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Administrative report of TC23 – Limit state design in geotechnical engineering

Compte rendu technique de la No. CT 23 – Calcul aux états limites en géotechnique

P.Day – Jones & Wagener Pty Ltd, South Africa

ABSTRACT: This report reviews the activities of the ISSMGE's Technical Committee TC23 for the period September 1997 – August 2001. It has been prepared at the request of the Secretary General for distribution at the time of the ISSMGE International Conference in Istanbul. The report concludes that the terms of reference set by the committee have been largely met with one exception. It is hoped that the National Reports and the proceedings of the LSD 2000 Workshop will be valuable references for the writers of geotechnical design codes over the next few years.

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. For the next seven years, the Danish Geotechnical Society remained TC23's sponsor. Many members of the committee were actively involved in the CEN/TC250/SC7 sub-committee responsible for the drafting of Eurocode 7. Not surprisingly, the emphasis was on activities in Europe and on development of the Eurocodes in particular. Two highly successful conferences were held during this period, the 1993 Copenhagen Symposium on Limit State Design in Geotechnical Engineering and the 1996 seminar in London entitled Eurocode 7 – Towards Implementation.

The developments in Europe were followed closely by a number of ISSMGE Member Societies. This interest was particularly keen amongst countries that had hitherto either adopted various European codes or had modelled their own codes on these documents. Even before the finalisation of the ENV (pre-standard) version of EC7, non-European countries were debating the merits of adopting the future Eurocode or revising their own standards on geotechnical design in line with this code.

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. This administrative report describes the activities of the committee during this period.

2 TERMS OF REFERENCE

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

- To review the progress made on the implementation of limit state design in geotechnical engineering in all ISSMGE Member Societies.
- To identify problems experienced by the Member Societies with the introduction / use of Limit State Design in geotechnical engineering and with the marriage of these codes with other national codes.
- To compare the design approaches, partial factors and selection of design values advocated in various countries

with a view to identifying differences and exploring opportunities for harmonisation.

- To encourage dialogue between the technical / drafting committees of the major standards organisations.
- To explore the feasibility of an International symposium, possibly allied with GeoEng 2000, at which these issues could be debated.

These Terms of Reference were adopted at the Committee's first meeting held during the European Conference in Amsterdam, June 1999.

3 COMMITTEE MEMBERSHIP

The Committee consists of members selected by the Chairman from names put forward by the various ISSMGE Member Societies. It includes representatives of Australia, Belgium, Brazil, Bulgaria, Canada, Czech Republic, Denmark, France, Germany, Hungary, India, Ireland, Israel, Italy, Japan, Lithuania, Netherlands, Norway, Poland, Portugal, Rumania, Russia, Spain, Sweden, United Kingdom, United States of America, the Hong Kong Special Administrative Region of China and South Africa.

In recognition of the work done in Canada on the application of limit state design in geotechnical engineering, Dr. Roger Green was appointed as Secretary of the Technical Committee. In 1999, however, he relinquished this position for health reasons and Dr. Kenji Matsui of Japan took his place.

4 COMMITTEE ACTIVITIES

4.1 Committee meeting in Amsterdam

The Committee's first meeting was held on 8 June 1999 on the occasion of the XII European Conference on Soil Mechanics and Geotechnical Engineering in Amsterdam. Fifteen committee members attended the meeting.

During the meeting, reports were received on the progress of Eurocode 7 and from six Member Societies outside the European Community including Japan, USA, Canada, Australia and Hong Kong and South Africa.

The meeting committed itself to three activities for its term of office:

- a) a questionnaire to Member Societies addressing the first three Terms of Reference given above,
- b) a workshop on limit state design at GeoEng 2000 to be held in Melbourne, Australia in November 2000. and

- c) a speciality session on limit state design to be held at the International Conference in Istanbul in 2001.

4.2 Questionnaire / National Reports

During the period between the Amsterdam meeting and the GeoEng 2000 Conference, it was decided that a formal questionnaire may be too restrictive and would not necessarily cover all the issues important to the various Member Societies. As a result, the format was changed from a questionnaire to a structured National Report.

In August 2000, invitations were issued to all Member Societies to submit a National Report on Limit State Design in Geotechnical Engineering. A broad framework for the report was suggested including

- country and region
- codes of practice used
- design methods
- load and material / resistance factors
- material properties
- specific problems.

A set of guidelines was provided to help reporters identify relevant issues and to clarify the specific requests for information. Two sample National Reports (South Africa and Japan) were also distributed to assist reporters.

Reports were submitted by seventeen member countries. These were received and collated by Dr. N. Krebs-Ovesen through the kind offices of the Danish Geotechnical Institute.

4.3 LSD 2000

On 18 November 2000, two days before the start of the GeoEng 2000 conference in Melbourne Australia, TC 23 hosted an International Workshop on Limit State Design in Geotechnical Engineering known as LSD 2000. Forty three delegates from 13 countries attended the workshop.

The programme was divided into two sessions. The first dealt with the presentation of the National Reports referred to above followed by a summary and comparison of the practice of Limit State Design in the various countries. The second session was devoted to the presentation of 13 papers submitted for publication in the workshop proceedings.

The modest profit made by the workshop was used to defray the cost of organisation and of posting the National Reports and papers on the conference website.

Seventy copies of the proceedings were produced; all of which were issued to delegates or sold by the organisers of GeoEng 2000. All proceedings have been converted into electronic format and are available on CD-ROM.

4.4 Questionnaire on Geotechnical Parameters

In March 2001, a survey questionnaire on geotechnical investigation methods and the determination of geotechnical parameters was sent out to the TC 23 Committee for distribution to their Member Societies. This survey was originally proposed by the Public Works Research Institute in Japan and has also been widely distributed to Japanese geotechnical engineers.

The purpose of the questionnaire was to obtain information on current practice relating to geotechnical investigation methods and the determination of geotechnical parameters. The aim is to formulate proposals for the determination of characteristic values for use in limit state design.

Dr. Kenji Matsui of Japan and Dr. Trevor Orr of Ireland formulated the questionnaire.

A report on the outcome of this questionnaire will be tabled at the final meeting of the current Technical Committee in Istanbul, August 2001.

5 PLANNED ACTIVITIES

Two main activities are planned for the Committee's final year of office.

The first is to post all the National Reports on the LSD 2000 Conference web site. Once this has been done, the Committee will encourage all Member Societies who have not yet submitted a National Report to do so by July 2001.

All reports received by then will be converted into electronic format and recorded on CD-ROM. The CD-ROM will also include a review of the progress made on the implementation of limit state design in the various Member Societies, the identification of problems experienced and a comparison of the design approaches used. This will serve as a final report on the first three of the committee's Terms of Reference.

The final activity of the current TC 23 will be a committee meeting in Istanbul during the International Conference in August 2001. The purpose of this meeting will be to review the activities of the Committee over the last four years, to distribute the CD-ROM containing the National Reports and commentary thereon to the Member Societies, to receive the report on the survey questionnaire on determination of design parameters and to provide suggestions for the possible future work of the incoming committee.

6 CONCLUSIONS

In retrospect, the objectives set for TC 23 were somewhat ambitious. Nevertheless, four of the five objectives have been met either in full or to a significant extent.

The National Reports go a long way towards fulfilling the first three Terms of Reference for the committee namely the review of progress, identification of problems and comparison of design approaches. These reports will also form a valuable reference for code writers in ISSMGE Member Societies.

The fifth objective of the Committee, the arranging of an International Symposium, was achieved with the LSD 2000 Workshop held in Melbourne in November 2000.

No progress has been made on the sole remaining objective of encouraging dialogue between the technical committees of the major standards organisations.

Looking ahead, the next four years is likely to prove very interesting for limit state design in geotechnical engineering. During this period, it is expected that both Eurocodes 1 (basis of design) and Eurocode 7 (geotechnical design) will be finalised and adopted as full European Standards. This will be something of a relief not only to the code writers themselves but also to the countries who have been following the development of the Eurocodes. A number of countries who have been delaying the revision of their own geotechnical design codes are expected to reconsider their options once Eurocode 7 has been ratified. It is also expected that there will be keen interest in the Japanese Geotechnical Society's efforts to develop a comprehensive foundation design code and in the international workshop to be held in Kamakura, Japan in 2002.

7 ACKNOWLEDGEMENTS

TC 23 wishes to record its thanks to all members of the Committee. Special thanks is due to Dr. Kenji Matsui for his enthusiastic and tireless input as Secretary and to Dr. Niels Krebs-Ovesen for his wise counsel and generous assistance with the compiling of the proceedings of the LSD 2000 Workshop.