

DYNAMIC PENETROMETERS FOR SOIL CHARACTERIZATION: INSTRUMENTS, MODELS AND APPLICATIONS

Miguel Angel Benz Navarrete^{*}, Philippe Reiffsteck[†], Jason T. DeJong[◆] and
Pierre Breul[◆]

^{*} Research, Development and Innovation, Sol Solution
Avenue Georges Gershwin, 63204 Riom Cedex, France
mbenz@sol-solution.com

[†] Laboratoire SRO, Gustave Eiffel University
4-20 Boulevard Newton. Champs sur Marne, F-77447 Marne la Vallée Cedex 2, France
philippe.reiffsteck@univ-eiffel.fr

[◆] Department of Civil and Environmental Engineering, University of California Davis
One Shields Avenue, Davis CA 95616, United States of America
jdejong@ucdavis.edu

[◆] Institut Pascal, Polytech Clermont, Clermont Auvergne University
Campus Universitaire des C ezaux, 63178 Aubi ere Cedex, France
pierre.breul@uca.fr

ABSTRACT

Dynamic Penetration Testing (DPT) is a worldwide soil characterisation technique. It is certainly the oldest in situ geotechnical test, with the first known experience dating back to the 17th century in Germany (Goldman, 1699). The principle of the test is simple and due to its rapid implementation, affordability and suitability for a wide range of soils, DPTs are currently used in geotechnical practice in many countries. However, its technical and technological development and its basic principle have remained in most cases the same as described 300 years ago.

Nevertheless, in the last 40 years, thanks to the miniaturisation of sensors, the democratisation of computers, the increase in computing power, the development of numerical methods (DEM, PFEM, SPH...) and the improvement of rheological, constitutive and engineering soil models, a considerable amount of work has been carried out on the study of the dynamic penetrometer.

Nowadays, the demand for in-situ testing methods in the field of geotechnics is constantly increasing and the development of dynamic penetration tests represents a simple and important means to characterise soils, to study them and to model the spatial variability of their main properties.

The main objective of this mini-symposium is to bring together and share the latest important advances and research on (a) the technical, technological and fundamental improvement of dynamic penetration testing (ISO 22476-2 DPTs, Becker penetrometer, P.A.N.D.A., SPT, DCP...), (b) phenomenological understanding and numerical modelling of dynamic penetration, (c) measurement corrections (e.g. input energy, rod length, (d) complementarity with other in-situ tests (CPT, SPT, PMT...) and (e) engineering applications (shallow and deep foundations, soil liquefaction, dam characterization, bearing capacity assessment, soil heterogeneity modelling, etc.)