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# Report of TC32: Engineering Practice of Risk Assessment and Management

## Rapport du CT32: Pratique de l'analyse et gestion du risque

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### ABSTRACT

The Technical Committee 32 (TC32), “Engineering Practice of Risk Assessment and Management Committee”, of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE) is charged with promoting and enhancing professional activities in geotechnical and geo-environmental engineering in areas related to geostatistics and probabilistic site characterization, quantification of uncertainties in performance prediction, reliability-based design, risk-based decision analysis and calibration of LRFD-type geotechnical design codes. This report provides a brief summary of the TC32 activities during the period 2005 – 2009.

### RÉSUMÉ

Le comité technique 32, “Pratique de l'analyse et gestion du risque”, de la Société Internationale de Mécanique des Sols et Fondations (SIMSF) a pour objectif de promouvoir et augmenter les activités professionnelles géotechniques et géo-environnementales relatives aux géostatistiques et la caractérisation probabilistes des sites, la quantification des incertitudes dans la prévision de la performance, le dimensionnement probabiliste, l'analyse de décision basée sur le risque et la calibration de codes géotechniques de type LRFD. Ce rapport donne un bref résumé des activités du CT32 durant la période 2005 – 2009.

Keywords : TC32, risk assessment, risk management

## 1 TERMS OF REFERENCE OF TC32

The terms of reference of TC32 for the period 2001 – 2005 were agreed upon by the Core Members in March 2002. In the TC32 meeting held in September 2005, in Osaka, Japan, in conjunction with 16<sup>th</sup> ICSMGE, it was agreed the terms of reference would remain the same for the period 2005-2009. The terms of reference are listed below.

The goals of TC32 are to promote and enhance professional activities and education in geotechnical and geo-environmental engineering, in areas related to:

- Geostatistics and probabilistic site characterisation
- Quantification of uncertainties in performance prediction
- Reliability-based design
- Risk-based decision analysis
- Calibration of LRFD-type geotechnical design codes

These goals are to be achieved through the following activities:

- Arrange special sessions and short courses in connection with relevant international conferences and seminars.
- Create and maintain Glossary of risk terms and definitions.
- Develop Guidelines for risk assessment and management in geotechnical engineering.
- Liaison and co-operation with other risk-related committees.
- Provide relevant information on the web to the geotechnical community.

## 2 MEMBERS OF TC32

### 2.1 Core members

The core members of TC32 during 2005 – 2009 are listed below.

*Chair:* Farrokh Nadim (Norway)

*Secretary:* Gordon A. Fenton (Canada)

*Core Members:*

Abdelmalek Bekkouche (Algeria)  
Albert Bolle (Belgium)  
Ken Ho (Hong Kong)  
Mark Jaksa (Australia)  
Eric Leroi (France)  
E.h. Manfred Nussbaumer (Germany)  
Marcus Pacheco (Brazil)  
Kok Kwang Phoon (Singapore)  
Bill Roberds (USA)

### 2.2 Regular members

The regular members of TC32 during 2005 – 2009 are listed below.

*Members:*

M.A. Aldungarov (Kazakhstan)  
Laurie Baise (USA)  
Laura Caldeira (Portugal)  
Ed Calle (Netherlands)  
Leonardo Cascini (Italy)  
Sarvesh Chandra (India)  
Zuyu Chen (China)  
Paul Cools (Netherlands)  
Kreshnik Dautaj (Albania)  
Youcef Houmadi (Algeria)

Leena Korkiala-Tanttu (Finland)  
 Bak Kong Low (Singapore)  
 Sanda Manea (Romania)  
 Miroslav Marenc (Croatia)  
 Laszlo Nagy (Hungary)  
 Mahyar Nourbaksh (Iran)  
 Anthony O'Brien (UK)  
 H. Ohtsu (Japan)  
 Hyuck Jin Park (Korea)  
 Wojciech Pula (Poland)  
 V.I. Sheinin (Russia)  
 Marc Smith (Canada)  
 Pierre van der Berg (South Africa)  
 William Vargas (Costa Rica)

### 3 TC32 ACTIVITIES DURING 2005 – 2009

#### 3.1 Website

The activities of TC32 in the period 2005 – 2009 are described on the TC32 web site:

<http://www.engmath.dal.ca/tc32/>

#### 3.2 Meeting(s)

One TC32 meeting were held prior to the 17<sup>th</sup> ICSMGE in Alexandria. The meeting was held on Tuesday, 13 September 2005, in Osaka, Japan, in conjunction with 16<sup>th</sup> ICSMGE. The minutes of the meeting are posted on the TC32 web site.

#### 3.3 Glossary of terms for risk assessment and management

One of the most significant achievements of TC32 has been the development of a general glossary of terms for risk assessment and management. After over a decade of discussions, the "official" TC32 glossary of terms for risk assessment and management was finally agreed upon and issued in December 2004.

The glossary of terms, which is posted on the TC32 web-site, needs to be updated as many new terms have entered the common vocabulary of risk management science in recent years because of the increased focus on the impacts of climate change and disaster risk reduction.

#### 3.4 Liaison with other groups

TC32 has liaison with following groups:

- ASCE GeoInstitute's Risk Assessment and Management Committee, which is chaired by Prof. Hsein Juang of Clemson University. TC32 Core Members K.K. Phoon, W. Roberds and G. Fenton are long-standing members of this committee.
- Joint Committee JTC1 of ISSMGE – IAEG – ISRM on Landslides (chaired by Prof. Willy Lacerda, Brazil).
- Joint Committee on Structural Safety (chaired by Prof. Michael H. Faber, Switzerland).

#### 3.5 Conferences and symposiums

TC32 collaborated with TC23 in organizing IS-Gifu 2009 symposium (2nd ISGSR) in Gifu, Japan, June 2009. This was one of the series of conferences that have been organized through close international collaborations.

IS-Gifu 2009 is considered as a continuation of a series of symposiums and workshops on geotechnical risk and reliability: LSD2000 (November 2000, Melbourne, Australia), IWS Kamakura (April, 2002, Tokyo and Kamakura, Japan),

LSD2003 (June, 2003, Cambridge, USA), Georisk 2004 (November, 2004, Bangalore, India), Taipei2006 (November, 2006, Taipei), 1<sup>st</sup> ISGRS (October, 2007, Shanghai).

The international collaborations concerning these symposiums and workshops included the following activities: Technical Committee 23 'Limit state design in geotechnical engineering practice' (chair: Y. Honjo 2002-2009) and TC32 'Risk assessment and management in geotechnical engineering practice' of ISSMGE, ASCE GeoInstitute's Risk Assessment and Management Committee, and GEOSNet (Geotechnical safety network, president: K.K. Phoon 2006-2009).

#### 3.6 Guidelines for geotechnical risk assessment and management

In September 2005, TC32 issued draft guidelines for risk assessment and management. The draft guidelines are available on the TC32 website:

[http://www.engmath.dal.ca/tc32/2005/Draft\\_Guidelines\\_for\\_Geotechnical\\_Risk.pdf](http://www.engmath.dal.ca/tc32/2005/Draft_Guidelines_for_Geotechnical_Risk.pdf)

#### 3.7 Call for case histories

Although the theory and methodology of risk assessment in geotechnical engineering are reasonably well developed, they remain, to some extent, inaccessible to practice. Added to this problem is the proliferation of commercial programs which provide 'black-box' risk assessments that are too often taken at face value without a proper appreciation for the issues involved. The blind use of such programs, without an understanding of the results, could lead to faulty conclusions and wrong decisions.

In addition, many geotechnical engineers do not appreciate what risk assessment and management can do for them. To illustrate the power of risk assessment in practice, TC32 plans to collect a series of case histories illustrating the use of risk assessment and what value a risk assessment brings to each problem. As the TC32 Core Member Bill Roberds points out, "I've found that one of the biggest impediments in promoting risk assessment and risk management is to establish its 'value' to the client. By having case studies that focus on the value of risk assessment and risk management (assuming it is done correctly, per the document discussed above), we can increase the demand for risk assessment and risk management. Such case studies would also be useful in developing reasonable expectations for the results of such studies and for dispelling the notion that 'ignorance is bliss' with respect to liability for risks, which I've found are other impediments in promoting risk assessment and risk management."

TC32, working in collaboration with Geo-Institute's RAM Committee, is asking interested people to submit their case histories for review. The case histories will be posted on the TC32 (and G-I RAM's) web page as they come in.

As a guideline, each case history should include the following information: title, author and contact, keywords, objectives, approach, results, added value, and references.

Submitting authors are responsible for obtaining any necessary approvals, copyright releases, etc., for the case history. A template for the case history is provided at the TC32 web site:

[http://www.engmath.dal.ca/tc32/2005/Proposed\\_Case\\_Study\\_format\\_rev1.pdf](http://www.engmath.dal.ca/tc32/2005/Proposed_Case_Study_format_rev1.pdf)

## 4 RECOMMENDATIONS FOR FUTURE ACTIVITIES

The following activities are still on-going in TC32:

- Organising or sponsoring a prediction symposium.

- Developing a bibliography for risk assessment and management.
- Assembling an extensive set of case studies.
- Assembling a set of course notes.

The Core Members of TC32 strongly recommend that these activities are continued in the period 2009 – 2013.

## 5 CONCLUDING REMARKS

The members of the TC32 represent a broad global geographical distribution and varied professional interests. Although this broad representation is generally positive, it means that it is very difficult to arrange meetings of the technical committee in connection with conferences and symposia.

The TC32 members should start using the technologies and possibilities offered by Internet more actively and hold regular web-based meetings and discussions. This is especially important for the leadership and Core Members of TC32 if significant progress is to be made in achieving the ambitious goals of the technical committee.