

STUDY OF THE EFFECT OF DEPTH VARIATION ON VERTICAL DEFORMATION CHARACTERISTICS OF PLAIN MINI PILE ON CLAY AND PEAT SOIL

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ABSTRACT

This study aims to determine the settlement of mangrove timber and plain concrete piles—configured as either single piles or pile groups—in peat and clay soils, and to compare the capacity and settlement of both pile types under immediate driving conditions (0 hours) and after a 48-hour waiting period. Testing employed an incremental loading method until the piles reached a failure state (loss of stability), with depth variations of 1 m, 2 m, and 3 m. The results indicate that the installation configuration (single vs. group) was the most dominant factor, with pile groups sustaining an average load 74.7% higher than single piles. Increasing pile depth from 1 m to 3 m resulted in a 69.9% increase in capacity. A post-driving waiting period increased capacity by 27.6% at the 48-hour mark, while plain concrete piles outperformed mangrove piles by 12.1%. Soil type had the least influence (2.8%), although an anomaly was observed with mangrove pile groups in peat, likely due to additional resistance provided by organic fibers or roots. Physical property tests classified the clay soil as inorganic clay with low-to-high plasticity (CL-CH) and an average specific gravity of 2.61, whereas the peat exhibited an average specific gravity of 1.31, consistent with literature ranges. It is concluded that pile group configuration and depth are the most critical factors determining the bearing capacity of piles in soft soil, while material and soil type have a relatively minor influence.

Keywords: *Bearing capacity, Clay soil, Mangrove wood, Pile foundation, Settlement.*