SELF BORING PRESSUREMETER

The self boring pressuremeter (SBP) is designed to perform in situ testing in a range of clays, sands and weak rock material. Due to minimal ground disturbance during insertion, the SBP is the most effective, high quality, in situ technique for providing engineering parameters that can be used in both routine and more complex geotechnical design.

INSTRUMENTED PROBE

The SBP comprises an integral cutting head with a central cylindrical section covered by a flexible membrane that is expanded by gas pressure against the ground. Beneath the membrane, radially mounted strain arms measure expansion, whilst internal cells measure the pressure. Porewater pressure in the ground can be measured using externally mounted cells. Outputs from the SBP are transmitted as digital signals to a laptop PC data logger, via an umbilical cable.

DEPLOYMENT

The SBP is operated in conjunction with a rotary drilling rig which provides the rotation and thrust for self boring. The SBP is self bored from about 1 m above the scheduled test depth. Correct selection of the cutter configuration and an appropriate flushing medium, normally water or polymer mud, are essential to minimise ground disturbance and provide optimal test conditions. Tests can be carried out consecutively at 1 m centres, or at wider spaced target depths with conventional drilling between tests. A separate hydraulic powerpack and rotary head is available for using the SBP in conjunction with a cable percussion rig in appropriate ground conditions.

WEAK ROCK MODE

By changing to a more robust membrane and cutter assembly, the SBP can be quickly reconfigured for testing in stiffer clays, denser sands and very weak mudstone, siltstone and chalk.

TESTING & ANALYSIS

Testing is carried out in stress and strain controlled manner with continuous loading and unloading via a strain control unit. It takes approximately 1 hour to carry out a full cycle of loading and unloading, with two or more reload cycles. Interpretation of the test data can be carried out to obtain: in situ horizontal pressure, soil strength (undrained shear strength of clays or angle of shearing resistance and dilation of sands) and the soil stiffness (shear modulus, G), including non-linear strain level dependency.

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