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Analysis of Axially Loaded Large Capacity Helical Piles using the Load Transfer Method

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ABSTRACT

In recent years, the use of helical piles to support a variety of loads has increased for its many advantages such as ease of installation, relatively small equipment, rapid installation speed, suitability in very limited access conditions, removability, and reusability. Due to its rising popularity, it is necessary to establish a load transfer criteria for helical piles so that the behavior of helical piles can be easily understood. The load transfer method has been widely used in the literature to solve the problem of piles under axial loading because of its simplistic concept that the load-settlement response recorded at the pile head is a consequence of how the reaction forces along the pile body depend on the local displacements. However, application of the load transfer method in the analysis of helical piles are limited or non-existing due to its complex configuration. In this study, the load transfer method is applied to simulate the behavior of large-scale helical piles. The nodes of the piles were replaced by springs, and the load transfer curves in the literature were used to represent the shaft and tip resistance. Additional springs for the helices were introduced, and the load transfer curves derived from experiments on large capacity helical piles were utilized. The results have shown that the load transfer method can well represent the behavior of large capacity helical piles in compression and uplift.

REFERENCES

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