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INNOVATIVE PROCEDURES TO DERIVE GROUND MODULI FROM PRESSUREMETER TESTS

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Pressuremeter tests are cylindrical cavity expansion tests that provide information about ground deformation and failure parameters. In the traditional Ménard approach, these tests yield the Ménard pressuremeter modulus (EM) and the limit pressure (plM). In French practice, these parameters are employed in the design of foundations under static loadings, utilizing well-established empirical correlations. However, the applicability of these design rules is limited when dealing with problems involving small-strain shearing, such as deep excavations, foundations subjected to cyclic loads, etc.

The research presented herein aims to show enhancements of the capabilities of pressuremeter tests in assessing soil moduli at small strain levels. It is part of the broader context of the French National Research Project ARSCOP, which focuses on improving pressuremeter testing procedures and expanding their applications in geotechnical design. To achieve this objective, refined calibration procedures and modified testing and interpretation protocols, have been developed. The procedures have undergone meticulous testing under controlled laboratory conditions, including calibration chamber experiments, followed by validation in actual field conditions. This comprehensive approach enables the evaluation of both stress and strain levels' influence on soil shear moduli. Additionally, the determination of standard Ménard pressuremeter parameters remains feasible, ensuring the proposed procedure complements the traditional approach.

This work represents a significant contribution to the geotechnical community by introducing novel in situ testing procedures for assessing the elastic properties of soils. These procedures have broad applications in geotechnical design and align with the overarching objectives of the French project ARSCOP, which seeks to expand the capabilities of the pressuremeter test and enhance its appeal both nationally and internationally.