

Administrative report: TC 10 – Geophysical testing in geotechnical engineering

Compte rendu sur la CT-10

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ABSTRACT

The terms of reference and the scope of main activities are presented. During the present term TC 10 has focused on the electronic information exchange, using an interactive Web platform and the establishment of Geophysics Info, a database on geophysical methods. A main objective was the development of a Guidance document on Seismic Downhole Testing. Other activities included sponsorship of the conference on Site Characterization, ISC'2 and organisation of a Workshop on Geophysical Testing.

RÉSUMÉ

Le mandat et la portée des activités principales est présenté. Pendant la période actuelle le comité s'est concentré sur l'échange d'information électronique, en utilisant une plateforme interactive sur l'Internet et l'établissement d'une base de données sur des méthodes géophysiques. Un objectif principal était le développement d'un document de conseils sur l'essai séismique de Downhole. D'autres activités ont inclus le patronage de la conférence sur la caractérisation d'emplacement, ISC'2 et l'organisation d'un Workshop « Geo-physical Testing ».

1 BACKGROUND

Technical Committee 10, Geophysical Testing in Geotechnical Engineering (TC 10) was established in 1989. Since 1997, the activities of TC 10 are sponsored by the Swedish Geotechnical Society.

The work of TC 10 is lead by a Core Group, consisting of: Mr. Tony Butcher, United Kingdom, Dr. Amir Kaynia, Norway; Dr. K. Rainer Massarsch, Sweden (Chair); Dr. Nils Rydén, Sweden (Secretary, 2004 - 2005) & Dr. Anders Bodare (Secretary, 2001 – 2003); Prof. Kohji Tokimatsu, Japan and Dr. Bob Whiteley, Australia.

The following 26 experts were nominated as TC 10 Members by their respective national societies: Dr. G. A. Athanassopoulos, Greece Dr. J. M. Barros, Brazil Prof. G. Baykal, Turkey Prof. Ewald Brückl, Austria Dr. Guy C. de Caprona, Sweden Prof. Giovanni Cascante, Canada Prof. Gye Chun Cho, Korea Dr. V. Cuéllar, Spain Dr. Pham Huy Giao, Vietnam Dr. Vera Glisnikova, Czech Republic Dr. Gerhard Heymann, South Africa Prof. Jozef Hulla, Slovakia Dr. Katherine Klein, Canada Dr. Gerard A. M. Kruse, Netherlands Prof. Haruhige Kusumi, Japan Prof. Zb. Lechowicz, Poland Mr. JeanLuc Mattiuzzo, France Mr. Goran Mitrovic, Croatia Prof. Satyendra Mittal, India Prof. Zbigniew Mlynarek, Poland Mr. Ernst Niederleithinger, Germany Mr. Peter O'Connor, Republic of Ireland Dr. Olli Okko, Finland Dr. Marilia Oliveira, Portugal Dr. Endre Törös, Hungary and Dr. Yu-Hsing Wang, Hong Kong.

In addition, 19 contact members ("Friends of TC 10") from 11 countries participated in specific activities of TC 10.

2 TERMS OF REFERENCE AND SCOPE OF ACTIVITIES

The following Terms of Reference were proposed by the Core Group and approved by the ISSMGE Board:

To disseminate information about the practical application of Geophysical Methods to geotechnical and geo-environmental problems.

To demonstrate the use of small-strain modulus, determined from seismic tests, for the solution of geotechnical problems.

To encourage the involvement of equipment manufacturers and software developers in the activities of TC 16 (Ground Property Characterization from In Situ Tests).

To co-operate with other ISSMGE Technical Committees, in particular TC 16.

To exchange information with other geophysical societies on the practical applications of geophysical techniques.

In order to realize these objectives, the following scope of activities was established:

1. Setting up of Task Force with the responsibility to finalize the Guidance document on seismic down-hole testing (SCPT).
2. Documentation of geophysical methods, which focuses on practical application of respective methods, including the implementation of a geophysical database on the Internet.
3. Active participation in ISSMGE-sponsored conferences, by organizing Workshops and involvement in sessions of ISSMGE regional and international conferences.
4. Organization of an International conference on site characterization (ISC'2), in partnership with ISSMGE TC 16.

3 COMMUNICATION AND INFORMATION EXCHANGE

Communication and information exchange was conducted mainly with the aid of the TC 10 Web site and communication platform (www.geoforum.com/tc10). Members and friends of TC 10 had access to the password-protected TC 10 web area, which included a listing of members, discussion section and a document archive with all relevant document files. Members were kept informed about postings with the aid of an automated notification service. Information about conferences, workshops, papers and references were added. A search function was included which facilitates the retrieval of information and documents posted on the Web site and on the Communication Platform.

Three to four Newsletters were distributed annually to TC 10 members, friends and chairmen of sister TCs. The objective of

the Newsletters was to keep members informed about planned activities and to solicit their involvement and contribution to specific activities.

A Geophysics database was added to Geoforum.com (www.geoforum.com/info/geophysical), comprising the following subject areas: Discussion Forum on Geophysical Testing; Geo Directory: Listing of individuals interested in geophysics; Market Guide: Listing of companies specializing in geophysical testing products and services; Conference directory: Listing of conferences and events in geophysical testing.

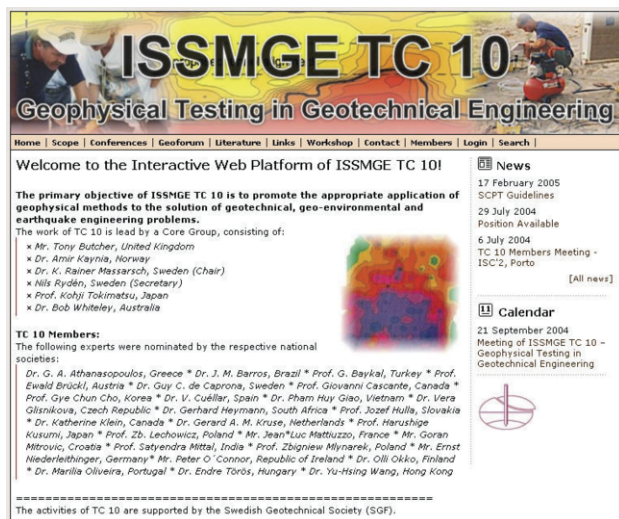


Figure 1. Web site and communication platform of TC 10 (www.geoforum.com/tc10).

4 WORKSHOPS AND CONFERENCES

4.1 Workshop on Geophysical Testing - ECSMGE

A well-attended workshop on "Geophysical Testing" was held on 27 August 2003 in Prague in connection with the XIIIth European Conference on Soil Mechanics and Geotechnical Engineering. More than 50 participants attended the Workshop. A significant part of the workshop was devoted to discussion of the evaluation of geophysical tests and the application of results to geotechnical, off-shore and environmental engineering. The Workshop presentations were posted on the TC 10 Web site and are included in Volume 2 of the conference CD.

4.2 International Conference on Site Characterization – ISC'2

The 2nd International Conference on Site Characterization (ISC'2) was held in Porto, Portugal on September 19 - 22, 2004. The conference was organized by the TC 16 (Ground Property Characterization by In-situ Testing) and co-sponsored by TC 10, ASCE Geo-Institute, Portuguese SMGE, and the University of Porto (FEUP).

The conference covered a wide range of geotechnical and geophysical site characterization and testing methods. More than 200 papers were accepted by a review committee and published according to the following topics:

1. Mechanical in-situ testing methods
2. Geophysical methods applied to geotechnical engineering
3. Innovative technologies and equipment
4. New developments in interpretation of in-situ data
5. Case studies involving practical projects
6. Characterization of non-textbook geomaterials
7. Applications to geotechnical structures
8. Enhanced characterization by combined in-situ testing
9. Laboratory and field comparisons

The conference offered also 10 Keynote lectures on the following topics:

- Characterization of granite and the underground construction in Metro do Porto, Portugal
- In-situ test characterization of unusual geomaterials
- Routine and advanced analysis of mechanical in-situ tests. Results on saprolitic soils from granites more or less mixed in Portugal
- The contributions of in-situ geophysical measurements to solving geotechnical engineering problems
- Deformation properties of fine-grained soils from seismic tests
- Advanced calibration chambers for cone penetration testing in cohesionless soils
- In-situ seismic survey in characterizing engineering properties of natural ground
- Characterization of the Venice lagoon silts from in-situ tests and the performance of a test embankment
- Characterization of soft sediments for offshore applications
- Evaluating soil liquefaction and post-earthquake deformations using the CPT

A highlight of the conference program was the presentation of the James K. Mitchell Lecture: "In-situ soil testing: from mechanics to interpretation", presented by Prof. Hai-Sui Yu.

The successful conference attracted 530 participants from around the world. The two volume proceedings in hard copy & searchable CD were issued, containing 10 state-of-the-art Keynote Lectures and 209 technical papers. Many of the papers and presentations addressed the interaction between geotechnical and geophysical methods for site exploration. Of particular interest was the discussion on the evaluation and practical application of test results.

5 TC 10 MEMBERS MEETINGS

Two TC 10 Member meetings were held, the first on August 27, 2003 during the ECSMGE in Prague, and the second on September 21, 2004 in connection with the ICS'2 Conference in Porto in 2004. More than 40 members participated in the respective meetings.

6 GUIDANCE DOCUMENT – SEISMIC DOWNHOLE TESTING

One of the primary objectives was to develop the Guidance Document "Seismic Cone Downhole Procedure to Measure Shear Wave Velocity - A Guideline". A Task Force was set up to implement the development of a Guidance document on Seismic Downhole Testing (SCPT). The members of the Task force were: Tony Butcher, (Chairman), Richard Campanella, Amir Kaynia and K. Rainer Massarsch. A Draft of the document was presented at the TC 10 Member Meeting in Prague and Porto, respectively. Thereafter, the Final Draft was submitted to TC 10 members and sister TCs for commenting. The final document will be presented in connection with the TC 10 Member Meeting in Osaka 2005.

The document is to provide guidance to practitioners and procurers on downhole seismic wave measurement using a seismic cone penetrometer. This guideline is a supplement to the International Reference Test Procedure (IRTP) for the electric Cone Penetration Test (CPT) and the Cone Penetration Test with Pore pressure (CPTU) as produced by the ISSMGE TC16. The guideline therefore follows and should be used with the CPT IRTP (1999). The document addresses the following topics:

1. Introduction
 2. Definitions
 3. Methodology
 4. Equipment
 5. Test procedures
 6. Reporting of results and interpretation procedures
 7. References and further reading
- Appendix: Maintenance, Checks, Calibrations, Corrections.

7 FUTURE OF TC 10

The future objectives of TC 10 was discussed at the two members meetings as well as among the Core Group. The consensus is that the activities of TC 10 should continue in its present form, with the primary objective to inform geotechnical and geo-environmental engineers about the potential applications

and limitations of geophysical field and laboratory methods. An important aspect of future activities would be to establish active information channels with other geophysical societies such as EEGS and EAGE. In order to facilitate efficient communication, the activities of the TC 10 Web platform should be continued in its present or a modified form.

REFERENCES

- European conference on soil mechanics and geotechnical engineering, 13: Geotechnical problems with man-made and man influenced grounds, Prague, 25 – 28th August, 2003. Proceedings, Vol. 1 & Additional CD-ROM.
- Geotechnical and geophysical site characterization. International conference on site characterization, 2, ISC 2, Porto, Portugal, 19-22th September, 2004. Proceedings, Vol. 1.