Following on from previous symposia, the Australian Centre for Geomechanics looks forward to hosting Ground Support 2019 in Canada. The International Ground Support Symposia have been a fundamental platform for advancing ground support excellence in mining and underground construction for over 35 years. It has been more than 25 years since this symposium was held in Canada and we are delighted to return to Sudbury!

Symposium Themes
- Rock mass classification
- Modelling and field verification
- In situ and laboratory testing
- Ground support for seismic conditions and dynamic testing
- Rockfalls and failure mechanisms
- Support design methods (mining and civil engineering)
- Risk and performance assessment
- Surface support
- Ground support corrosion
- Ground support in caving
- Analytical (non-empirical) principles and methods for shotcrete support design
- Ground support monitoring
- Ground support quality control

See inside for list of 70+ accepted abstracts!

Previous Ground Support Symposia
1st 1983 Abisko, Sweden
2nd 1992 Sudbury, Canada
3rd 1997 Lillehammer, Norway
4th 1999 Kalgoorlie, Australia
5th 2004 Perth, Australia
6th 2008 Cape Town, South Africa
7th 2013 Perth, Australia
8th 2016 Luleå, Sweden

Keynote speakers include:

Peter Andrews
VP and Group Head of Geotechnical, Gold Fields Australia Pty Ltd

Dr Mark Board
Vice President – Technical Services, Hecla Limited, USA

Frédéric Mercier-Langevin
General Manager Goldex Complex, Agnico Eagle Mines Ltd., Canada

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Principal Geotechnical Engineer  
Mining Technical Excellence Centre, Vale Base Metals, Canada

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Shandong University, China

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**Professor Weishen Zhu**  
Shandong University, China

TUESDAY | 22 OCTOBER  
Monitoring Performance of Ground Support Workshop

WEDNESDAY | 23 OCTOBER  
Ninth International Symposium on Ground Support in Mining and Underground Construction

THURSDAY | 24 OCTOBER  
Symposium Dinner

FRIDAY | 25 OCTOBER  

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KEYNOTE ADDRESS: Ground support from a corporate perspective M Board, Hecla Limited, USA

KEYNOTE ADDRESS: Ground support – a mine manager’s perspective F Mercier-Langevin, Agnico Eagle Mines Ltd., Canada

Dynamic bolt development and application in ultra deep mechanised mining R Abreu, New Concept Mining, South Africa; J Ekkard, S Potgieter, Gold Fields South Africa, South Africa; P Andrews, Gold Fields Australia Pty Ltd

Explicit discrete fracture network numerical analyses of the stability of underground stopes and effects of cablebolt support at Mine Raglan P Andrieux, T Lavioie, S Guitard, A2GC, Canada; R Caumartin, Glencore Canada, Canada

Dynamic testing of a surface support system R Brändle, GeoBrugg AG, Switzerland; RL Fonseca, GeoBrugg Ibérica S.A., Spain

Stability assessment of initial shotcrete lining using a 2D continuum modelling approach N Bahrami, S Naseri, Dalhousie University, Canada

Application of the Geological Strength Index in Peruvian underground mines: retrospective 18 years after its implementation LAM Camones, Mine Design Engineering Inc., Canada; CC Nuriez, Pan American Silver Peru, Peru

Modelling the response of reinforcement elements during dynamic loading LYM Cardona, J Vallegos, Universidad de Chile, Chile

Challenges of mining in large deformation underground mines: CSA Mine case study B Chapula, Glencore, Australia; M Sharifzadeh, Western Australian School of Mines, Australia

Analysis of in situ and laboratory corrosion coupons AJ Chambers, CB Sunderland, CC Clark, MJ Powers, National Institute for Occupational Safety and Health, USA

Microbiologically induced corrosion in underground mines H Chen, O Kimyon, HL Ramandi, A Crosky, S Soydam, University of New South Wales Sydney, Australia

Evolution of a dynamic support system at Vale’s Copper Cliff mine: case studies DR Chinnaswamy, A Breckon, R Savignac, Vale Canada Ltd, Canada

Rockbolting advances at the Vanscoy Mine, Saskatchewan T Coleman, SRK Consulting (Canada) Inc., Canada; D Neely, Nutrien Vanscoy Mine, Canada

Support design validation and the need for a multi-faceted approach L Cotesta, R Brummer, T Katsoga, B Paudel, Itasca Consulting Canada Inc., Canada

Laser-based scanning to manage geotechnical risk in deep mines DB Counter, Glencore Canada Corporation, Canada

Development of a single-pass detailed damage mapping application D Cumming-Potvin, Y Potvin, J Wesselse, P Harris, M Heinsen Egan, S Tierney, Australian Centre for Geomechanics and The University of Western Australia, Australia; C. Ho, Australia

Technologies of ground support monitoring in block caving operations T Dawn, W Conrad, M van Balkom, Canary Systems, USA

Practical methods of assessing ground control hazards in the workplace AP Dirige, Workplace Safety North, Canada

Corroded rock support issues – implementation of an investigation and rehabilitation program J Durion, Glencore Canada Corporation, Canada

Raiseboring in difficult rock conditions C Edelbro, Itasca Consultants AB, Sweden; R Brummer, Itasca Consulting Canada Inc., Canada; M Pierce, Pierce Engineering, USA; D Sandström, Bolditen Mineral AB, Sweden; J Sjöberg, Itasca Consultants AB, Sweden

Shotcrete behavior under dynamic loads and early strength development for rapid mine development F Erismann, M Hansson, Sika, Switzerland

Ground support challenges in arctic mining conditions V Falmagne, N St-Onge, Agnico Eagle Mines Ltd, Canada

A comparison between load distributions of support tendons measured in the laboratory and in situ using optical fiber strain sensing B Forbes, Queen’s University, Canada; N Vlacopoulos, Royal Military College of Canada, Canada; MS Diederichs, Queen’s University, Canada; AJ Hyett, YieldPoint Inc., Canada

Evaluation of ground support system at Eleonore Mine using bonded block model T Garza-Cruz, L Bouzeran, Itasca Consulting Group Inc., USA; M Pierce, Pierce Engineering, USA; A Jalbout, M Ruest, Goldcorp Inc., Canada

About the likely performance of ground support systems submitted to dynamic loading D Gaudreau, Newmont Mining Corporation, Canada

Advanced geotechnical monitoring technology to assess ground support effectiveness L Gélinas, V Falmagne, B Bédard, Agnico Eagle Mines Ltd, Canada; O Matte, Université Laval, Canada

Quality control and quality assurance of resin rebar installation at the Tanco Mine, Manitoba, Canada O Gibbons, CE Lee, SRK Consulting (Canada) Inc., Canada

Review of seismic and geomechanics hazard, Uchucchacua Mine, Peru CV Gonzalez, Mirarco Mining Innovation, Canada; R Beltran, Buenaventura Company, Peru

Identification of critical seismic parameters contributing to high demand on ground support element at LaRonde Mine G Sasseville, M Grenon, Université Laval, Canada; P Morissette, Agnico Eagle Mines Ltd., Canada

Forensic investigations of ground control failures J Hadjiigeorgiou, University of Toronto, Canada

The evaluation of rockbolt as rock support in underground gold mine, Pongkor, West Java, Indonesia PN Hartami, S Supriyadi, Trisakti University and Syarif Hidayatullah State Islamic University, Indonesia; L Lillian, Trisakti University, Indonesia; R Pratama, PT Aneka Tambang Tbk, Indonesia

Limitations of standard analytical methods of shaft design N Henrich, S Blok, DS Calderón, DMT GmbH & Co. KG, Germany

A framework for extracting value from ground movement and support monitoring data AJ Hyett, YieldPoint Inc., Canada; BJ Forbes, Queen’s University, Canada

A case study of design and performance of diaphragm wall braced with struts for deep excavation S Iqbal, G Dora, M Naeem, Ammico Contracting Co., Qatar

Geomechanical approach to design the lower mine’s material handling system at Eleonore Mine A Jalbout, Goldcorp Inc., Canada

Rehabilitation and recovery methods for convered drawpoints C Kamp, New Gold Inc., Canada

Preloaded dynamic testing of rockbolts G Knox, New Concept Mining, South Africa

Ground support applications at Vale’s Coleman Mine D Landry, E Reimer, Vale Canada Limited, Canada

Evolution of the support systems and support practices in high-stress conditions at Vale’s Creighton Mine F Malek, M Yao, Vale Canada Ltd., Canada

Development and application of new artificial expandable pillars for ground support in hard rock mining Y Li, Northeastern University, China

Improvements in the numerical modelling of dynamic testing for reinforcement and retaining elements used in underground excavations E Mambroio, JA Vallejos, LGurgos, University of Chile, Chile; C Gonzalez, MIRARCO Mining Innovation, Canada

Suppression of spalling risk by confinement and engineered rock mass damage A McDonald, Goldfield Associates Ltd., Canada; SD McKinnon, Queen’s University, Canada

*As of 19 March 2019. Accepted abstracts list is subject to change. For updates, please visit www.groundsupport2019.com
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Monitoring Performance of Ground Support Workshop
22 October 2019 | Sudbury, Canada

Workshop Facilitators

Professor John Hadjigeorgiou
Pierre Lassonde Chair in Mining Engineering
University of Toronto, Canada

Professor Hadjigeorgiou holds the Pierre Lassonde Chair in Mining Engineering at the University of Toronto. John has over 25 years of extensive mining experience from both academia and industry, having served as a technical adviser to mining operations worldwide.

Professor Yves Potvin
Professor Geotechnical Engineering
Australian Centre for Geomechanics, Australia

Yves joined the ACG in 1998 and was Centre director 2000-2019. He has over 35 years’ experience in rock mechanics and mine design and has had managerial positions at Mount Isa Mines, the Noranda Technology Centre and worked as a mining engineer at Noranda Mines, Gaspe Division.

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**24 October 2019**

- **AUD/CAD 120/125**

Please notify us below of any special dietary requirements.

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All full registrations will receive luncheons and refreshments. Symposium papers will be accessible at papers.acg.uwa.edu.au from 21 October 2019. If you would like a printed copy of the proceedings, please tick the box below.

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**22 October 2019**

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Up to 8 days before event commencement: an administration fee of AUD150/CAD155 will be charged. 7 or less days before: no refund. Non-attendance: no refund. Substitutions will be accepted at any time.

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