Report from Board-level committee

CAPG session at 17th ECSMGE, Reykjavik, Iceland

At the 17th ECSMGE, CAPGE of the ISSMGE held a session, on a topic: ***''Bridging the gap between designers and constructors: how do we ensure effective 'transfer' of design into construction?".***

The CAPG plenary session took place in the morning of the last day of the 4-day Conference. It was the first part of the morning session and the Bright Spark Award lectures succeeded the CAPG panel discussion. It was organised this way so that the Young Members Presidential Group (YMPG) can be exposed, connect and interact as much as possible with the Industry and the Corporate Associates (CA).

The CAPG panel discussion members were as below

- Yuli (Chaido) Doulala-Rigby, (Tensar, Corporate Associate) - Panel Chair
- Karel Allaert (Jan De Nul, Corporate Associate)
- Lars Anderson (NGI, Corporate Associate)
- Mandy Korff (Deltares, Corporate Associate)
- Jorgen Steenfelt (Cowi)
- Valérie Bernhardt (Terrasol) – Moderator
- Fabio Tradigo (Arup - Corporate Associate, YMPG) – support and Chair of Bright Spark Lecture

Photo 1. During the CAPG session

The CAPG panel discussion kicked off with an introduction by Peter Day that included what CAPG is, what is our aim, what have we achieved so far and where we are heading. Then Peter introduced the CAPG Panel Discussion Chair, Yuli (Chaido) Doulala-Rigby, who set the scene of the topic of the panel discussion by briefly presenting an anonymous near miss case study where the wrong fill was used in a project, despite appropriate fill being explicitly specified on the construction drawings and the what the consequences would have been if the situation was not rectified. Then Yuli introduced the panel discussion members and handed over to the moderator, Valérie Bernhardt, who asked both the panel and the audience to reply to the following 3 questions. A lively debate and floor participation followed with various views and opinions being expressed, some of them captured as below:

1. **How can we ensure that the responsibility for supervision and compliance with specifications does not fall through the cracks?**
   - *Need for a geotechnical engineer on site. Not about paperwork but it is about looking closely to the site as that would raise early warnings and prevent problems to be overlooked.*
   - *We need to have things in writing. Who is responsible from a contractual point of view to do what. The level of checks we have on site sometime is not the same we have in design activities.*
   - *Put things on drawings, not just on large reports.*
   - *Training engineers in university.*

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- *Many things written in the contract in France. We tried to add regulations to have supervision as mandatory to have a geotechnical engineer on site. Contractor has his mission and the owner needs a geotechnical engineer to supervise.*
- *In Austria the geotechnical designer is also the project site verifier. This seems to work quite well.*
- *Impractical to have geo engineer on site during full construction. You need a certified inspector who knows what is going on under the guidance of a geo engineer. Not necessarily a geo engineer. In USA you have quality engineers for the whole project. You do not need a full time geo engineer, as that is more applicable.*
- *Supervision is not the issue. Selection of a suitable contractor for the works is the issue. Specialist works require specialist contractor and owners should recognise this and ensure that suitably experienced people are involved in these works at the tender stage.*
- *Designers have no power over the selection of the Contractor and hence the quality. We need to improve understanding of design requirements on site how we can improve communication between contractors, owners and designers.*

2. How can we best equip site staff and young graduates to recognise potential critical departures from specification requirements?

- *In my experience new engineers had had to spend at least 5 years on site to build practical experience. This required, to some degree, unlearning the theoretical practice that they had been taught at University. They were able to understand the same concepts but from a practical point of view.*
- *It is not just the responsibility of young engineers. We are all required to constantly learn our trade. We can learn a lot from the presentations case studies not just from site based experience early in our career. Older engineers are probably better equipped to understand issues have occurred from case studies.*
- *We need more case study examples as a learning points for the industry as a whole. This helps us learn about the implications of departures from specifications.*
- *The bottom line is money. Universities have insufficient funding to allow site-based training. This needs to be borne by the industry. In my opinion this can only be obtained through postgraduate industry training (on the job).*
- *It's concerning to hear that funding may result in project manager's dictate the quality of a project outcome rather than technical people. Or that price is dictating the quality of contractors employed.*
- *Manufacturers have had to bridge the gap. We have had to become both the consultant and the contractor on projects to protect PI.*
- *I believe the issue is commercial arrangements and the way construction projects are divided up and sub-contracted on site. There needs to be more clarity about responsibilities between engineers and various subcontractors. Supervising engineers also need to be empowered to highlight deviations from specifications.*
- *I have no direct experience in civil construction however I can tell you that in France we encourage undergraduates to spend at least 10 months in the field as part of their academic training. This emphasises the fact that geoscience is field based and not office based. There is a risk that with the increase in numerical modelling and computer based design methods that less and less engineers are exposed to site based practical issues.*
- *Internships are important part of undergraduate study. In Sweden we encourage students to spend time within industry to gain this practical experience.*
- *Modern construction practice and health and safety requirements are hindering engineers exposure to practical construction problems. For example, visiting sites requires full inductions and there are often exclusion zones around heavy equipment e.g piling rigs.*
- *Accountability is an issue; individuals are singled out for problems on site and not companies. Programming and late communication often prevents the flow of design requirements to site.*

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- *Construction works are often started ahead of specifications being finalised or adequately relayed to site base staff.*
- *It's not just young engineers, I believe all professionals need assertiveness training or at least be supported and empowered to speak up and question when they believe site work deviates from that intended by the design.*

3. How can our Industry balance technical excellence vs. commercial interests?

- *In my opinion the role of technical people within companies and organisations and their relative importance when compared to the business leaders and Line management elements has diminished over time. This imbalance in importance is leading to less of project funding being allocated to site based technical staff and more to office based managerial staff.*
- *Which is a shame because geotechnical engineers are ultimately much more cheaper than lawyers.*
- *Less supervision increases the risk of deviation from specifications. Less supervision implies that the design is more robust to omissions and less quality works*
- *I agree less money is spent on supervision then the commercial management of projects. Commercial tension between tendering contractors are resulting in efficiency in supervision being employed more and more. Less specialist attendance results.*
- *Should a technical excellence be considered in the commercial aspects of a project when we consider the technical excellence of designers or contractors.*
- *Could we account for less experience in a more robust design which may cost more.* Should we be considering a factor of safety on our design in relation to the experience of the designer or the class of contractor that we envisage will undertake the work!!

The CAPG panel discussion session concluded with an interactive survey where we asked all delegates to log on a website with a passcode that was displayed on the screen and asked them to respond to 5 questions that had multiple choice replies. As the delegates from the floor were responding to the questions, the results were displayed on real time on the screen for all to see! That was a very successful interactive session and got most of the audience engaged, with more than 200 participants that replied to all or most of the 5 questions set out in the table below.

Photo 2. Delegates actively participating the CAPG session

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What description fits you best?
- Supplier
- Academic
- Designer
- Other

How big is the gap between academia and practice?
- Practitioners, who are they?
- Gap exists, is too big!
- Never saw an academic after I graduated!
- There is no gap

Who should be principally responsible for geotechnical site supervision?
- Designer
- Contractor
- Asset Owner
- Resident Engineer

Who should be responsible for training young site supervisors?
- On the job
- University
- Prof. or voluntary associations like ISSMGE etc

What is your suggestion to bridge the gap between academia and practice?

The CAPG panels discussion concluded at this point and Yuli introduced the Chair of the Young Member Presidential Group (YMPG) Session, Fabio to introduce the Bright Spark Award lectures session.

Europe Bright Spark Awards

Fabio Tradigo summarized YMPG activities and summarised the purpose and the process of the Bright Spark Award, which is a new award promoted by ISSMGE to promote young members of ISSMGE to play a major role in various international and regional conferences. The award consists in the opportunity for promising young (under 36 years old) geotechnical engineers/academics to have a chance to deliver keynote and invited lectures at these conferences.

Most of the European member societies nominated candidates for this ECSMGE 2019 Bright Spark Award, YMPG provided a preliminary selection to ISSMGE President for final approval. More details and future calls can be found on the ISSMGE website.

Fabio introduced the two winners: Federico Pisanò and Matteo Ciantia. A brief summary of their CV and keynote is summarized below.

Federico Pisanò - *Input of advanced geotechnical modelling to the design of offshore wind turbine foundations*. Federico is Assistant Professor at TU Delft. He received his Ph.D. from Politecnico di Milano, and carried out international research at UPM (Spain), UC Davis (USA) and UWA (Australia). He is member of TC209 on Offshore Geotechnics, and recently chaired the CPT'18 conference in Delft. His main research interests, testified by over 50 publications, lie on the numerical modelling of soil behaviour and soil-structure interaction, with emphasis on offshore geotechnical applications.

His lecture overviewed recent work at TU Delft regarding advanced numerical modelling in offshore wind geotechnics. The benefits of 3D FE modelling combined with sophisticated constitutive models are demonstrated with respect to the structural analysis of offshore wind turbines and their monopile foundations subjected to environmental cyclic/dynamic loading.

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Matteo Ciantia - *Pile penetration in crushable soils: Insights from micromechanical modelling*. Matteo is Lecturer at the University of Dundee, with background in theoretical and numerical geomechanics. Prior to his current post he was at Imperial College London as a junior research fellow and at UPC as a postdoctoral researcher. Since his PhD awarded at the Politecnico di Milano in 2013, Matteo has published 55 original research articles in leading international journals and peer-reviewed conferences.

Matteo presented his work on discrete element modelling of piles in crushable media. He showed how the DEM can be employed to study such a complex mechanical problem. The results unveil interesting micromechanical mechanisms that may help to understand the macroscopic response of this structures.

Fabio and Prof. Manassero (Europe VP) closed the session.

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