

Cone Penetration Testing (CPT) for ground investigation and verification

An instrumented cone pushed into the ground gives a continuous profile of soil resistance, before and after treatment.

TYPICALLY USED FOR

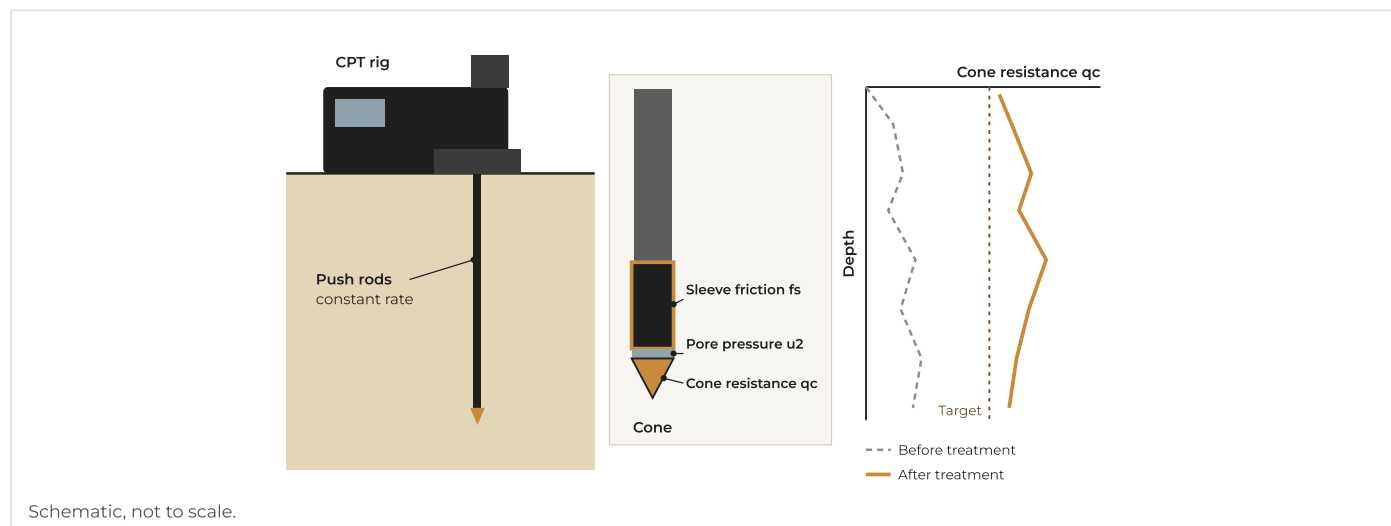
- Site investigation in sands, silts and clays.
- Verifying densification by comparing profiles before and after treatment.
- Liquefaction assessment in sandy soils.
- Locating soft layers and checking layer thickness across a site.

LIMITATIONS

- Penetration stops in very dense layers, cemented ground, gravel or rock.
- No soil sample is recovered, so boreholes may still be needed.
- Correlations to design parameters depend on soil type and should be calibrated to the site.

HOW THE TEST WORKS

A rig pushes rods with a cone at the tip into the ground at a standard rate, typically 20 mm/s. Sensors in the cone measure the resistance at the tip (q_c), the friction on a sleeve behind it (f_s) and, in a piezocone, the pore water pressure (u_2).



TEST PLANNING INPUTS

- Purpose: investigation, design parameters or verification.
- Test locations and depths, including positions between treatment points.
- Target cone resistance or acceptance criteria.
- Expected ground conditions and risk of refusal.
- Applicable standard and reporting format.

TEST EXECUTION CONTROLS

- Push rate kept within the standard tolerance.
- Verticality and depth monitored.
- Zero drift checked after each test.
- Refusal and termination recorded.
- Test location surveyed.

INTERPRETATION AND REPORTING

Test plan: What is specified

Test locations, depths and acceptance values agreed with the consultant.

Test record: What was measured

Calibrated q_c , f_s and u_2 profiles with depth for each test.

Interpretation: What it shows

Soil classification, derived parameters and comparison with the targets.

DELIVERABLES

Test location plan · CPT logs (q_c , f_s , u_2 , friction ratio) · Calibration and zero-reading records · Interpretation report · Before/after comparison for verification