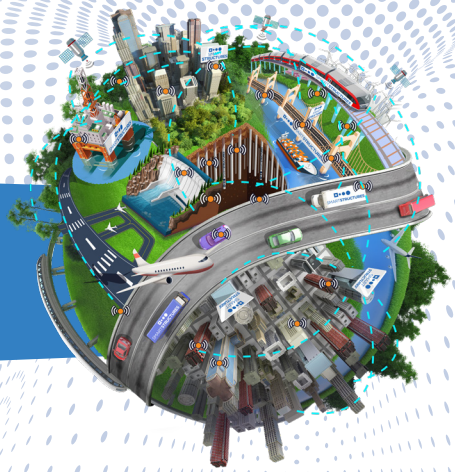
SMARTSTRUCTURES
INFRASTRUCTURE CONNECTED

DILATOMETER



The Dilatometer (DMT) provides a simple method for the rapid, accurate, and economical insitu determination of important soil parameters. Smart Structures is distributing and manufacturing the DMT in North America.

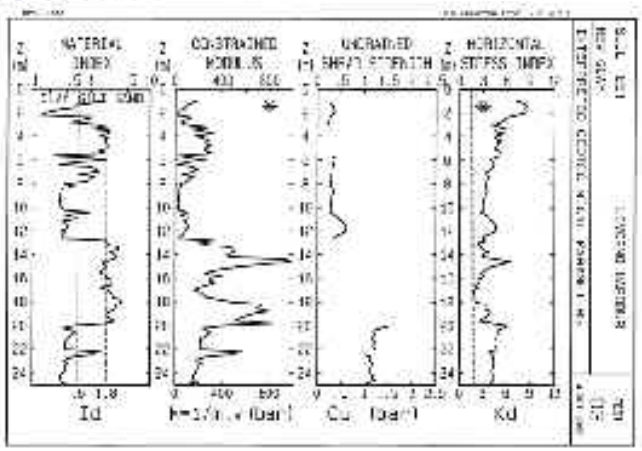
THE BLADE is constructed of high-strength stainless steel. Normally the blade is advancing by pushing from a cone penetrometer rig, at up to 250 tests per day. It may also be pushed with the hydraulic capability of a drill rig. Penetration by driving with SPT or lighter equipment is possible as well. Testing can also start from the bottom of a borehole. The DMT data are then analyzed by computer using published methods described in the user's manual. The ASTM Suggested Method (ASTM Geot. Testing Journal, June, 1986) is currently being revised as a Standard Method.

THE TEST starts by inserting the dilatometer blade into the ground. Gas pressure supplied through tubing from a control unit at the surface is then used to expand a flexible membrane on the face of the blade. The operator determines the A-pressure required to initiate movement of the membrane and the B-pressure required to move its center 1 mm into the soil. Typically the operator performs this simple test at depth intervals of 20 cm or 1 ft.

THE DMT determines these soil parameters:

- Tangent modulus
- Lateral stress
- Preconsolidation stress
- Water table and pressure (sands)
- Soil stratigraphy
- Undrained shear strength (clays)
- Drained friction angle (sands)
- Young's Modulus
- Quick settlement calculations
- Compaction control
- P-y curves for laterally loaded piles

DMT Control Unit
Typical DMT Soil Profile



DMT Soil Profile

SPECIFICATIONS

THE EQUIPMENT supplied conforms to Marchetti's original drawings and includes recent improvements in durability and functionality. It is simple to operate and understand, rugged to use, and mechanically oriented. It is fully portable (dimensions within those of airline luggage) and does not require an external electrical source. The standard hardware and software package includes the following:

- 2 blades, control and calibration unit, 2 rod adapters (CPT, AW, and N rod readily available), 4 pressure cables (totals 100m length), a small (80 cf) nitrogen tank with regulator and tubing for quick connect to the control unit, ground cable, tool box, and spare parts.
- User's manual: Test procedures and analysis of results with design examples.
- Computer analysis program in BASIC.
- A comprehensive training course.
- Periodic updates through the DMT DIGESTS.

FEATURES FOR RESEARCHERS

- Wedge-shaped tip deforms the soil uniformly with less shear and volume strain than 60o cone penetrometers.
- In Situ tests at depths as shallow as 6", over a 1000 factor range of strength and compressibility.
- Specific measurement of lateral stress and soil stiffness, traditionally difficult properties to determine.
- Used at many Universities for research and teaching

FOR EXPLORATION FIRMS

- Yields in a short time a large volume of test data, working from either an SPT or CPT rig.
- Test results presented in familiar parameters for easy presentation to client.
- Substitute for "undisturbed" sampling and testing. The DMT is quicker, less expensive, and provides depth profile of tests.

FOR CONSULTING ENGINEERS

- Nearly continuous profiles of the soil parameters for design (especially settlement calculations!).
- Reduce lab testing delays and eliminate concerns about operator-induced error.
- Direct measurement of settlement and strength parameters.