Minutes for 30th ISSMGE TC304 Meeting
(6 ISRERM)

Date: June 1, 2018
Time: 17:00 – 18:30 pm
Venue: Cardamom room at Shaw Foundation Alumni House, National University of Singapore

Attendees: Jianye Ching (Chair), Armin Stuedlein (Vice Chair), Zijun Cao (secretary, on behalf of Jie Zhang), Arjan Grashuis, Jinsong Huang, Dianqing Li, Zhongqiang Liu, Andy Y.F. Leung, Qing Lü, Kok-Kwang Phoon, Yu Wang, Limin Zhang

Guests: Owolabi T. Abimbola, Gang Fan, Ruilin Fan, Liang Han, Jian He, Jinzheng Hu, Shuihua Jiang, Lo Man Kong, Yong Liu, Yang Na, Chong Tang, Xiaosong Tang, Mi Tian, Zhipeng Xiao, Wengang Zhang, Tengyuan Zhao, Runhong Zhang, Shuo Zheng, Shengyang Zhou

Meeting begins at 5pm

Members introduce themselves

1. **TC304 Forum on 304dB**

The final session of the 6ISRERM consisted of a Forum session to discuss the "Opportunities and Drawbacks" of publically-available databases. Following discussion, it was noted that perhaps a better title for this session could have been: "How to kick-start the new Machine Learning (ML) thrust by ISSMGE". Specifically, the following issues were discussed by the participants:

- Initiation of machine learning with TC309 requires that data for training be available. The TC304-309 collaboration may lead to development of a tool box of ML capabilities that could be made available to the profession, and 304dB could be used to advance the rate of adoption of ML techniques.
- The quality of the data admitted to a database was a point of concern for many in the panel session. Presently, 304dB contains peer-reviewed data and is considered high-quality; however, as additional data is obtained, perhaps from the public domain (e.g., public works projects), it is possible that poor-quality data could be introduced. However, screening of data quality could represent a new research questions to be addressed by machine learning.
- The availability of 304dB can lead to the development of software that can be used by practitioners, which can lead to the adoption of probabilistic analyses by practitioners, and then have the practitioners feed data into the software. For example, KK & Jianye have developed one such kind of software and are preparing estimates of characteristic soil property values for practitioners.
- The availability of 304dB can help the profession through development of student competitions. For example, one such competition is planned for the conference hosted by Harbin, as is another for ISGSR2019
- The availability of 304dB can facilitate development of short courses and webinars for the profession, returning value to the profession, perhaps leading to contribution of more data (i.e., the "snowballing" effect).
- Case histories that demonstrate the usefulness of software and data analytics are desirable.

In general, the forum participants agreed that the availability of data in 304dB represents a strong and positive step forward and it received considerable support from the committee owing to the significant benefits outweighing the disadvantages (e.g., possibility of poor quality data).

2. **Approval of the 29th TC304 minutes (Email meeting, Mar 26-30 2018)**

   Minutes are approved.

3. **TC304 task forces & working groups**

TC304 databases (304dB) http://140.112.12.21/issmge/Database_2010.htm

- Multivariate soil/rock property databases (Yu Wang)
  - New multivariate rock database (ROCK/9/4069)
- Liquefaction databases (LiqChina) (Yanguo Zhou, Xiao-jun Li, Su Chen, Xiao-Ming Yuan, Long-Wei Chen, Lan-Min Wang, Lin Dong, Li-Hua Tang, Shuai Li, Guo-Jun Cai, Jie Zhang, Wen-Ping Gong & Chih-Sheng Ku)
  - A meeting was held during April 2018 to develop the roadmap to create the database.
- 1-page powerpoint
  - TC304 members are encouraged to mention 304dB in conference presentations. A 1-page PPT file for 304dB can be downloaded here (standard; wide).
  - Jianye urges all participants to broadcast 304dB by presenting the 1-page PPT in conferences.
- Usage report for 304dB: It is important to trace the actual usage of the TC304dB. Please list your works below if you have utilized 304dB and acknowledged the TC304 and the database owners in them.

Database	Work title	Acknowledge 304dB and database owners?
CLAY/10/7490	Ching, J. and Phoon, K.K. (2018). Constructing site-specific probabilistic transformation model by Bayesian machine learning. ASCE Journal of Engineering Mechanics (in review)	Will acknowledge.
A-CPT/232/2500m^2	Ching, J., Phoon, K.K., Stuedlein, A.W., and Jaksa, M. (2018). Can the auto-correlation of soil be characterized by the scale of fluctuation alone? Structural Safety (in review)	304dB is acknowledged (database owner is co-author)
SC-CPTU/25/78m^2	Ching, J., Phoon, K.K., Stuedlein, A.W., and Jaksa, M. (2018). Can the auto-correlation of soil be characterized by the scale of fluctuation alone? ASCE Journal of Engineering Mechanics (in review)	304dB is acknowledged (database owner is co-author)
CLAY/10/7490	Sin-Chi Kuok and Ka-Veng Yuen (2018). Clay properties correlation prediction using broad learning. To be submitted to a special collection for the ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering (under preparation)	Will acknowledge.
A-CPT/232/2500m2	Yu Wang, Tengyuan Zhao, and KK Phoon (2018). Bootstrapping of random field correlation structure from multiple sets of incomplete measurement data, Structural Safety (in review)	304dB is acknowledged

- TC304 Student Contest on "Geotechnical Data & Machine Learning"
  - In 5th China National symposium on Engineering Risk and Insurance, Aug 17-19 2018, Harbin Institute of Technology Harbin, China

- The contest question is now released on the TC304 website: http://140.112.12.21/issmge/tc304.htm
- Now there are 60 participants (16 groups)
- TC309 (Machine Learning and Big Data in Geotechnics) will be fully supporting this event. Dr. Dongming Zhang from TC309 will assist Jie Zhang (Zhongqiang).

- Nomination of the Suzanne Lacasse Lecturer in ISGSR 2019
  - Jianye mentioned that 3 candidates are needed and 2 have been secured. After the 3rd candidate is secured, the election process will start.

4. Activities in the <u>past six months</u> (conferences, short courses, and keynotes)

- 6th International Symposium on Reliability Engineering and Risk Management (6ISRERM), May 31-June 1 2018, Singapore (chaired by KK) (KK Phoon)
  - Special sessions organized by TC304:
    - Yu Wang and Jianye Ching "Geotechnical risk and reliability" (12 papers)
    - Dianqing Li and Dagang Lv "Meta-model based uncertainty quantification and reliability analysis" (6 papers)
    - Hongwei Huang and Bilal Ayyub "Resilience of geostructural system and infrastructure" (3 papers)
    - Zijun Cao and He-Qing Mu "Geotechnical databases and data analysis" (8 papers)
    - LM Zhang and Jinhui Li "Landslide risk assessment and management" (6 papers)
  - Short course on "Statistical Estimation of Soil Properties" (KK Phoon & J Ching)
  - Keynote lecture "Bayesian data mining for a generic geotechnical database" (J Ching & KK Phoon)
  - Plenary lecture "Smart sensing on tunnel defects by artificial intelligence" (HW Huang)

5. Future activities

5.1 Conferences

- International Symposium for Geotechnical Safety & Risk (ISGSR 2019), Dec 11-13 2019, Taipei, Taiwan (J Ching)
  - http://www.isgsr2019.org/
  - Call for abstract: June 1, 2018
  - Abstract due: Aug 31, 2018
  - Wilson Tang & Suzanne Lacasse Lectures and 4 keynotes
  - 2 mini-symposiums, 16 sessions & 3 short courses
    - TC309/304 mini-symposium on Machine Learning and Big Data for Geotechnics
    - Mini-symposium on Performance-based Design Codes and Practice honoring Prof. Yusuke Honjo (Makoto Suzuki and Masahiro Shirato).
    - Advances in geotechnical reliability-based design (Zijun Cao & Dianqing Li)
    - Bayesian method for processing geotechnical data (Shadi Najjar)
    - Bayesian updating: Formalizing the observational method (Iason Papaioannou, Johan Spross & Daniel Straub)
    - Dams, levees and flood risk (Timo Schweckendiek)
    - Effect of spatial variability on seismic performance of soil and rock and associated reliability (Armin W. Stuedlein and Taeho Bong)

        - Engineering risk sensing by monitoring and inspection (Hongwei Huang & Shinichi Akutagawa)
        - Inverse analysis in geotechnical engineering (Shin-ichi Nishimura)
        - Landslide risk assessment and management (Limin Zhang)
        - Modelling spatial variability in geotechnical engineering (Jinsong Huang, D.V. Griffiths)
        - Numerical techniques for integrating the spatial variability of soil and groundwater parameters into designing and environmental management (Giovanna Vessia, Diego Di Curzio & Wojciech Pula)
        - Probabilistic seismic hazard assessment and engineering seismology (JP Wang)
        - Probabilistic site characterization (Yu Wang & Zijun Cao)
        - Risk assessment of rainfall-induced geo-hazards (Lulu Zhang & Hong-Xing Chen)
        - Robust geotechnical design in the face of uncertainty (Wenping Gong, Lei Wang, Mengfeng Shen)
        - Statistics for soil & rock properties (KK Phoon)
        - Uncertainty & reliability analysis in rock engineering (Rafael Jimenez)

- 16th Asian Regional Conference (16ARC) on Soil Mechanics and Geotechnical Engineering, Oct 14-18 2019, Taipei, Taiwan (Der-Wen Chang)
    - http://www.16arc.org
    - TC304 session on "Geotechnical risk/reliability and data analysis" (JP Wang & J Ching)
        - Abstract due: March 31 2018
    - Short course (KK Phoon & J Ching)
    - Keynote (J Ching & KK Phoon)

5.2 Books/journals/special issues

- 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, J Ching & KK Phoon)
    - Confirmation of authors and title: April 15 2018

6. Other businesses

- Limin Zhang briefed the current status of Georisk journal, which has been indexed by ESCI (Emerging Sources Citation Index), and mentioned that the journal needs more supports from TC 304 members. He also mentioned that the scope of Georisk will be expanded to include studies on machine learning and data analytics.
    - Jinsong Huang urged members to submit good papers to Georisk. Yu Wang, Armin Stuedlein, and Jianye Ching echoed.

- Andy briefed the current status of the Wikipedia page on spatial variability. TC 304 members are encouraged to contribute to this Wikipedia task force.

The meeting adjourns at 630pm

Cardamom room at Shaw Foundation Alumni House, National University of Singapore

Dinner after the meeting