

T-Bar

Undrained shear strength

In soft soils, the undrained shear strength, C_u , is sometimes difficult to determine accurately using a conventional electric cone, due to the various required corrections to the cone data.

As a consequence of these uncertainties, a novel T-Bar cone has been developed that overcomes some of the disadvantages of the conventional electric cone.

Composition

The T-bar consists of a short cylindrical bar measuring 250mm in length and 40mm in diameter attached at right angles to the penetrometer rods, and just below a calibrated load cell. Also included in the shaft is an inclinometer to indicate any derivation from the vertical during insertion. The device can also have incorporated pore water pressure transducers.



Advantages

The T-bar cone has two major advantages over the conventional electric cone. Firstly, the load cell measures what is essentially a differential force (or net pressure) on the bar so that no adjustment need be made for the overburden stress and ambient pressure.

Secondly, the correlation between net pressure on the bar and the shear strength of the soil is via an exact plasticity solution, with a potential range of bar factor of less than $\pm 10\%$ (due to different roughness of the bar surface), compared with cone factors which may vary from as low as 7 in sensitive clays to over 15, that is a range of $\pm 35\%$.

Remoulded strength

An additional use of the T-Bar is to assess the remoulded strength of the soil, by monitoring the bearing resistance during extraction along the same path as insertion.

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