

From Antoinet Peek
To
Date 2 September 2026
Subject Thesis topic

Influence of weak soil layers on pile tip position and pile stiffness

Pile foundations transfer loads to the surrounding soil through both shaft resistance and end bearing at the pile tip. Over the past decades, an increasing number of pile load tests have provided valuable insights into these load transfer mechanisms. These tests have shown that the contribution of pile tip resistance has often been overestimated, while the contribution of shaft resistance has been underestimated. This shift in understanding is reflected in the development of pile class factors α_p and α_s in the latest version of NEN 9997-1:2025 compared to the 2012 and 2016 editions, particularly for screw pile systems.

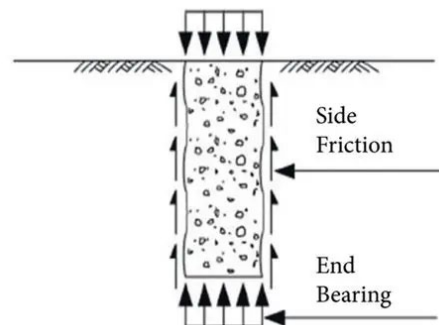


Figure 1: Schematic overview of pile capacity.

Historically, pile tips were often installed through weak soil layers to avoid their unfavourable influence on the calculated end-bearing resistance. As the importance of pile tip resistance is reconsidered, the necessity of this design practice becomes less evident. The question remains, however, what the implications are for the stiffness and deformation behaviour of the pile foundation.

The aim of this thesis is to investigate the influence of weak soil layers near pile tip level on the stiffness and deformation behaviour of pile foundations, and to assess whether extending pile tips through such layers remains beneficial in terms of foundation stiffness and settlement performance.

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