Minutes for 23rd ISSMGE TC304 Meeting
3-7 October 2016 (email meeting)

Date: 3-7 October 2016
Time: Meeting closes as of 5:00 pm (Singapore, UTC/GMT +8 hours), 7 Oct 2016

1. **Approval of the 22nd TC304 minutes (APSSRA 2016 meeting, 28 May 2016)**

   The minutes are approved.

2. **Updates and matters arising from the previous meeting**

- TC304 survey questions to support project on "Creation and distribution of a global survey on the state of the art versus state of practice in the varied fields of geotechnical and geo-environmental engineering" initiated by Technical Oversight Committee (TOC) and the Corporate Associates Presidential Group (CAPG) – **final submission given in Annex**

- Joint TC205/TC304 Working Group on "Discussion of statistical/reliability methods for Eurocodes" (Brian, KK)

  - Interim reports have been posted for a **2-month open discussion**: http://140.112.12.21/issmge/tc304.htm.
  - The following discussion guidelines for these interim reports have been shared with all participants:
    - Discussion leaders could take onboard comments submitted informally through emails and revise report accordingly. There is room for alternate views to be presented in the form of "Discussion" and "Reply to discussion" described below.
    - Given the complex nature of this discussion, diverse views are to be expected. The standard journal practice for "Discussion" would be adopted. Any participant could submit a "Discussion" with title pointing to the report being discussed and author list to Jianye. Jianye would post this "discussion" paper below the relevant report. All participants, including the discussion leader, are invited to write a "Reply to discussion", although a reply is optional. Jianye will post the "Discussion", "Reply" and further responses in chronological order of receipt. We feel this would allow a more comprehensive capture of diverse views in a structured way. It will also add value to our eventual final report as these discussions could serve to clarify and stimulate further research.
    - Discussion leaders are encouraged to read other reports and add citations to other reports pointing to complementary work or even conflicting views, i.e. include relevant reports in their reference list. This will create some useful cross-links and cross commentaries between reports.

Lead discusser	Topic	Interim report
Malcolm Bolton	Limits of reliability analysis	Download powerpoint
Jianye Ching	Transformation uncertainties & multivariate soil data	Download report
Peter Day	Practical geotechnical design using reliability based design methods	To be posted

Kerstin Lesny	Evaluation and consideration of model uncertainties in reliability based design	Download report
Dianqing Li	Incorporating spatial variability into geotechnical reliability based design	Download report
BK Low	EXCEL-based direct reliability analysis and its potential role to complement Eurocodes	Download report
Sónia H. Marques	Imprecise probabilistic and interval approaches applied to partial factor design	Download report
Brian Simpson	Robustness	Download report
Yu Wang	Selection of characteristic values for rock and soil properties using Bayesian statistics and prior knowledge	Download report
Jie Zhang	Bayesian method: a natural tool for processing geotechnical information	Download report

  - Comments from TC205/TC304/GEOSNet/CEN TC250/SC7 due on Nov 30 2016
  - Final reports due March 2017
  - The "Joint TC205/TC304 Working Group on 'Discussion of statistical/reliability methods for Eurocodes' – Final Report" would be compiled for presentation in 19ICSMGE

- Georisk Special Issue on "Distinctive and Critical Elements in Geotechnical Risk and Reliability" (Yu Wang) – **published online** (**Volume 10, Issue 4, Dec 2016**)
  1. John T. Christian and Gregory B. Baecher, Sources of uncertainty in liquefaction triggering procedures
  2. Yu Wang, Oluwatosin Victor Akeju and Zijun Cao, Bayesian Equivalent Sample Toolkit (BEST): an Excel VBA program for probabilistic characterisation of geotechnical properties from limited observation data
  3. Wen-Chao Huang and Hong-Wen Yu, Variability of levee failure mechanisms subject to heavy rainfalls, case studies in Taiwan
  4. Jonathan C. Huffman, John P. Martin and Armin W. Stuedlein, Calibration and assessment of reliability-based serviceability limit state procedures for foundation engineering
  5. Jianye Ching, Kok-Kwang Phoon and Tsai-Jung Wu, Spatial correlation for transformation uncertainty and its applications
  6. Shin-ichi Nishimura, Toshifumi Shibata and Takayuki Shuku, Diagnosis of earth-fill dams by synthesised approach of sounding and surface wave method

- Phoon, KK & Retief, JV (2016). "Reliability of Geotechnical Structures in ISO2394", CRC Press/Balkema, Leiden, The Netherlands – **published**

- 10th Anniversary Issue for Georisk (**Scheduled for Volume 11, Issue 1, 2017**)
  1. Phoon K. K., Role of reliability calculations in geotechnical design
  2. Adeyemi Emman Aladejare & Yu Wang, Evaluation of rock property variability
  3. Richard J. Bathurst & Sina Javankhoshdel, Influence of model type, bias and input parameter variability on reliability analysis for simple limit states in soil-structure interaction problems
  4. Jinbo Chen & Robert B. Gilbert, Offshore Pile System Model Biases and Reliability
  5. J. Michael Duncan & Matthew D. Sleep, The Need for Judgement in Geotechnical Reliability Studies
  6. Ahmad Kahiel, Shadi Najjar, & Salah Sadek, Reliability-Based Design of Spread Footings on Clays Reinforced with Aggregate Piers

7. Sara Khoshnevisan, Lei Wang & C. Hsein Juang, Response Surface-Based Robust Geotechnical Design of Supported Excavation - Spreadsheet-Based Solution
8. Trevor Orr, Defining and selecting characteristic values of geotechnical parameters for designs to Eurocode 7
9. Iason Papaioannou & Daniel Straub, Learning Soil Parameters and Updating Geotechnical Reliability Estimates under Spatial Variability – Theory and Application to Shallow Foundations
10. Rita Sousa, Karim S. Karam, Ana Laura Costa & Herbert H. Einstein, Exploration and Decision Making in Geotechnical Engineering - A Case Study
11. Te Xiao, Dian-Qing Li, Zi-Jun Cao, Xiao-Song Tang, Full Probabilistic Design of Slopes in Spatially Variable Soils Using Simplified Reliability Analysis Method

- ASCE GSP in honour of Professor Wilson Tang – **scheduled for publication before Geo-Risk 2017** (ASCE GI-RAM; Eds.: Hsein Juang, Bob Gilbert, Limin Zhang, Jie Zhang, and Lulu Zhang)

- Special Collection on "Probabilistic site investigation" in ASME-ASCE Journal of Risk and Uncertainty in Engineering Systems (KK) – (**11 abstracts accepted**)

- 5th International Symposium on Reliability Engineering and Risk Management (ISRERM 2016), August 17-20 2016, Seoul, Korea (http://www.isrerm2016.org/)
    - Keynote lecture: KK Phoon, Geotechnical Design According to ISO2394:2015
    - Session: Geotechnical Engineering – 1 (Chairs: Yu Wang & Dongwook Kim)
    - Session: Geotechnical Engineering – 2 (Chairs: Kok-Kwang Phoon & Jae Hyun Park)

- 4th China National symposium on Engineering Risk and Insurance, Aug 26-28 2016, Wuhan University, Hubei, China (Hongwei, KK, Dianqing)
    - 76 papers are received and 43 papers are accepted (in Chinese)
    - A total of 220 attendees
    - Three TC 304 members (Dagang Lv, Yu Wang, Lulu Zhang) gave keynote lectures
    - Two special sessions (i: engineering risk and insurance; ii: uncertainty quantification and reliability analysis) were organized, each of which has 18 presentations

- Recent Trends in Geotechnical Engineering and Education, Workshop No. 3, September 15-16, Brisbane, Australia (D.V. Griffiths, Jinsong Huang) (http://rtgee.weebly.com/)
    - Statistics and Probabilistic Methods in Geotechnical Engineering– the Fundamentals (Short course, D.V. Griffiths)
    - Statistics and Probabilistic Methods in Geotechnical Engineering Applications and Case Histories (Invited talks, D.V. Griffiths, Jinsong Huang)

- ASCE Workshop on Resiliency of Urban Tunnels and Pipelines, Sep 1 2016, Reston, VA (Chairs: Michael Beer, Bilal Ayyub, Hongwei Huang)
    - Three topics were discussed: resiliency monitoring, robustness design, and uncertainty analysis.

3. Future activities in 2016/2017+

- Georisk 2017/ISGSR 2017, June 4-6 2017, Denver, Colorado (Conference Chair: Vaughan; Conference Co-Chair: Gordon)
    - Suzanne Lacasse Lecture "Bayesian thinking for geotechnical engineers" (Gregory Baecher)
    - Wilson Tang Lecture "Future directions in reliability-based geotechnical design" (Gordon Fenton)

- Keynote lecture "Performance of structures founded in spatially variable soil: a probabilistic SSI framework" (Armin Stuedlein)
- Discussion session on "Reports from Joint TC205/TC304 working group on "Discussion of statistical/reliability methods for Eurocodes" (KK, Brian, Jianye)
  - **Discussion leaders please email Jianye to confirm attendance as speakers**

- TC304/TC205/GI-RAM/GEOSNet mini-symposium "Reliability of geotechnical structures" in 12th International Conference on Structural Safety and Reliability (ICOSSAR2017), 6-10 August 2017, Vienna, Austria (KK, Jianye, Gordon) – (**12 abstracts accepted**)
  - Jianye Ching - A weakest-link model for the mobilized shear strength of a spatially variable soil mass
  - Wenping Gong, C. Hsein Juang, and James R. Martin, II - A Modified Importance Sampling Method for Estimating Failure Probability
  - Yoshida Ikumasa - Iterative Particle Filter for Bayesian Update of Model Parameters Rafael Jimenez - Tunnel convergences: Calibration with Bayesian methods and prediction of failure-times
  - Andy Leung - Effects of superstructure stiffness on the reliability of piled foundations on spatially variable soils
  - Dianqing Li - Characterization of statistical uncertainty in probabilistic model using bootstrap method for slope reliability analysis
  - Sónia Marques - Discussion on Imprecise Interval Approaches Applied to the Eurocode 7 Partial Factor Design
  - He-Qing Mu, Ka-Veng Yuen, Iok-Tong Ng - Prediction on Uniaxial Compressive Strength of Rock: Bayesian Inference and Outlier Analysis
  - Shin-ichi Nishimura - Risk Evaluation of Earth Dam Breaches due to Heavy Rains with Use of Response Surface Method
  - Chong Tang & KK Phoon - Model Uncertainty in Axial Helical Pile Capacity Calculations using Installation Torque
  - Giovanna Vessia - Random field theory applied to the prediction of the pile bearing capacity measured at Araquari site (Brazil)
  - Yu Wang - Quantification of Prior Information in Geotechnical Site Characterization Using Excel Add-in: Bayesian Equivalent Sample Toolkit (BEST)

- 19th International Conference on Soil Mechanics and Geotechnical Engineering (ICSMGE 2017), Sep 17-22 2017, Seoul, Korea (https://www.icsmge2017.org/)
  - Suzanne Lacasse Lecture (Farrokh Nadim)
  - Joint TC205/TC304 Workshop (Hyunki Kim)
    - Presentation and discussion of final reports from Joint TC205/TC304 working group on 'Discussion of statistical/reliability methods for Eurocodes'
    - **Discussion leaders please email Jianye to confirm attendance as speakers**

- TC304 Special session "Computational probabilistic geomechanics" in 15IACMAG, Oct 19-23 2017, Wuhan, China (KK, Dianqing, Michael Beer)
  - **Abstract should be submitted online before 15 Oct 2016** to: http://www.15iacmag.org/dct/page/65558

- International Symposium on Sustainability and Resiliency of Infrastructure (ISSRI 2016), Nov 9-12 2016, Taipei, Taiwan (http://www.issri2016.ntust.edu.tw/)
  - Keynote lecture: "Mobilized shear strength in spatially variable soils" (KK & Jianye)

4. **Other business**

- Directory of national reliability-based design (RBD) groups

  To strengthen and coordinate activities between TC304 and national groups, particularly those engaging in developing reliability-based design codes, we propose to maintain a directory at our TC304 website as a start. We welcome participation from anyone who are interested in RBD codes for geotechnical engineering – formal membership in national code committees is not necessary.

  The sample entries for Canada, The Netherlands, South Korea, and China would be posted in our TC304 website. Do submit other national entries to Jianye.

Country	Name	Affiliation	Email	Code committee(s)
Canada	Gordon Fenton	Dalhousie University	gordon.fenton@dal.ca	Canadian Highway Bridge Design Code
	Dennis Becker	Golder Associates	dennis_becker@golder.com	
	Dave Dundas			
	Richard Bathurst	Royal Military College of Canada	bathurst-r@rmc.ca	
The Netherlands	Schweckendiek, Timo	Deltares / Delft university of Technology	timo.schweckendiek@deltares.nl	Eurocode 7 (WG1/TG1), ENW (Dutch Expertise Network for Flood Protection), WBI2017 (Flood Defences)
	Kanning, Wim	Deltares / Delft university of Technology	wim.kanning@deltares.nl	WBI2017 (Flood Defences)
	Teixeira, Ana	Deltares	ana.teixeira@deltares.nl	WBI2017 (Flood Defences)
	Van der Krogt, Mark	Deltares	mark.vanderkrogt@deltares.nl	WBI2017 (Flood Defences)
	Calle, Ed	Deltares	ed.calle@deltares.nl	ENW (Dutch Expertise Network for Flood Protection)
	Hicks, Michael	Delft University of Technology	m.a.hicks@tudelft.nl	
	Vardon, Phil	Delft University of Technology	p.j.vardon@tudelft.nl	
	Jommi, Cristina	Delft University of Technology / Deltares	c.jommi@tudelft.nl	Eurocode 7 (WG3/TG4)
	Gavin, Ken	Delft University of Technology / Deltares	k.g.gavin@tudelft.nl	
	Van der Meer, Martin	Fugro	m.vandermeer@fugro.nl	ENW (Dutch Expertise Network for Flood Protection)
	Rijneveld, Ben	Fugro	b.rijneveld@fugro.nl	
	Jongejan, Ruben	Jongejan RMC	ruben.jongejan@jongejanrmc.com	ENW (Dutch Expertise Network for Flood Protection)
	Bisschop, Cor	Greenrivers	c_bisschop@hotmail.com	
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	De Visser, Marieke	Ministry of Infrastructure and the Environment	marieke.devisser@rws.nl	
	Koopmans, Rimmer	Arcadis	rimmer.koopmans@arcadis.nl	
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	Everts, Bert	ABT	bert.everts@abt.eu	
	Viehofer, Thomas	Royal Haskoning DHV	thomas.viehofer@rhdhv.nl	
	Tsimopoulou, Vana	Van Oord	vana.tsimopoulou@vanoord.nl	
	Vastenburg, Erik	HHNK (water board)	erik.vastenburg@hhnk.nl	
	Effing, Bas	Rivierenland (water board)	bas.effing@wsrl.nl	
South Korea	Park, Jae Hyun	Korea Institute of Civil Engineering and Building	jaehyeon@kict.re.kr	Committee Highway & cable stayed bridge design codes & Secretary_KGS

		Technology		Limit state design discussion group
	Kwak, Kiseok	Korea Institute of Civil Engineering and Building Technology	kskwak@kict.re.kr	Committee_Highway bridge design code & Chair, KGS Limit state design discussion group
	Chung, Choong Ki	Seoul National University	geolabs@snu.ac.kr	Committee_Highway bridge design code
	Lim, Jong Seok	Mokpo National University	jslim@mokpo.ac.kr	
	Kim, Byung Il	Myong Ji University	bikim@mju.ac.kr	
	Cho, Sung Min	Korea Expressway Coorperation	chosmin@ex.co.kr	
	Jung, Sang Seom	Yonsei University	soj9081@yonsei.ac.kr	Committee_Cable stayed bridge code
	Chung, Moonkyung	Korea Institute of Civil Engineering and Building Technology	mkchung@kict.re.kr	
	Yoon, Gil Lim	Korea Institute of Ocean Science and Technology	glyoon@kiost.ac.kr	Committee_Harbor and port design code
	Jung, Gyung Ja	Korea Expressway Coorperation	gjjung@ex.co.kr	
	Kim, Dongwook	Incheon National University	wookdong2@gmail.com	
	Kim, Hyun Ki	Kookmin University	geotech@kookmin.ac.kr	
	Huh, Jungwon	Chonnam National University	jwonhuh@jnu.ac.kr	
China	Huang, Hongwei	Tongji University	huanghw@tongji.edu.cn	China National Code for risk management of underground works in urban rail transit
	Li, Jie	Tongji University	lijie@tongji.edu.cn	
	Jin, Weiliang	Zhejiang University	jinwl@zju.edu.cn	
	Gong, Jinxing	Dalian University of Technology	gong_jx.vip@eyou.com	
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	Li, Dianqing	Wuhan University	dianqing@whu.edu.cn	
	Zhang, Lulu	Shanghai Jiaotong University	lulu_zhang@sjtu.edu.cn	
	Jin, Xinyang	China construction science research institute	jinxinyang@cabrtech.com	
	Zhao, Jida	China construction science research institute	zhaojida@cabrtech.com	Unified standard for reliability design of building structures
	Lv, Dagang	Harbin institute of technology	ludagang@hit.edu.cn	Unified standard for reliability design of building structures
	Zhang, Yuling	China academy of railway science	zyl@rails.com.cn	
	Cao, Zijiun	Wuhan University	zijuncao@whu.edu.cn	
Portugal	Sónia H. Marques	Faculdade de Engenharia da Universidade do Porto (FEUP)	sonia.h@fe.up.pt	

Annex

International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE)
Global survey on the state of the art versus state of practice in the varied fields of geotechnical and geo-environmental engineering

TC304 - Engineering Practice of Risk Assessment and Management

Principal theme – Reliability- and risk-informed decision making for design, assessment, and management of geotechnical systems over their service life

'Hot topics' in the practice –

1. Value of reliability- and risk-informed decision making in practice
2. Geotechnical databases and probability models
3. Practical methods to manage geotechnical risk for real-world problems (semi-probabilistic, reliability-based, risk-informed)

Questions related to above 'hot' topics –

1. Have you adopted a reliability- or risk-informed method for design, assessment, and/or management of a geotechnical project?
    a. If YES, provide some project details and highlight how your method complements the factor of safety approach?
    b. If NO, what are your reservations or concerns?
2. In relation to bridging state-of-the-art and state-of-practice, which aspect(s) of reliability- or risk-informed decision making deserve the most attention (e.g. role of engineering judgment, selection of characteristic value, statistical interpretation of site data and other geotechnical data, target reliability/risk level, Bayesian observational approach, codification versus site-specific needs)?
3. What are the top 3 items in your wish list that you feel would facilitate adoption of reliability- or risk-informed decision making in geotechnical practice (e.g. statistical guidelines, databases, softwares, short courses, clearer design standards/codes, case studies, bibliography)

Follow-on questions –

1. Which topics do you prefer to read about in a State of Practice (SOP) report on reliability- or risk-informed decision making for geotechnical engineering?
2. What activities should TC304 engage in to bridge state-of-the-art and state-of-practice?
3. What are the grand challenges in the state-of-the-art that will exercise the greatest societal impact?