Message from CAPG: Regional session report

'Geo-education for the Future' - XVI Pan-American Conference on Soil Mechanics and Geotechnical Engineering, Cancún, México

Introduction

The Corporate Associates Presidential Group (CAPG) is a Board level committee representing the commercial sector of the international geotechnical community within ISSMGE. One of the main objectives of CAPG is to assist ISSMGE in fostering the advancement of geotechnical knowledge and encouraging activities such as research, practice, exchange of knowledge, and education. With this in mind, CAPG, together with the Technical Oversight Committee, launched a global survey in early 2017 on the State of the Art (SoA) and the State of Practice (SoP) in geotechnical engineering. The survey attracted approximately 1300 respondents from 68 countries answering a number of questions. This was followed by CAPG holding a workshop at the 19th ICSMGE in Seoul in September, 2017 to discuss the results of the survey. A follow-up paper presenting the survey results and the workshop discussion comments was prepared by CAPG and was published in 2018 in various journals and magazines.

Encouraged by the success of the global survey and the conference workshop, CAPG embarked on organising several plenary sessions at the various ISSMGE regional conferences held in 2019. The first four sessions and its topics (some of which have been summarised in previous Bulletins) were:

- Australasia: Collaboration in geotechnical engineering – Impact on research and project delivery (Plenary session, April 2019, Perth, Australia) [Report on V13 (3), June 2019 Bulletin (https://bit.ly/2xLWGTS)].
- Europe: Bridging the gap between designers and constructors: how do we ensure effective 'transfer' of design into construction? (Plenary session, September 2019, Reykjavik, Iceland) [Report on V13 (5), October 2019 (https://bit.ly/2RglKt4)].
- Africa: Geotechnical innovation (Plenary session, October 2019, Cape Town, South Africa).
- Asia: Are we overdesigning? (Theme Session, October 2019, Taipei, Taiwan) [Report on V14(1), Feb 2020 Bulletin (https://bit.ly/3dThvNO)].

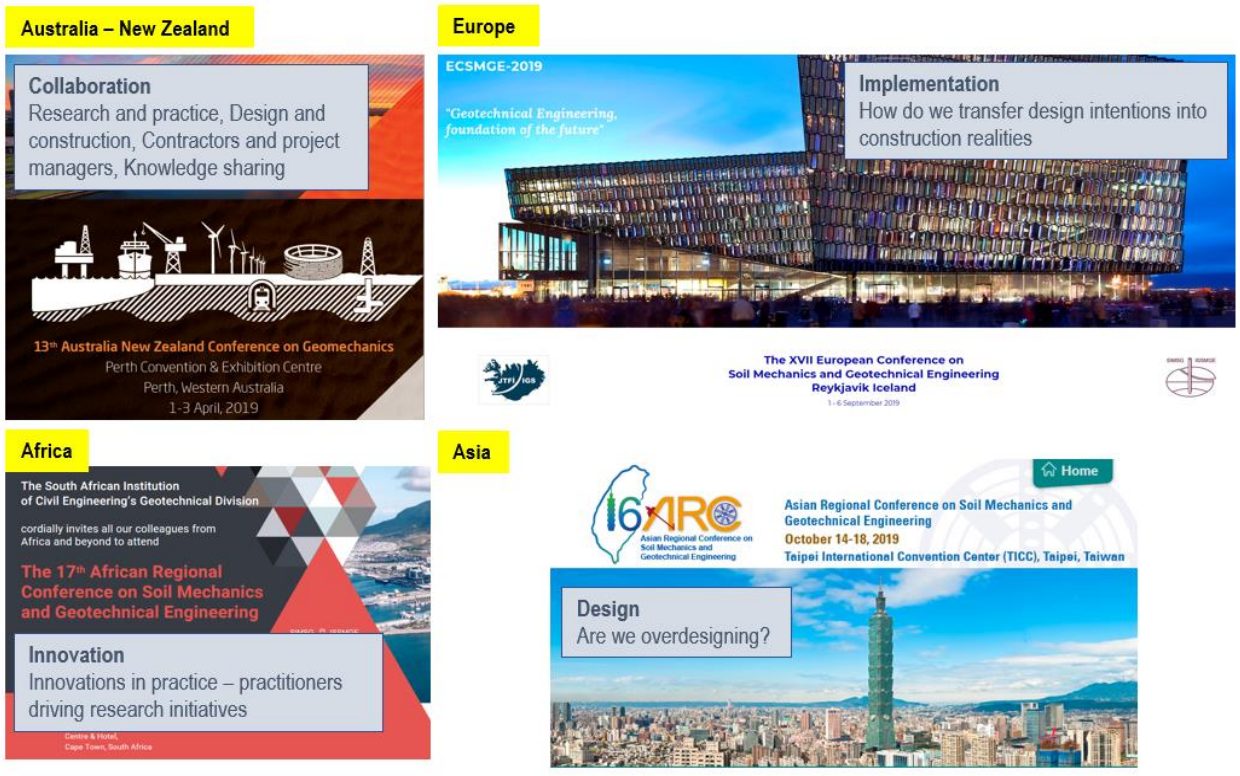

Figure 1: CAPG contributions to ISSMGE Regional Conferences in 2019 (before XVI PCSMGE)

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CAPG Session in Cancún

The last session in the series was held during the XVI Pan-American Conference held in Cancún, México, 17-20 Nov 2019. After consultation with members in the region, the topic selected for the XVI PCSMGE was 'Geo-education for the Future'. The objective was to explore what are the skills required by geomechanics professionals in the next 2-3 decades, from the perspective of different stakeholders (academia, research, industry, consulting, contractors, asset owners, etc.).

The invited panellists included: Prof J. Carlos Santamarina, Mr Juan de Dios Alemán, Mr Juan Paulín Aguirre and Mrs Daniela Pollak. Prof Tim Newson, ISSMGE VP for North America, delivered the closure notes. An opening statement and coordination of interaction with the audience was carried out by Dr Hugo Acosta-Martínez.

Figure 2: Panellists (left-right, top-bottom): Prof J. Carlos Santamarina (King Abdullah University of Science and Technology), Mrs Daniela Pollak (IDIEM and University of Chile), Mr Juan de Dios Alemán (Federal Electricity Commission, México), and Mr Juan Paulín Aguirre (IBAM Engineering Manager, Soletanche-Bachy)

It was acknowledged that geo-education needs vary per region, and as a result different programs are required to satisfy regional specific needs and societal challenges. The education is expected to comprise a combination of first principle fundamentals linked to practice and soft skills (communication, risk, digital, innovation, problem-solving, etc).

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Before starting an open discussion with the audience, the following provoking questions that confront educators and geomechanics practitioners were asked.

Considering that teaching hours for geotechnical engineering are limited in undergraduate courses:

- *Should universities emphasise (a) physical fundamentals, or; (b) practical solutions and case histories?*
- *Should we teach the physics and mechanics of unsaturated soils in undergraduate courses?*
- *Is there a need to teach more or less physics/chemistry of soils and rocks?*
- *Should universities teach the use of commercial software commonly used in industry?*
- *For the analysis of saturated soils, do you prefer teaching in terms of effective stresses or total* stresses?

Figure 3: (top) Audience interaction, and; (bottom) last attendees standing after '*Will you be a reference for some young geotechnical engineers in 20-30 years?*' question

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An interesting open discussion confirmed that needs vary per region and that there are different expectations from academics and practitioners in terms of geo-education and the challenges to achieve it. It is important to promote forums where different stakeholders come together to discuss this geo-education topic and maintain geotechnical engineering as an attractive specialised discipline for future students but also as a profession that contributes in a sustainable way to solving current societal problems (climate change, increased population living in urbanised areas and associated infrastructure demands, etc). The need for both academia and industry to embrace diversity and inclusion in geo-education was also highlighted.

Figure 4: Session closure and panellists with commemorative Mayan-calendar mementos: (l-r) Dr Hugo Acosta-Martínez, Prof Tim Newson, Mr Juan Paulín Aguirre, Prof J. Carlos Santamarina, Mrs Daniela Pollak and Mr Juan de Dios Alemán.

Closure

Final thoughts from the session were summarised by Prof Tim Newson, Vice-President North America (2017-21) for the ISSMGE:

- It seems clear that employers want geoengineers who 'hit the ground running'.
- Academic courses need to match industry needs (but where does academia's responsibility stop?).
- Graduates need technical skills (fundamental/applied) and enabling skills (business, communication, problem solving, creativity, innovation, team work).
- How do we 'future-proof' geo-education? Do we want hedgehogs (specialists) or foxes (generalists)?
- Education delivery also needs to consider new teaching paradigms such as: multi-media, physical laboratory models, deep learning (project based) and better industry involvement (case history/study).
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CAPG would be happy to know your views on this topic. A discussion post is available at the GeoWorld platform (https://bit.ly/2R8RKPF).

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Acknowledgements

The CAPG acknowledges the contribution of the ISSMGE VPs in the Pan-American region (Tim Newson and Alejo Sfriso), panellists and members of the conference organising committee for their continued support during the planning and delivery of this session. Regular teleconferences were held for over 18 months with attendees distributed over three continents, which implied discussions on early mornings and late nights. The effort and commitment of all the above to make this session a success is greatly appreciated.

Dr Hugo Acosta-Martínez
Aurecon (Australia) and Australian Geomechanics Society