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# AXIAL CAPACITY OF H-PILES

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## ABSTRACT

H-Piles are an attractive deep foundation solution that is commonly employed in bridge highway construction. H-Pile advantages include: (i) light weight relative to their size and yield strength and therefore easy to mobilize and handle, (ii) minimal soil disturbance during penetration, (iii) controlled flexibility with high strength hence ideal for use in integral bridges and offshore structures, and (iv) easy to splice (welding) and hence accommodate various subsurface conditions.

A recent study has determined that 52% of all bridge driven pile foundations are H-Piles (Paikowsky, 2000). As a result of the increase in the use of H-Piles, it became apparent that their design is difficult due to a limited accuracy of the methods used for predicting H-Piles capacity. The uncertainties in the analysis are related to the frictional mechanism between the granular material and the steel, pore pressure build up and dissipation in the clay, and the development of soil plugging between the web and the flanges.

A database containing 97 H-pile cases statically loaded to failure has been developed as part of a research aimed at rewriting the AASHTO Deep Foundation Specifications for the year 2001. The analyses of the database included the determination of the ultimate static capacity, the performance of static capacity analyses utilizing various methods and computer programs, and conducting statistical evaluations of the data for developing resistance factors to be used in the revised code based on LRFD principles.

With the developed database, analyses, a study of the plugging phenomenon, and statistical data, a better understanding of the H-piles behavior is achieved. This knowledge allows for a more reliable and safe design and provides the first step for the development of methods that will more accurately determine the axial capacity of H-Piles.