

INTERNATIONAL SOCIETY FOR SOIL MECHANICS AND GEOTECHNICAL ENGINEERING



This paper was downloaded from the Online Library of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE). The library is available here:

<https://www.issmge.org/publications/online-library>

This is an open-access database that archives thousands of papers published under the Auspices of the ISSMGE and maintained by the Innovation and Development Committee of ISSMGE.

Ground property characterization by in-situ tests: A report of TC 16 activities

Caractérisation des propriétés des sols par les essais in-situ: Un rapport des activités du TC16

Paul W. Mayne

Georgia Institute of Technology, Atlanta, Georgia USA

John J.M. Powell

Building Research Establishment, Watford, UK

ABSTRACT: This report presents an overview of the activities undertaken by the ISSMGE Technical Committee TC 16 on in-situ testing during the period from 2005 to 2009, including our terms of reference, membership, website, and the 3rd international conference on site characterization (ISC-2008, Taipei), as well as other meetings & events.

RÉSUMÉ: Ce rapport présente une vue d'ensemble des activités tenues par le Comité technique TC 16 de la SIMSEG sur essais en place pendant la période de 2005 à 2009, y compris notre mandat, l'adhésion, le site web, et la 3rd conférence internationale sur la reconnaissance géotechniques (ISC-2008, Taipei), aussi bien que d'autres réunions et événements.

1 INTRODUCTION

ISSMGE TC 16 is the technical group that is responsible for international activities related to in-situ testing and geotechnical site characterization of the ground. The present committee was formed following the 16th international conference on soil mechanics & geotechnical engineering held in Osaka, Japan in 2005, as well as the initial 6-month startup period with the assistance of President Pedro Sêco e Pinto. This report details our activities during the 2005-2009 timeframe.

2 TERMS OF REFERENCE

At the onset of our term, TC 16 proposed a five-fold mission with the following objectives and directions:

a. To promote the utilization and improve the interpretation of in-situ tests to enhance geotechnical site characterization, including the determination of soil and rock properties, use of borehole techniques, penetration tests, and geophysical methods and their variance.

b. Maintain an international website and email network, as well as hold several meetings, for interactive communication among the TC 16 members and geotechnical affiliates to share ideas, information, and technical solutions. The active and current website is: www.webforum.com/tc16

c. Plan and host an international conference on site characterization (ISC-3) to exchange theoretical, practical, and applied research in the areas of in-situ testing, geophysics, and geotechnical site investigation.

d. Maintain a set of international guidelines and standards for in-situ testing methods which reference the procedures and interpretation.

e. Upgrade the social importance & relevance of our geotechnical discipline within eyes of the public, private, commercial, industrial, and military communities.

In addition, TC 16 members had considerable joint activities with their sister committee TC 29 on laboratory stress-strain-testing behavior, resulting in the 4th IS on *Deformational Characteristics of Geomaterials* (21-24 Sept. 2008, Atlanta).

3 MEMBERS

The following 46 members participated in the formal makeup of TC 16 during the period 2005-2009:

Allkja, S.. (Albania)	Mukherjee, S.N. (India)
Areas, L. (Belgium)	Mulabdić, M. (Croatia)
Coutinho, A.S. (Portugal)	Niederleithinger, E. (Germany)
Cunha, R. (Brazil)	Nilsson, G. (Sweden)
Devincenzi, M. (Spain)	Nuyens, J. (Belgium)
Dittrich, P. (Canada)	Pardini, M. (Argentina)
Fahey, M.* (Australia)	Popov, V.N. (Kazakhstan)
Fakher, A. (Iran)	Powell, J.J.M. (UK)
Folayan, J.I. (Nigeria)	Peuchen, J. (The Netherlands)
Halkola, H. (Finland)	Robertson, P.K.** (USA)
Hinchberger, S. (Canada)	Rust, E. (South Africa)
Huang, A-B.* (Taiwan)	Santos, A. (Spain)
Imre, E.* (Hungary)	Schnaid, F.* (Brazil)
Jamiolkowski, M.** (Italy)	Shen, X. (China)
Kashirsky, V. (Russia)	Shiwakoti, D.R. (Nepal)
Kovacs, M. (Hungary)	Simonini, P. (Italy)
Lee, Woo Jin (Korea)	Tanaka, H. (Japan)
Li, Aiguo (China)	Tschuschke, W. (Poland)
Long, M. (Ireland)	Van Alboom, G. (Belgium)
Lunne, T.* (Norway)	Viana da Fonseca, A. (Portugal)
Marcu, A. (Romania)	Yue, Q (Hong Kong)
Massarsch, K.R.** (Sweden)	
Matys, M. (Slovakia)	
Mayne, P.W.* (USA)	
Młynarek, Z.* (Poland)	

NOTES: *TC 16 Core Member **Advisor To TC16

In addition, a group entitled "Friends of TC 16" was maintained which contained a another set of active participants who served to promote & enhance the mission of this committee.

4 WEBSITE

Thanks to the generosity of Dr. K. Rainer Massarsch in providing a webserver, TC 16 maintains a fairly active website for sharing information and the dissemination of books, manuals, technical events, conferences, announcements, internet links,

and email correspondence with its members and affiliates. The website is currently located at:

www.webforum.com/tc16

although the original domain (www.geoforum.com/tc16) is also still operational.

5 MEETINGS

As part of its planning and operational stages, TC 16 has held several 1- to 2-hour meetings during the following organized international events:

2005 (Sept) - 16th ICSMGE - Osaka
 2006 (April) - 2nd IC-DMT - Arlington, VA
 2006 (June) - GeoShanghai International Conference, China
 2006 (Dec.) - Singapore Characterization Workshop
 2007 (Sept) - 14th ECSMGE, Madrid
 2008 (Aug) - 11th Baltic Sea Geotechnical Conference, Gdansk
 2009 (Mar) - International Foundation Conference, Orlando

6 ACTIVITIES

Our major activities during the 2005-2009 period included the updating and maintenance of the TC 16 website, planning ISC-3, and participating in several other conferences, symposia, and workshops. Of specific relevance, several TC 16 members attended sessions, gave papers, presentations, and keynote talks at the following events:

- SOA-1 Keynote Presentation entitled: "Geocharacterisation and properties of natural soils by in-situ tests" given at the 16th ICSMGE by Professor Fernando Schaid from the Federal University of Rio Grande do Sul, Brazil who is a core member of TC 16. This outstanding paper eventually was expanded into a book on in-situ testing that cover the 5 main tests: SPT, CPT, DMT, PMT, and VST (see Schnaid, 2009).
- 2nd International Conference DMT 2006 on the flat plate dilatometer test (DMT) that was held at the Hyatt Hotel in Arlington, VA - DC from 02-05 April 2006. Details can be found at: <http://www.insitusoil.com/dmt.html>
- GeoShanghai 2006 from 2-4 June 2006 that had a keynote 2006 James K. Mitchell Lecture (later published in *Geoengineering & Geomechanics: An Intl. Journal*) given by P.W. Mayne. Also, a set of contributed papers were contained in special GSP on the topic of in-situ testing that was published by ASCE (See section 8).
- The Singapore Workshop on characterization of natural soils was held by TC 29 in December of 2006 and included three keynote papers, one given by the TC 16 chair on the overview topic of calibrating in-situ tests. Details for this are given at: www.eng.nus.edu.sg/civil/conf/NS2006/
- General Report on "Site investigation and mapping in urban area" given by Z. Młynarek at Main Session 6 of the 14th ECSMGE in Madrid. See Volume 1 of the proceedings: *Geotechnical Engineering in Urban Environments*.
- Workshop on *Pressuremeter and Its Relevance in Site Characterization* was held by TC 16 as part of the ECSMGE technical events. ISSMGE VP Roger Frank participated in this exciting discussion.
- The primary focused event of TC16 was the successful 3rd International Conference on Site Characterization (ISC-3) that was held at the Taipei International Conference Center from 01-04 April 2008. The host was Professor An-Bin Huang of National Chiao Tung Univ, Taiwan, who is a core member of our group. This conference followed the ISC-1 (1998, Atlanta) and ISC-2 (2004, Porto) as a series

established by our committee. Approximately 450 participants were in attendance at ISC-3. An epilogue and details are found at: <http://www.elitepco.com.tw/ISC3/>

- The 11th Baltic Sea Geotechnical Conference held from 15-18 Sept. 2008 at Univ. Gdansk, Poland brought together good participants from the TC 16 members. The 2-volume proceedings were edited by Professor Zbigniew Młynarek of Poznan University, who is a TC16 core member. Information is given at: www.11bc.pg.gda.pl/
- As part of the established symposia series on the theme of *Deformation Characteristics of Geomaterials* founded by TC29, members of TC16 participated in the 4th DCG that was held at the Georgia Institute of Technology from 21-24 Sept 2008: www.isAtlanta2008.org
- The SOA-1 theme for the 17th ICSMGE is entitled: "Geomaterial behaviour and testing" that was appointed five co-authors, two of which are TC 16 core members.

With regard to future events, TC 16 has been planning for two upcoming momentous technical programs: CPT'10 and ISC-4, as detailed below:

Second International Symposium on Cone Penetration Testing (CPT'10) that will be held from 09-11 May 2010 in Huntington Beach, California. The event follows the well-known CPT'95 that was held in Linköping, Sweden which produced three volumes of technical proceedings on the topic. At this time, 180 abstracts from 34 countries have been submitted for consideration. Our host for CPT'10 is Dr. Peter K. Robertson. For additional information, see: www.cpt10.com

Fourth International Conference on Site Characterization (ISC-4) will be held in Recife, Brazil in September 2012. The event is organized under the auspices of TC16 and sponsored by the Brazilian Society on Soil Mechanics & Geotechnical Engineering. Our host will be Professor Roberto Quental Coutinho from the Federal University of Pernambuco.

Further details and updates will be made available at both the TC16 and ISSMGE websites in due course.

7 COOPERATION AND INTERACTION

Several of the activities of TC 16 were conducted in cooperation with its affiliate technical committee on laboratory stress-strain behavior of geomaterials (TC 29), including: (a) 2006 Singapore Workshop on *Characterization & Engineering Properties of Natural Soils*; (b) 2008 *Third International Conference on Site Characterization* (Taiwan), and (c) the *4th International Symposium on Deformation Characteristics of Geomaterials* (Atlanta, Georgia).

The ISSMGE TC 16 interacted with other international professional organizations and societies, including: ASCE, ASTM, ADSC, CEN, CGS, and TRB. TC 16 members were involved with the ASCE Geo-Institute through their *Engineering Geology & Site Characterization Committee* (Chair: Prof. Nick Hudyma), helping in participation of sessions, papers, and short courses events at the annual conferences: GeoCongress (Feb. 2006, Atlanta); GeoDenver (Feb. 2007); GeoCongress (New Orleans, March 2008), and the International Foundations Conference and Equipment Expo (IFCEE, March 2009) that was held in Orlando as joint ASCE Geo-Institute event with the Association of Drilled Shaft Contractors (IAFD-ADSC) and Pile Driver Contractors Association (PDCA). In the latter, several sessions were organized with the theme related to in-situ testing resulting in the production of a geotechnical special publication (GSP 186) entitled: *Contemporary Topics in In-Situ Testing..* The International Activities Committee (IAC) of the ASCE Geo-Institute also helped provide partial travel funding to the TC 16 chair to attend the 17th ICSMGE in Alexandria, Egypt.

TC 16 members were involved with the American Society for Testing & Materials (ASTM) in revising the standard D5778 on electronic friction cone and piezocone testing of soils that was approved and issued in December 2007. A revision of the vane shear standard (D2573) was issued in 2008.

Members of TC 16 have also participated in the Transportation Research Board (TRB) meetings and committee AFP 20 on Exploration and Classification of Earth Materials Committee. Of particular note, the chair of TC 16 completed the *Synthesis 368 on Cone Penetration Testing* (2007) for the National Cooperative Highway Research Program (NCHRP) for the TRB and National Academies. This document required interactions with the 64 Departments of Transportation (DOTs) in the United States, Puerto Rico, and Canada. Full details can be found at: www.trb.org and the entire document may be downloaded from:

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_368.pdf

In interaction with the Canadian Geotechnical Society (CGS), the chair of the committee gave a series of talks on in-situ testing as part of the *Cross-Canada Lecture* which involved 14 presentations visiting 12 cities in 2 weeks in December 2007. In addition, special lectures were given in 2008 to the CGS Montreal Section and in 2009 to the CGS Toronto Section.

8 PUBLISHED DOCUMENTS

Document proceedings and reports from TC 16 activities:

- Schnaid, F. (2005). Geocharacterisation and properties of natural soils by in-situ tests. *Geotechnology in Harmony with the Global Environmental*, Vol. 1 (Proc. 16th ICSMGE, Osaka), Millpress, Rotterdam: 3-45.
- Mlynarek, Z., editor (2006). Proc. 3rd International Seminar on Soil Design Parameters from In-Situ and Laboratory Tests, Poznan, *Studia Geotechnica et Mechanica*, Vol. XXIX, No. 1-2 (2007): 175 p.
- Viana da Fonseca, A. (2007). ISSMGE TC 16: Ground property characterisation by in-situ tests: *Geotechnical Engineering in Urban Environments* (Proc. 14th ECSMGE, Madrid), Millpress, Rotterdam, Vol. 5: 629-630.
- Viana da Fonseca, A. and Santos, J.A. (2008). *Behaviour of Bored, CFA, and Driven Piles in Residual Soil*, Faculdade de Engenharia da Universidade do Porto, Portugal: 670 pages.
- Huang, A-B. and Mayne, P.W., editors (2008). *Geotechnical & Geophysical Site Characterization 2008*, Vols. 1 and 2 (Proceedings, ISC-3, Taipei), Taylor & Francis Group, London: 1555 pages.

Contributory Documents with Some Participation by TC16:

- Gourvenec, S. and Cassidy, M., editors (2005). *Frontiers in Offshore Geotechnics*, (Proc. ISFOG, Perth), Taylor & Francis, London: 1110 pages.
- Puppala, A., editor (2006). *Site & Geomaterial Characterization*, ASCE GSP 149 held during GeoShanghai, 316 p.
- Failmezger, R.A. and Anderson, J.B., editors (2006). *Flat Dilatometer Testing* (2006), Proceedings 2nd Intl. Conference on DMT, Washington, DC (April 2006): 370 p.
- Tan, T.S., Phoon, K-K., Hight, D., and Lereouil, S., editors (2007). *Characterization & Engineering Properties of Natural Soils II*, Vol. 3 and 4 (Proc.Intl. Workshop, Singapore Dec. 2006), Taylor & Francis Group, London.
- Society for Underwater Technology (2007). *Offshore Site Investigation and Geotechnics* (Proc. 6th IC, London), Royal Geographical Society: 558 pages.
- Mlynarek, Z., Sikora, Z., and Dembicki, E., editors (2008). *Geotechnics in Maritime Engineering*, Vols. 1 and 2 (Proc. 11th Baltic Sea Geotech Conf, Gdansk), Polish Comm. on Geotechnics: 1052 pages.

Burns, S.E., Mayne, P.W., and Santamarina, J.C., editors (2008). *Deformational Characteristics of Geomaterials*, Vols. 1 and 2 (Proc. 4th IS-DCG, Atlanta), Millpress/IOS Press, Amsterdam: 953 pages.

Iskander, M., Laefer, D.F., and Hussein, M.H., editors (2009). *Contemporary Topics in In-Situ Testing, Analysis, & Reliability of Foundations*, GSP 186, ASCE, Reston, Virginia: 668 p.

Noteworthy mention:

Schnaid, F. (2009). *In-Situ Testing in Geomechanics: the main tests*. Taylor & Francis Group, London: 330 pages.