit, methods to contain lateral spreading, and earth-movement related damage to infrastructure following an earthquake or other type of disaster. Most titles apply to bridge and highway systems.



Modeling Pile Behavior in Large Pile Groups Under Lateral Loading
A.M. Dodds and G.R. Martin MCEER-07-0004 | 4/16/2007 | 292 pages

About the Report:
TOC: The table of contents is provided.

Keywords: Lateral loads. Numerical models. Pile behaviors. Soil-pile interaction. Large pile groups. Initial stress states. Soil behaviors. Soil conditions. Translational loads. Horizontal displacement.

Abstract: Large pile groups, defined as pile groups containing a large number of closely spaced vertical piles, were examined using a three-dimensional finite-difference based numerical modeling approach. The specific case of a large pile group subject to only translational loading at the groundline was considered, assuming that a rigid pile cap, whose base is located at the groundline, was present to enforce equal horizontal displacements of all pile heads. Research efforts focused on local pile-soil interaction using p-y curves as the primary assessment tool and p-multipliers to characterize group effects. Analysis efforts were preceded by an extensive review on lateral pile-soil interaction to provide an assessment of the existing state of knowledge, and a critical review of the three-dimensional modeling approach in terms of its formulation and application to simulating laterally loaded piles and pile groups. Rationalization of a large pile group into a two-pile in-line configuration and a single pile with periodic boundaries was undertaken for the research. Factors considered were soil type, pile type, initial soil stress states, pile head restraint, and pile spacing. Overall, the large pile group study indicated that initial stress state, pile type, and pile head restraint resulted in some differences, but these were relatively weak compared with the influence of soil behavior and movement. However, various issues such as installation effects, pile, pile head, and soil conditions remain a challenging endeavor to assess.