

Minutes for 40th ISSMGE TC304 Meeting (Email meeting)

Date: April 18-22 (Mon-Fri)

Time: Meeting closes as of 5:00 pm (China Standard Time, GMT +8 hours), April 22 2022

1. Approval of the 39th TC304 minutes (Email meeting)

Minutes are approved.

2. Succession plan of TC304

- Because many members supported Prof. Michael Hicks and no one proposed other candidates, Jianye Ching will propose Prof. Michael Hicks to ISSMGE Technical Oversight Committee and (new) ISSMGE President.

3. ISSMGE Outstanding Technical Committee Award

- TC304 has recently won the ISSMGE Outstanding Technical Committee Award for this presidential term (2017-2022). This is the second time TC304 wins this rare honor since its inauguration in 2013 (the first time was the term during 2009-2013). Prof. Armin Stuedlein will attend the award ceremony to receive the award on behalf of TC304.

4. Activities in the past six months (conferences, short courses, awards, keynotes, and special issue)

3.1 Highlighted activities

- ISSMGE launched the Time Capsule Project (TCP). Each TC is responsible to produce a historical document that describes its past <https://www.issmge.org/the-society/time-capsule>
- TC304 has prepared the following two Time Capsule Project (TCP) documents:
 - Time capsule for geotechnical risk and reliability (Marcin Chwała, KK Phoon, Marco Uzielli, Jie Zhang, LM Zhang & J Ching):
 - PDF file
https://www.dropbox.com/s/g28v3lwmgzopige/TCP_geotech_risk_reliability.pdf?dl=0
 - Summarizing PPTs
https://www.dropbox.com/s/4rmciwdunvzxogd/PPT_geotech_risk_reliability.pptx?dl=0
 - Time capsule for landslide risk assessment (Lei Yu, J Huang, Yifei Cui, Shui-Hua Jiang, Shengnan Wu & J Ching):
 - PDF file
https://www.dropbox.com/s/plnsg7rrk9zcpdo/TCP_landslide_risk_assessment.pdf?dl=0
 - Summarizing PPTs
https://www.dropbox.com/s/ltgc5uo6og5crle/PPT_landslide_risk_assessment.pptx?dl=0

- Review papers/reports related to TC304 have been published in journals:
 - The story of statistics in geotechnical engineering (KK Phoon):
 - <https://www.tandfonline.com/doi/abs/10.1080/17499518.2019.1700423?journalCode=ngrk20>
 - Challenges in geotechnical design revealed by reliability assessment: Review and future perspectives (Yu Otake & Yusuke Honjo)
 - <https://www.sciencedirect.com/science/article/pii/S0038080622000373>
 - State-of-the-art review of inherent variability and uncertainty in geotechnical properties and models (J Ching & Timo Schweckendiek)
 - http://140.112.12.21/issmge/2021/SOA_Review_on_geotechnical_property_variability_and_model_uncertainty.pdf
- Massive Open Online Courses (MOOC) on “Probability Analysis in Civil Engineering” in ISSMGE virtual University (Jie Zhang)
 - <https://www.issmge.org/news/new-tc304-course-on-probability-analysis-in-civil-engineering-by-dr-jie-zhang>

3.2 Special issues

- Special issue on Data analytics in geotechnical and geological engineering has been released in Georisk as Volume 16 Issue 1 in Feb. 2022 (Y Wang, WG Zhang, XH Qi & J Ching)
 - 10 contributions
- Special Collection of the ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems: Part A on “Bayesian Learning Methods for Geotechnical Data” (Kelvin Yuen, Jianye Ching & Kok-Kwang Phoon)
 - Seven contributions
 - https://ascelibrary.org/ajrua6/bayesian_methods_geotechnical
- TC304 Special issue in International Journal of Geoengineering Case histories (Andy Leung)
 - 8 contributions
- TC304 contributions to ISSMGE Virtual University
 - TC304 Young Group has set seven topics for short videos (about 15 min each) introducing different aspects of geotechnical risk and reliability. Target audience would be practicing engineers and students.
 - SV1: Overview and significance of geotechnical uncertainty (Waldemar Hachich)
 - SV2: How to characterize site/model uncertainty (Zijun Cao)
 - <http://virtualuniversity.issmge.org/courses/course-v1:ISSMGE+TC304-103+2020/course>
 - SV3: How to estimate characteristic values for design (Yu Wang)
 - <http://virtualuniversity.issmge.org/courses/course-v1:ISSMGE+TC304-101+2019/about>
 - Examples by Zijun (in preparation)
 - SV4: How does geotechnical uncertainty impact the system response (TBA)
 - SV5: How to perform reliability analyses on a spreadsheet (Lei Wang)
 - <http://virtualuniversity.issmge.org/courses/course-v1:ISSMGE+TC304-104+2021/about>
 - SV6: Insights from geotechnical reliability-based design (BK Low)

- <http://virtualuniversity.issmge.org/courses/course-v1:ISSMGE+TC304-102+2020/about>
- SV7: Deterministic and probabilistic case analyses of slopes (Bak Kong Low)
 - <http://virtualuniversity.issmge.org/courses/course-v1:ISSMGE+LM101+2021/course/> (under “Landslides and Mitigations”)
- SV8: Case studies for reliability-based design and risk assessment (TBA)

3.3 Conferences

- Machine Learning & Risk Assessment in GeoEngineering (MLRA 2021) - Joint International Symposium of Two Events: 3rd International Symposium on Machine Learning and Big Data in Geosciences (3ISMLG) & TC304 Workshop on Risk Assessment in Geoengineering (TCWW 2021), Oct 25-27 2021 (Wojciech Pula, Isam Shahrour & Giovanna Vessia)
 - TC309/TC304 Contest (groundwater time-series forecasting) in MLRA2021, Oct 25-28 2021, Wroclaw, Poland
 - <http://140.112.12.21/issmge/tc304.htm?=10>
 - TC309/TC304 Contest (groundwater time-series forecasting) in MLRA2021, Oct 25-28 2021, Wroclaw, Poland
 - <http://140.112.12.21/issmge/tc304.htm?=10>
- The 3th International Symposium on Testing and Monitoring of Tunnel and Underground Engineering, October 15-17 2021, Central South University, Changsha, China (Chairs: Hongwei Huang & Helin Fu)
 - Hybrid conference with both in-person and remote online presentations
- ASCE G-I Geo-congress 2022, Charlotte, NC, March 20 2022 – March 23 2022.
 - Session on Risk Assessment and Management (Hui Wang & Lei Wang)
 - 6 papers submitted and reviewed
- The 2nd international Workshop on numerical simulation methods for large deformation problems in geotechnical engineering, September, 18th to 19th, 2021, Tongji University, Shanghai, China (Chair: Hongwei Huang).
 - Hybrid mode
 - Speakers: 30 well-known experts and scholars from more than 20 universities
 - Participants: 1500 participants from 50 institutes from 10 countries.
- 2022 United States Society on Dams (USSD) Annual Conference & Exhibition, April 11-14, 2022, San Diego, CA, USA.
 - Technical Session on Dam Safety - Risky Business, organized by Chris Regilski (Bureau of Reclamation) and Lei Wang (University of the District of Columbia)
 - Four papers presented

3.4 Keynotes

- Mark Jaksa, keynote on “Site investigation optimisation that adopts machine learning” at MLRA2021, Oct 25-28 2021
- Jianye Ching, keynote on “MUSIC-3X: A Case History” at MLRA2021, Oct 25-28 2021
- Armin W. Stuedlein, “Some Critical Observations regarding the Seismic Response of Rigid Inclusions,” 46th Annual Meeting of the Deep Foundations Institute, October 12-15, 2021, Las Vegas, Nevada
- Jinsong Huang, keynote on “Use of Probabilistic Methods in Geotechnical Engineering”, 2021 Australian Geomechanics Society Victorian Symposium, October 21, 2021.

- Vaughan Griffiths, a module on “Slope Stability Analysis” at the annual iRALL (International Research Association on Large Landslides) to be hosted by the SKLGP, Chengdu University of Technology, Chengdu (October 2021)
- Armin W. Stuedlein, “Driven Displacement Pile Ground Improvement for Liquefaction Mitigation,” Piling and Ground Improvement Conference 2022, February 23-25, 2022, Sydney, Australia, Deep Foundations Institute
- Hongwei Huang, “Smart sensing on the safety of geo-structural system”, Future of Geotechnics - Technology, AI, Big Data, October 5th, 2021, ISSMGE, online.
- Hongwei Huang, “The development of WSN monitoring for infrastructure safety”, International Workshop on Smart Instrumentation & Monitoring, October 20th, 2021, Geotechnical Society of Singapore (GeoSS), Online.
- Hongwei Huang, “Computer-Vision-Based(CVB) Rock Mass Intelligent Rating for Tunnel”, The 11th Asian Rock Mechanics Symposium in Beijing, International Society for Rock Mechanics, October 21th to 25th, 2021, Online
- Hongwei Huang, “Resilience Analysis and Intelligence Enhancement of Networked Underground Infrastructure”, Shanghai Summit on Global Urban Underground Space Development and Utilization (FUUS2021), October, 31th, 2021, Shanghai, China.
- Adrian Rodriguez-Marek and Ellen Rathje. “Site Response Analysis for Nuclear Facilities.” State-of-the-Art Lecture. 2022 GeoCongress, Charlotte, North Carolina, USA. March 21, 2022.
- Vaughan Griffiths, Panelist on “Risk Informed Decisions in Geotechnical Engineering” at the Geo-Congress, Charlotte, NC, March 2022

3.5 Short courses

- Vaughan Griffiths, short course on “Risk Assessment in Geotechnical Engineering” at the upcoming G-I Specialty Conference Geo-Extreme 2021 (November 2021)

3.6 Books

- Textbook/Monograph: "Reliability-Based Design in Soil and Rock Engineering: Enhancing Partial Factor Design Approaches", by Bak Kong Low, CRC Press, published on 1-Nov-2021, 399 Pages, ISBN 9780367631390.
- Textbook “Geotechnical Reliability Analysis: theories, methods, and algorithms” by Jie Zhang, Te Xiao, Jian Ji, Zijun Cao & Peng Zeng, Tongji University Press, published in 2021
- Monograph “Model Uncertainties in Foundation Design” by Tang Chong and KK Phoon, CRC Press, published in 2021 (20% discount code available on request)
- Marco Uzielli, as requested by the editors of Italian Geotechnical Journal, performed a Book review on “Model Uncertainties in Foundation Design” by Chong Tang and Kok-Kwang Phoon. The book review will be published in the 2021 September issue of Italian Geotechnical Journal

3.7 Design codes

- CHBDC (Canadian Highway Bridge Design Code) Section 6 Technical Subcommittee on “Foundations and Geotechnical Systems”, Part of the ongoing work on the geotechnical design provisions to appear in the next edition of CHBDC (2025), Chaired by Gordon Fenton
- NBCC (National Building Code of Canada) Task Group on Geotechnical Design, Chaired by Gordon Fenton
- Greg Baecher and Bob Gilbert are involved with the development of a primer and direction-setting document on reliability-based methods for ASCE-7 (the structural code guidance by ASCE) under the sponsorship of Jean-Louis Briaud, who is now President of

the overall ASCE organization. The target is to have a draft ready for review by the G-I by the end of the year.

3.8 Research institute

- Establishment of international center and hosting of international cooperative scientific research, November 14th, 2021, Tongji University, Shanghai, China (Director: Hongwei Huang) & Inaugural Meeting of International Joint Research Center for Resilient Infrastructure & 1st International Workshop on Resilient Infrastructure in Tongji University. (Hybrid) (Chair: Hongwei Huang)

5. Future Activities

Please email updates to Jie Zhang (cezhangjie@tongji.edu.cn) for compilation

4.1 Conferences & workshops

- 13th International Conference on Structural Safety & Reliability (ICOSSAR 2021), Jun 22-24 2022, Tongji University, Shanghai, China
 - <http://www.icossar2021.org/>
 - Important dates
 - Full paper due: Oct 31 2021
 - TC304 Sessions
 - Bayesian analysis of structural and geotechnical models (Iason Papaioannou, Costas Papadimitriou, Daniel Straub, Jie Zhang) (6 paper submitted)
 - Hazard and risk assessment of earthquake-induced landslides (Cong Xu & Qing Lü) (2 paper submitted)
 - Machine learning and data analytics in geotechnical site investigation (Yu Wang & Hui Wang) (8 papers submitted)
 - Multi-source and multi-methodological data fusion to improve the reliability of geo-engineering and environmental characterization, urban planning, and geotechnical designing (Di Curzio Diego, Castrignanò Annamaria, Pula Wojciech & Vessia Giovanna) (4 paper submitted)
 - Uncertainty characterization of the geological model and its influences (Wenping Gong & Lei Wang) (2 paper submitted)
- 20th International Conference on Soil Mechanics and Geotechnical Engineering (ICSMGE 2022), May 1-5 2022, Sydney, Australia
 - <https://icsmge2021.org/>
 - TC304/TC309 joint workshop on "From geotechnical databases to data analytics: challenges and perspectives" (J Huang, Mohammad Rezaia, J Ching & Zhongqiang Liu)
 - 10 presentations
 - TC304-TC309 Pre-conference Workshop on "Risk Assessment and Machine Learning in Geotechnical Engineering"
 - Time: 1240-1630pm AEST, May 1, 2022 (free for all; Zoom link will be sent to TC304 members when it is ready together with the workshop program)
 - TC304 virtual session #1 on "Modeling and quantification of geotechnical variability and uncertainty"
 - Time: 1630-1730pm AEST, May 4, 2022, virtual meeting for ICSMGE registrants)
 - TC304 virtual session #2 on "Geotechnical risk and reliability in practice"

- Time: 0945-1045am AEST, May 5, 2022, virtual meeting for ICSMGE registrants)
 - TC304 in-person session (physical meeting during ICSMGE; see the conference program for detail)
- 4th International Conference on Information Technology in Geo-engineering (4ICITG), July 2022, Singapore
 - TC304 Session
 - Data analytics in geotechnical and geological engineering (Y Wang, WG Zhang, XH Qi & J Ching)
 - 8 contributions
- ISGSR2022, Dec 14-16 2022, University of Newcastle, Newcastle, Australia (Jinsong Huang)
 - Call for session proposals: August 31, 2021
 - Session proposals due: September 30, 2021
 - Call for abstracts: October 31, 2021
 - Abstracts due: November 30, 2021
 - Acceptance of abstracts: December 31, 2021
 - Draft full paper due: February 28, 2022
 - Draft paper review comments due: March 31, 2022
 - Deadline for final papers: April 30, 2022
 - Publish final technical program: May 31, 2022
 - Submit material to publisher: August 31, 2022
 - Host conference: December 14-16, 2022
 - Dec 14 2022: Short course & registration
 - Dec 15-16 2022: conference
- 8th International Symposium on Reliability Engineering and Risk Management (ISRERM), Sep 4 - 7 2022, Leibniz University Hannover, Hannover, Germany (Michael Beer, Enrico Zio, Kok Kwang Phoon & Bilal M. Ayyub)
 - TC304 Geotechnical related session (Timo Schweckendiek & J Ching)
 - 14 submissions
- Geo-Risk 2023, July 23-26 2023, Arlington, Virginia, USA (Geo-Institute RAM) (Chaired by Shadi Najjar, LM Zhang, R.B. Gilbert)
 - <http://www.geo-risk.org/>
 - Abstract due May 20 2022
 - Conference begins July 23 2023
- 17th International School on "LAndslide Risk Assessment and Mitigation" LARAM 2022, 5-16 September, Salerno, Italy (Michele Calvello)
 - hybrid mode, with some students and teachers connected online
 - <https://www.laram.unisa.it/school/2022hybrid/2022hybrid>
 - PARTICIPANTS: 40 selected PhD students, 10 registered Young Doctors (PhD defended not before 2017)
 - DEADLINE: Monday 30 May 2022 (PhD Applications, Young Doctors Registrations)
 - REGISTRATION FEE: € 250 (PhD students), € 400 (Young Doctors)

4.2 Special issues

- Special Collection of the ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems: Part A on “Benchmarking Data-Driven Site Characterization Methods” (KK Phoon & Takayuki Shuku)
 - Contact Takayuki (shuku@cc.okayama-u.ac.jp) if you are keen to submit a paper
 - Timelines
 - Deadline of submission: 1 Apr 2022
 - Decision of all papers: 1 Aug 2022
- Special Issue of Gondwana Research on “Advances in Data-Driven Models in Geosciences” (WG Zhang)
 - 12 contributions
- Special Issue of Probabilistic Engineering Mechanics on “Data-Centric Foundation Engineering Using Statistics” (KK Phoon and Chong Tang)
 - 10 – 14 contributions
 - Deadline: May 2022
 - <https://www.journals.elsevier.com/probabilistic-engineering-mechanics/call-for-papers/special-issue-on-data-centric-foundation-engineering-using-statistics>
- Special issue of Georisk on “Risk and reliability in offshore geotechnics” (Farrokh Nadim, Hendrik Sturm, Jie Zhang, Jinhui Li)
 - Contact Jie Zhang (cezhangjie@tongji.edu.cn) if you are keen to submit a paper
 - Timelines
 - Deadline for submissions: 31 October 2022
 - Decision of all papers: 30 April 2022
- Special Issue on “Geological Uncertainty and Its Impact on Geohazards and Water Resources Assessments and Infrastructure Design” in Engineering Geology (Chuen-Fa Ni, Chih-Chung Chung, Limin Zhang, Yu Wang, Jia-Jyun Dong)
 - Deadline of submissions: February 2022
 - 22 submissions

4.3 Keynotes & short courses

- Armin W. Stuedlein, theme lecture on “On the In-Situ Seismic Response of Medium Dense Sand and Comparison to Cyclic Stress- and Strain-based Laboratory Behavior,” 4th International Conference on Performance-based Design in Earthquake. Geotechnical Engineering (PBD-IV), July 15 -17, 2022, Beijing, China
- Hongwei Huang, keynote lecture on "Why and How Shield Tunnel can be Resilient: From Componential to Systematic Perspective", 8th International Symposium on Reliability Engineering and Risk Management (ISRERM), Sep 4 - 7 2022, Leibniz University Hannover, Hannover, Germany
- Hongwei Huang, invited lecture on "Machine-Vision-Based (MVB) Safety Risk Assessment on Rock Tunnel", International Symposium on Intelligent Geotechnics , June 10-11, 2022, Hong Kong, China.
- Vaughan Griffiths, 7th Wilson Tang Lecture to be delivered at the 8th ISGSR conference, December 2022, Newcastle, NSW, Australia
- Vaughan Griffiths & Jinsong Huang, 2-day industry short course on “Probabilistic Methods in Geotechnical Engineering” to Douglas Partners in Newcastle, NSW, June/July 2022
- Vaughan Griffiths, a course module (16 hours) on “Risk Assessment in Geotechnical Engineering” offered to graduate students at the SKLGP, Chengdu University of Technology, China, August 2022

- Vaughan Griffiths, 1-day short course on “Risk Assessment in Geotechnical Engineering” offered to the Pittsburgh, PA Chapter of the Geo-Institute, USA, October 2022

4.4 Books

- Monograph “Big Data in Geotechnics” by KK Phoon, Chong Tang & J Ching, in preparation
- Textbook “Soil mechanics and foundation engineering” 2nd Edition (in Chinese), by Lulu Zhang et al., China Construction Industry Press, to appear in 2022
- Book chapter on "Limit State Design" that will be appearing in the 5th edition of the Canadian Foundation Engineering Manual (to appear in Oct 2022) by Gordon Fenton

4.5 Popular science book

- Guide for traveling in an uncertain world: what is the risk? (In Chinese) (Jie Zhang & Hongwei Huang), To appear in Aug 2022

6. Other businesses

- 304dB database (<http://140.112.12.21/issmge/tc304.htm?=6>)
 - Expansion of 304dB
 - Six sets of new load test databases (Tang Chong & KK Phoon)

Database/Reference	Limit state	Soil type	N	Pile geometry	
				B (m)	D/B
NUS/ShalFound/950	Bearing	Clay	56	0.3-5	0-5.7
		Sand	427	0.25-7	0-6.1
	Tension	Clay	123	0.31-3.05	0.8-13.2
		Sand	313	0.1-2.5	0.5-14.5
	Punch-through	Sand-over-clay	31	0.8-3	0.5-3
NUS/Spudcan//212	Punch-through	Multi-layer clays with sand	140	3-20	0.16-1.17
		Multi-layer clays with stiff layer	72	3-12	
NUS/DrilledShaft/542	Bearing	Clay	64	0.32-1.52	1.6-56
		Sand	44	0.35-2	5.1-59
		Grave;	41	0.59-1.5	6.2-30
	Tension	Clay	32	0.36-1.8	3.4-55
		Sand	30	0.3-1.31	2.5-43
		Gravel	109	0.43-2.26	1.77-17.3
NUS/DrivenPile/1243	Bearing	Clay	47	0.28-0.41	16-95
		Sand	52	0.28-0.42	22-110
		Mixed	50	0.28-0.42	17-85
	Bearing	Clay	175	0.1-0.81	7.9-200
	Tension		64	0.1-0.81	12-110
	Bearing	Sand	134	0.14-0.76	13-251
	Tension		28	0.25-0.76	19-84
NUS/RockSocket/721	End bearing	Rock	270	0.1-2.5	1-31.3
	Shaft shearing	Rock	544	0.2-3.2	0-19.5
NUS/HelicalPile/1113	Bearing	Clay	270	0.21-1.02	6-74
		Sand	181	0.21-1.02	6-110
	Tension	Clay	165	0.21-0.91	12-48
		Sand	121	0.21-0.91	10-62

- Review of ASTM standards on Geostatistics (Armin)

- OVERVIEW: Gerald Verbeek, Chair of ASTM Committee D18.01, Committee for Surface and Subsurface Characterization has engaged TC304 to assist with the review of standards related to geostatistics
- The four standards (available on request) to be reviewed include:
 - D5924 – 18: Selection of Simulation Approaches in Geostatistical Site Investigations
 - D5549 – 19: Contents of Geostatistical Site Investigation Report
 - D5922 – 18: Analysis, Interpretation, and Modeling of Spatial Variation in Geostatistical Site Investigations
 - D5923 – 18: Selection of Kriging Methods in Geostatistical Site Investigations
- The main phase of standard review by four review groups has been completed:
 - D5549-19 (Group Leader Mark Jaksa)
 - D5922-18 (Group Leader Yu Wang)
 - D5923-18 (Group Leader Giovanna Vessia)
 - D5924-18 (Group Leader Lulu Zhang)
- TC250/SC7/TG-C3 Reliability-based methods (Timo)
 - guideline document for reliability-based verification of limit states in geotechnical design and assessment
 - to be published as JRC Technical Report (EU Joint Research Centre)
 - task group with 28 members from 14 European countries (TG leader: Timo Schweckendiek)
 - planning milestone: draft report ready by September 2022
- Working group on the application of reliability-based design methods for geotechnical engineering within the German Geotechnical Society (DGGT). (Patrick Arnold)
 - The group will start working in May 2022
 - Lead by Kerstin Lesny (member of TC 205) and joined (amongst others) by Isaon Papaioannou, Timo Schweckendiek, Axel Möllmann and Patrick Arnold (members of the TC 304)
 - Mission: As RBD-methods will become an integral part of the new EC 7, the main aim of the working group is to bridge the gap between the available theoretical methodologies and tools and the engineering practice, as RBD-methods never made it into the geotechnical engineering practice nor the national design guidelines and standards in Germany. The working group will try to raise the awareness of the possibilities and limitations of RBD-methods by compiling new guideline documents, organizing workshops and developing education platforms for both students and practicing engineers.