## Alireza Afshin

**Title**

**Evaluation of Time-Dependent Pile Capacity Increase in Soft Clay**

**Abstract**

An extensive experimental program was developed to study the evolution of pile capacity increase with time for driven piles into soft clay. First phase of the experiment was developed to investigate the pile-soil interface shear strength behaviour over time, employing a modified direct shear test apparatus, for both steel and concrete piles. The interface strength obtained for pile-soil specimens was found to be less than those of soil-soil tests. Residual friction angle for steel-soil interface was lower than that of the concrete-pile tests. The interface shear strength for both concrete-soil and steel-soil system increased as the consolidation time increased.

A series of pile load testing was also performed on piles driven into soft clay using medium scaled model tests in laboratory. A variety of different piles were driven into the undisturbed Leda clay samples and their capacity was measured immediately after driving and repeated at appointed elapsed time stages. Results showed a minimum 60% of pile capacity increase, twelve days after initial pile driving. The large portion of this setup was generated within the first day due to the fast excess pore water pressure dissipation, and afterward, the pile capacity was increased at a very lower rate. The pile setup rate was shown to be higher for concrete pile in comparison with steel piles, possibly due to higher moisture absorbance. The research also revealed that pile setup rate for displacement piles are slightly higher than that of non-displacement piles.

Date of Completion

2012

Degree

Master of Applied Science in Civil Engineering

Supervisor

Mohammad Rayhani