

Evaluation of Driven Pile Capacity

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The need for a simplified and reliable method for the prediction of driven pile capacity is well established. Analyses utilizing dynamic measurements during pile driving in the field are proven to be economic and efficient. In spite of the common use of these methods worldwide, the unique conditions of the Boston area (as well as other locations where capacity changes with time) do not allow full realization of their potential.

The prediction of capacity of piles driven in soils typical to the Boston area (i.e. glacial till and Boston Blue Clay - BBC) is extremely difficult. Substantial accumulated experience suggests major limitations with the common method of analysis currently used, especially those used in the field.

The ongoing study is based on an integrated methodology including (i) preliminary evaluation utilizing extensive data sets, (ii) in-situ measurements for accurate predictions and (iii) quality control based on monitoring during driving. This methodology is based on an alternative original approach to the current design procedures. This approach combines two analyses; (a) the change of pile capacity with time and (b) a simple energy-based method which provides a reliable tool for the field analysis of driven piles.

The project development comprises of the following stages (often in parallel to each other); (a) method of evaluation of pile capacity with time, (b) data set for existing measurements, (c) development of in-situ equipment, (d) field measurements including subsurface site testing (field and laboratory) and in-situ measurements, (e) full scale testing evaluation and (f) establishment of a comprehensive methodology.

Limited experience in the Boston area suggests excellent potential of this approach. Successful implementation is expected to result in: (a) cost effective foundation systems and (b) the ability to implement the same methods in different locations experiencing gain of pile capacity with time after driving.