

Report theme meeting 2, Geotechnology and road construction, Swedish Universities of the Built Environment, Göteborg 17-19 August, 2016

During three days, 25 PhD candidates and 3 supervisors met for a short course and conference on risk and uncertainty at Hönö in the archipelago of Gothenburg. The meeting was held as a theme meeting within the Geotechnology group at Swedish Universities of the Built Sciences (SBU).



Before the meeting, four journal articles related to the topic was sent out to the participants:

- Aven, T. 2011. The riskconcept - historical and recent development trends. *Reliability Engineering and System Safety*. 99 (2012), pp. 33–44.
- Lindhe, A., Rosén, L., Norberg, T., Bergstedt, O. 2009. Fault tree analysis for integrated and probabilistic risk analysis of drinking water systems, *Water Research*, 43 (6), 1641-1653.
- Saltelli, A., Funtowicz, S. 2014. When All Models Are Wrong. *Issues in Science and Technology*. Computer Modeling. Winter 2014, pp. 79-85.
- Walker, W.E, Harremoes, P., Rotmans, J., Van Der Sluijs, J.P., Van Asselt, M.B.A, Janssen, P., Kraye Von Krauss, M.P. 2003. Defining Uncertainty – A Conceptual Basis for Uncertainty Management in Model-Based Decision Support. *Integrated Assessment*. 2003, Vol. 4, No. 3, pp. 5-17.

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Based on these articles, each participant was supposed to write one page on how their own research relates to the topic.

After a lunch at Chalmers, the meeting started with a study visit to the drinking water supply of Gothenburg. During the bus tour, Lars Rosén and Andreas Lindhe gave an introduction the geological setting of the city of Gothenburg and the Göta Älv river. The first stop was at the raw water intake from the river into the water treatment plant of Alelyckan. At this site, Lars and Andreas explained the different hazards to the supply such as saline water and pollutants. Continuing to the reservoir at lake Delsjön, the old waste disposal site (and nowadays ski-slope) Brudaremossen was introduced as another significant hazard. Lars and Andreas stressed out the need of a full system perspective, from raw water to consumer, when assessing the different risks of a drinking water system.



After bus transfer to Hönö, the participants were accommodated at hotel Trubaduren and its associated hostel. After a dinner at the hotel, the participants gathered at the cliffs next to the shoreline and watched the sunset together.

On Thursday morning, Lars Rosén held an introduction lecture on risk and uncertainty. Johan Spross, KTH, gave an example on different uncertainties when evaluating parameters from soil samples and how these can be treated with Bayesian updating. Jonas Sundell held a presentation on how subsidence due to groundwater drawdown can be simulated on large areas with a probabilistic method. After these presentations, the participants were divided into groups of four. Each group was given one of the four papers as a basis for a discussion. The discussion was limited to main concepts and ideas of the article, possibilities and limitations to apply these on their own individual work and future collaboration. The workshop discussions focused on the following:

1. Presentation of each member's research to the group
2. What main ideas and concepts are presented in the "main paper" given to the group?
3. What possibilities and limitations are there in your research (member) to apply these ideas and concepts?

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4. What possibilities and limitations are there within theme Geo to collaborate on these ideas and concepts?
5. Presentation (with 3 slides) of group work (max 10 min) results:
 - Ideas and concepts presented in the “main paper” (point 2)
 - The possibilities and limitations of applying these ideas and concepts (points 3 and 4)



After these discussions, each group gave a 10 minute presentation of their discussions, using 3 ppt-slides each.



The general result of the workshop was that uncertainty analysis is an important topic for all participants and risk assessments of importance to some. A general opinion was that an improved level of knowledge regarding uncertainty and risk would be helpful to many of the researchers and that PhD courses on these topics should be arranged and coordinated between the universities. Also during the second day, the cliffs at Hönö served as the perfect setting for continuous discussions after dinner.

The last day was initiated by Gerhard Barmen, Lund, who presented how future collaboration can be held within theme Geo at SBU. After this, Mats Karlsson, Chalmers, gave a lecture on the geotechnical challenges when Marieholmstunneln underneath Göta Älv is constructed. The whole program was finished with a study visit to the area next to the construction of Marieholmstunneln. Outside of the program, the participants from Luleå met with the Geotechnical research group at Chalmers Friday afternoon.

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