Development of Simple Generalized Pseudo-static *p-y* Curves for Liquefied Sands

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Abstract

Based upon an increased need to understand liquefied soil behavior in laterally loaded pile foundations, small-scale and full-scale experiments have been conducted in the past including centrifuge, shake table and field tests. Several *p-y* models to account for liquefied soil behavior have been proposed including use of *p*-multipliers, Matlock's soft clay model, and site specific *p-y* models. The *p*-multiplier and Matlock's soft clay model which are more generalized for design purposes show too much resistance at small displacements and not enough resistance at large displacements. The small-scale and full-scale test results have shown that these models fail to capture the true behavior of the soil in the liquefied domain. Finite element models have been developed to account for these behaviors, but these are quite complicated for design purposes and require a substantial amount of geotechnical investigation. As a result, a new generalized pseudo-static model is being proposed for design purposes to capture these soil behaviors which takes into account readily available parameters for design including the sand's relative density and maximum acceleration of the design earthquake. This model is compared to results obtained from centrifuge, shake table and full scale tests.