Administrative Report: 2005 – 2009

TC23: Limit State Design in Geotechnical Engineering Practice

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ABSTRACT
This report reviews the activities of ISSMGE's Technical Committee TC23 for the period 2005 – 2009. It has been prepared at the request of the Secretary General for distribution at the time of the ISSMGE International Conference in Alexandria. The report concludes that the terms of reference set by the TC have been largely met. It is hoped that the documents produced by the TC on workshops and conferences will be valuable references for the ISSMGE members who have interests in this area.

1 INTRODUCTION

Technical Committee TC 23 on Limit State Design in Geotechnical Engineering was established by the ISSMFE in 1990 under the chairmanship of Dr. N. Krebs Ovesen of the Danish Geotechnical Society. This was two years after work began on drafting Part 1 of Eurocode 7: Geotechnical Design, General Rules. In the next seven years, the Danish Geotechnical Society remained TC23's sponsor. Not surprisingly, the emphasis was on activities in Europe and on the development of the Eurocodes in particular. The most important conference held during this period was the 1993 Copenhagen Symposium on Limit State Design in Geotechnical Engineering.

The development of the limit state design in geotechnical engineering triggered by Eurocode 7 attracted the interests of European as well as non-European members on this method. In recognition of this interest, and possibly of the need to shift the emphasis away from Europe, the Geotechnical Division of the South African Institution of Civil Engineers was asked to become the sponsoring Member Society of TC 23 for the period 1997 to 2001. The TC was led by Mr. Peter Day, the Chairman. The major achievements of this term are presented in the proceedings of LSD2000, which was held on 18 November 2000 in Melbourne, Australia. Forty-three delegates from 13 countries attended the workshop.

The activities of this committee was succeeded along the same line to the current term, where the Japanese Geotechnical Society (JGS) was asked to become the sponsoring Member Society of the TC for the period of 2001 to 2005 and then continuously from 2005 to 2009. This administrative report describes the activities of the latter period.

2 TERMS OF REFERENCE

The Terms of Reference of TC 23 for the period were:

(1) Discuss the issue of the introduction of the performance based design concept in conjunction with geotechnical limit state design.
(2) Encourage exchanging information concerning issues that have arisen during the implementation stage of limit state design codes in various countries and regions.
(3) Discuss the matter of 'test values' and 'derived values' in addition to 'characteristic values' that have been discussed extensively in the past four years in TC23.
(4) Review and advance the reliability based methodologies on determination of partial factors.
(5) Discuss how partial factors be used in numerical design calculations, especially in the finite element method dealing with highly non-linear force-deformation behaviors.
(6) Issues concerning geotechnical design codes in the small and/or developing countries: using Asian countries as an example.

These Terms of Reference were adopted at International Workshop (IWS) Kamakura held on 10 to 12 April 2002 in Tokyo and Kamakura in Japan, which was organized by TC23 and continuously kept for 8 years until 2009.

3 COMMITTEE MEMBERSHIP

Yusuke Honjo was appointed as the Chairperson, and Limin Zhang was assigned as the Secretary. The Core Members were: D. E. Becker (Canada), K. Mastui (Japan), S. Paikowsky (USA), K. K. Phoon (Singapore), B. Schuppener (Germany), B. Simpson (UK), and J. S. Steenfelt (Denmark). All the information is available at TC23's web site, http://www.cive.gifu-u.ac.jp/~tc23/.

4 COMMITTEE ACTIVITIES

4.1 *Summary of activities*

TC23 hosted IWS Kamakura on 10 to 12 April 2002 in Tokyo and Kamakura in Japan. This was really a kick-off event for our activities for 2001-2005. Since nine out of the ten core members of TC 23 attended the event, the plan for the next four years was discussed and determined. The major events during 2001-2005 are listed as follows:

(1) LSD2003 held right after the Pan-American conference (SARA) at MIT on 26 June 2003.
(2) Two sponsored sessions at 12th Asian Regional Conference in Singapore on 7 and 8 August 2003.
(3) The committee meeting of TC23 held in Prague during the European Conference on 25 August 2003.
(4) Georisk 2004 held on 26-27 Nov. 2004 at Bangalore, India.
(5) TC23 joined organizing the workshop 'Evaluation of Eurocode 7', of which the main sponsor was ERTC 10, held at Trinity College, Dublin on 31 March and 1 April 2005.
(6) During the 16th ICSMGE in Osaka in 2005, TC23 was involved in Session 5a, *Engineering Practice and Education*.

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During 2005-2009, TC23 was involved in the following events:

(1) Taipei 2006: International Symposium on New Generation Design Codes for Geotechnical Engineering Practice, 2-3 November 2006 in Taipei.
(2) ICASP'10: International Conference on Application of Probability and Statistics in Civil Engineering, 31 July to 3 August 2007 in Tokyo. TC23 organized one session: Reliability Analysis and Design in Geotechnical Engineering (Organizers: Y. Honjo and L. M. Zhang).
(3) Spirit of Krebs Ovesen Session: Challenges in Geotechnical Engineering, 14th ECSMGE on 23 September 2007 in Madrid.
(4) ISGSR 2007: The First International Symposium on Geotechnical Safety and Risk, on 18-19 October 2007 in Shanghai, China.
(5) IS-Gifu: Second International Symposium on Geotechnical Safety and Risk, on 11-12 June 2009 in Gifu, Japan.
(6) A TC23 committee meeting will be held at 9:00 am - 12:00 noon, 3 Oct. 2009 during the coming ICSMGE in Alexandria. The topics to be presented include: development of performance based design concept and design codes, implementation of limit state design codes, report on lessons learnt during the drafting of design codes, and reliability analysis tools in geotechnical engineering.

Among these activities, the Spirit of Krebs Ovesen Session at the 14th ECSMGE and IS Gifu are highlighted below.

4.2 *Spirit of Krebs Ovesen Session 14th ECSMGE on 23 September 2007 in Madrid*

On Sunday afternoon, 23 September 2007 at Hotel Meli-Castilla in Madrid, a session in the Spirit of Krebs Ovesen was held to commemorate the contributions of the late Niels Krebs Ovesen, who passed away on the last day of 2005. The session was jointly organized by the Danish Geotechnical Society, ETC 10 (Evaluation of Eurocode 7), and TC 23 (Limit State Design in Geotechnical Engineering), and took place as one of the special events of the XIV ECSMGE. The session lasted 4 hours and was attended by more than 80 people including Krebs' wife Hanne, 2 daughters, 4 grandchildren and Prof. Seco e Pinto, the current ISSMGE President.

The session was co-chaired by Roger Frank (ISSMGE Vice President) and Yusuke Honjo (Chair of TC23). Presentations were made by Jørgen Steenfelt (Denmark), Frans B. J. Barends (Netherlands), Trevor Orr (Ireland, Chair ETC10), Peter Day (South Africa), Sarah Springman (Switzerland, Chair TC2), Brian Simpson (UK), all referring to the contributions and achievements of late Prof. Ovesen from various aspects.

The proceeding of the special session is available from the Danish Geotechnical Society (2008).

4.3 *IS-Gifu on 11-12 June 2009 in Gifu, Japan*

IS Gifu - the Second International Symposium on Geotechnical Safety and Risk' (ISGSR) was held in Nagaragawa International Convention Center in Gifu City, Japan on 11-12 June 2009. The symposium was registered by 126 people, of which 32 were from the overseas. The conference was jointly sponsored by ISSMGE, JGS and Geosnet (Geotechnical Safety Network), and organized by TC23 (Limit State Design in Geotechnical Engineering Practice) and TC32 (Engineering Practice of Risk Assessment and Management) of ISSMGE.

The major themes of IS Gifu are as follows:

(1) Evaluation and control of uncertainties concerning geotechnical structures.
(2) Performance based specifications, RBD and LSD of geotechnical structures, and design code developments.
(3) Risk assessment and management of geo-hazards.
(4) Risk management issues concerning large geotechnical construction projects.

One of the highlights of this symposium was the inauguration of Wilson Tang Lecture. The lecture is named to recognize and honor the significant contributions of Professor Wilson Tang, who is one of the founding researchers in geotechnical reliability and risk. The first lecture entitled 'Reliability of geotechnical predictions' was given by Prof. T. H. Wu of the Ohio State University, who is also one of the founders of geotechnical reliability design.

Three keynotes lectures, one special lecture and 51 presentations were delivered during the two-day symposium. One of the main sessions of IS Gifu was 'Geotechnical code drafting based on limit state design and performance based design concepts,' which was organized by TC23. The most recent information on this issue was presented through 16 contributions form the various parts of the world. The JGS Domestic Chapter of TC23 presented a report on the code calibration based on Level I RBD, which reflects the Japanese experiences on this issue.

The proceeding of the workshop is available from Taylor & Francis (Honjo et al., 2009). The next symposium of the ISGSR series will be held in Munich, Germany in 2011.

5 CONCLUSIONS

As is observed from the records of the activities, the terms of reference set by the committee have been largely met. The information related to LSD in geotechnical engineering has now been much widely shared by the members compared to several years ago. Design codes based on LSD concepts have been gradually developed and implemented worldwide.

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