

Applicability of Various Load Test Interpretation Criteria in Measuring Driven Precast Concrete Pile Uplift Capacity

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Abstract

This paper presented a comprehensive analysis of load test interpretation criteria to determine their suitability to driven precast concrete (PC) pile uplift capacity. A database was developed containing static pile load tests and utilized for the evaluation. The piles were round and square cross-sections under drained and undrained loading. To explore and compare their behavior, the stored data were categorized into four groups. In general, the trends of every criterion for the four groups were notably the same. In both drained and undrained loading, slightly larger interpreted capacities were demonstrated by square piles than by round piles. Moreover, round piles demonstrated more ductile load-displacement response than square piles especially in undrained loading. Statistical analyses presented that smaller values of displacements exhibited higher coefficient of variation. The drained and undrained tests were compared and results showed less variability in drained than undrained loading and capacity ratios (Q_x/Q_{CHIN}) in drained loading were slightly higher than in undrained loading. The interrelationship and applicability of these criteria as well as the design recommendations in terms of normalized capacity and displacement were given based on the analyses.

Keywords: driven precast concrete piles, uplift, interpretation criteria, database

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