### VENUE: Quality Hotel 11, Maskingatan 11, Gothenburg

**08.00-09.00 Registration**

**09.00 Welcome to Gothenburg and the Nordic Symposiums**

**Opening of 7th Nordic Grouting Symposium**

### CASE STUDIES IN THE NORDIC COUNTRIES PART I

- **Rock mass grouting in Sweden and Norway**
  - A matter of cultural differences or factual causes?
  - *Eivind Grøv, SINTEF/NTNU Trondheim Norway*
  - *Johan Funehag, Chalmers University of Technology, Sweden*
  - *Thomas Janson, Tyrén, Sweden*

- **Grouting of shaft intersecting deep underground hydro-geological zones HZ20A & HZ20B in ONKALO underground research facility, Olkiluoto**
  - *Lassi Hatakka, Janika Tirinen, Noora Salminen, Guido Nuijten, Rockplan, Finland*
  - *Riitta Lehmsjärvi, Susanna Aro, Posiva, Finland*

- **Grouting operations in complex and heavily water bearing ground – an analysis and summary from the Hallandsås Project**
  - *Robert Sturk, Skanska Sverige, Sweden, Johan Striberger, Skanska-Vinci, Sweden, Björn Stille, Sweco Infrastructure, Sweden, Oskar Aurell Skanska-Vinci, Sweden*

### SCIENCE AND RESEARCH ON MATERIALS, PROGNOSIS AND EQUIPMENT

- **Experiences from low-pH grouting at 400 m depth in the Äspö HRL expansion project**
  - *Henrik Ittner, Svensk Kärnbruksleverantör, Sweden*
  - *Isabelle Olofsson, Svensk Kärnbruksleverantör, Sweden*

### CONCEPTS FOR GROUTING

- **Approach for early engineering geological prognosis adapted for rock grouting design**
  - *Sara Kvartsberg, Åsa Fransson, Chalmers, Sweden*

- **In-line ultrasound based rheology – A new tool for the measurement of flow and rheological properties of cement based grout**
  - *Mashuqur Rahman, KTH, Sweden*
  - *Ulf Håkansson, KTH/Skanska, Sweden*

### CASE STUDIES IN THE NORDIC COUNTRIES PART II

- **Colloidal silica-grouting tests in underground research facility Onkalo, Eurajoki, Finland**
  - *Kalle Hollmén, Saanio & Riekola, Finland*
  - *Sanna Mustonen, Posiva, Finland*
  - *Tapani Lyytinen, ElyManagement, Finland*

- **Experiences from the grouting methods used in the Matinkylä contract during the construction of the West metro between Helsinki and Espoo**
  - *J.P. Pöllä, I. Konstantas, Sito, Finland*
Evaluation of pre-grouting with the RTGC method and results from the City Line project
Mats Holmberg, Tunnel Engineering, Sweden
Masakuni Tsuji, Shimizu Corporation, Japan
Jalaleddin Yaghoobi Rafi, KTH Royal Institute of Technology, Sweden
Björn Stille, Sweco Infrastructure, Sweden
Håkan Stille, KTH Royal Institute of Technology, Sweden

Closure of Nordic Grouting Symposium

POSTER PRESENTATIONS:

Silica grouting in deep underground saline conditions in ONKALO underground research facility, Olkiluoto
Lassi Hatakka, Noora Salminen, Guido Nuijten, Rockplan Ltd, Finland
Riitta Lehmusjärvi, Sanna Mustonen, Posiva Oy, Finland

Experiences of pre-excavation grouting in TBM tunnelling
Orjan A Sjostrom, MSc, Civil Engineering, Sweden

Improvement of penetrability of cement based grouts by changing the cement size curve
Almir Draganović, KTH, Royal Institute of Technology, Sweden
Conny Björk, Nauplion, Sweden

Forbidden particle love
Pernilla Petersén, Sika, Sweden

Gelling of silica sol in high pressure
Masakuni Tsuji, Shimizu Corporation, Japan
Johan Funehag, Chalmers/Tyréns

Grouting strategy using Observational Method at Äspö Hard Rock Laboratory, Sweden
Isabelle Olofsson, Svensk Kärnbränslehantering, Sweden
Mats Holmberg, Tunnel Engineering, Sweden
Emmeli Johansson, Svensk Kärnbränslehantering, Sweden

The Professional Discussion commences after the final sessions of the Grouting Symposium and the concluding discussion will be held the next day, just before the Rock Mechanics Symposium. All participants of both symposiums are welcome to attend. The Professional Discussion will comprise a short opening lecture, working in groups and a concluding panel discussion.

Moderator: Dr. Lars Hässler/Golder Associates

Introductory presentation:
Fracture aperture measurement and consequences for grouting
J. Thörn, Chalmers University of Technology, Sweden
Å. Fransson, Chalmers University of Technology, Sweden

Professionals from both the field of grouting and rock mechanics are gathered at the two symposiums. We would therefore like to take the opportunity to initiate a discussion and elaborate on topics in the interphase of our fields of knowledge. It is not so developed, and needs to be addressed to increase knowledge and understanding.

The drill and blast tunneling method will induce fractures in the adjacent rock material and thus may increase the local permeability and ingress of water. Rock grouting will affect the rock mechanical parameters around an excavated opening during construction as well as after.
Do we need to take such considerations into account in our design? These, as well as other questions and thoughts will be addressed at the Professional Discussion.

19.30 Festive Dinner at Gothenburg City Hall
**Final Program • 2nd Nordic Rock Mechanics Symposium • November 14, 2013**

**VENUE:** Quality Hotel 11, Maskingatan 11, Gothenburg

**08.00-09.45 Registration**

**09.00 Professional Discussion – Part II, closure (**from November 13**th). Delegates from day 1 + 2 are welcome.**

**09.45 Opening of 2nd Rock Mechanics Symposium**

**USE OF UNDERGROUND SPACE IN THE NORDIC COUNTRIES**

**Going underground in Sweden, past-present-future**
Per Tengborg, BeFo, Sweden  
Ulf Lindblom, Gecon, Sweden

**Rock Engineering in Norway**
Roger Olsson, NGI, Norway

**Use of underground space in Finland**
Ilkka Vähäaho, Helsinki City Real Estate Department, Finland

**ROCK TUNNEL STABILITY**

**Life time optimization of hard rock tunnel maintenance**
Ulf Lindblom, Gecon, Sweden  
Lars-Olof Dahlström, NCC Construction/Chalmers University of Technology, Sweden

**ROCK SUPPORT DEGRADATION AND MAINTENANCE**

**Maintenance of important traffic links – special requirements on tunnel refurbishment measures**
Robert Strukely, Amberg Engineering, Switzerland  
Flavio Modetta, Amberg Engineering, Switzerland

**Inspection and maintenance of 130 km sewage tunnels in Gothenburg**
Hans Aspfors, Bergab, Sweden, Thomas Wallroth, Bergab, Sweden

**Numerical study of the stability of a large hydropower machine hall in the Himalayas under dynamic loading**
Rajinder Kumar Bhasin, Thomas Pabst and Roger Olsson, Norwegian Geotechnical Institute, Oslo, Norway

**Numerical approaches for estimating the effect of scale on rock mass strength**
Derek Martin, Yun Lu & Hengxing Lan, Dept. of Civil and Environmental Engineering, University of Alberta, Edmonton, Canada  
Rolf Christiansson, SKB, Stockholm, Sweden

**Thermal spalling and fracturing around cylindrical opening in rock under bi-axial loading condition — Observations and analysis**
Pouria Taleghani, Ping Zhang, Erling Nordlund, Luleå University of Technology

**Spatial distribution of elastic properties around vertical shaft in ONKALO URCF and horizontal TBM and D&B tunnels in ÄSPÖ HRL**
Topias Siren, Posiva Oy, Finland
CASE RECORDS

Rock burst phenomena and micro tremors
– experience gained from the Gotthard Base Tunnel
Michael Rehbock-Sander, Amberg Engineering, Switzerland

TBM excavation in fault zones and squeezing ground,
based on the case study of Gotthard Base Tunnel
T. Jesel, Amberg Engineering Ltd. Regensdorf, Switzerland
G. Wieland, Amberg Engineering Ltd. Regensdorf, Switzerland

Rock engineering challenges and excavation methods at the
City Line, Station City, Stockholm
R.M. Swindell, NCC Teknik, Sweden
G. Manell, NCC Construction, Sweden
M. Christiannsson, NCC Teknik, Sweden

16.00 Closure of Nordic Rock Mechanics Symposium

POSTER PRESENTATIONS:

Rock mechanics study for the Hitura mine
E. Johansson, A. Lehtonen, H. Lampinen, T. Hänninen, Saanio Riekkola Oy, Finland
V-M. Seppä, J. Nieminen, Belvedere Mining Oy, Finland

POSE in situ Pillar stability experiment
Erik Johansson, Saanio & Riekkola Oy, Finland, Topias Siren, Posiva Oy, Finland
Matti Hakala, KMS-Hakala Oy, Finland

A first step towards a quantitative and cost efficient indirect determination of geotechnical parameters in sedimentary rocks
Sara Johansson, Henrik Möller, Olof Friberg, Tyréns, Sweden

Geological-hydrogeological modeling in support of tunnel design and construction
Mansueto Morosini, Peter Hultgren,
Swedish Nuclear Fuel and Waste Management Co, Sweden

Numerical simulation of the response of an underground opening at different locations under fault-slip induced seismic wave
Faez Sayahi, Ping Zhang, Erling Nordlund, Luleå University of Technology, Sweden

2D/3D numerical study of the stability of a tunnel with thin rock overburden and sidewall thickness
Arnstein Aarset, Thomas Pabst and Jørgen Fjæran,
Norwegian Geotechnical Institute, Oslo, Norway

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Symposiums Sponsors

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