

GROUND
SUPPORT 2019



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Ground Support 2019

Proceedings of the Ninth International Symposium on
Ground Support in Mining and Underground Construction

23–25 October 2019 | Sudbury, Canada

EDITORS John Hadjigeorgiou and Marty Hudyma

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Editors

John Hadjigeorgiou

University of Toronto, Canada

Marty Hudyma

Laurentian University, Canada

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Production team: Paul Burnett, Garth Doig, Candice McLennan, Josephine Ruddle, and Stefania Woodward, Australian Centre for Geomechanics.

ISBN 978-0-9876389-4-6



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Australian Centre for Geomechanics

The University of Western Australia
35 Stirling Highway (M600)
CRAWLEY, WESTERN AUSTRALIA
AUSTRALIA 6009
Telephone: +61 8 6488 3300
publications-acg@uwa.edu.au
www.acg.uwa.edu.au

ABN 37 882 817 280

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Australian Centre for Geomechanics, Australia

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M Yao
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Preface

The First International Symposium on Ground Support in Mining and Underground Construction took place in Abisko, Sweden, 1983 under the theme of rock bolting: theory and application in mining and underground construction. This series of symposia has evolved over the years to cover all areas of ground support and provide a documented timeline of the significant advancements in ground support technology and practice in the last 35 years. These are reflected in the improved safety statistics and performance of excavations.

The Ninth International Symposium on Ground Support in Mining and Underground Construction covered the complete spectrum of ground support, from new reinforcement and surface support products, new laboratory and in situ testing methods, quality control, monitoring, numerical modelling and applications in difficult ground conditions.

The organisers of Ground Support 2019 gratefully acknowledge the keynote speakers, Dr Mark Board, Frédéric Mercier-Langevin and Peter Andrews who provided a practical and international perspective from the USA, Canada and Australia.

The organisation of this symposium was conducted by a committee whose membership consisted of Dr Ming Cai, Professor Bruce Hebblewhite, Professor Charlie C Li, Professor Erling Nordlund, Professor Yves Potvin, Professor Pekka Särkkä, Brad Simser, Dr Jonny Sjöberg, Eduardo Rojas Valdivia, Dr Mike Yao and Professor Weishen Zhu. All administrative elements of the symposium were provided by the competent and enthusiastic Australian Centre for Geomechanics team. The symposium benefited from the financial support of many industry sponsors and the organisers gratefully acknowledge them.

Finally, this symposium would not have been possible if it were not for the authors who shared their experiences, and the independent reviewers who provided useful and insightful suggestions.

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John Hadjigeorgiou
Pierre Lassonde Chair in Mining Engineering
University of Toronto

Marty Hudyma
Associate Professor Mining Engineering
Laurentian University

Co-editors and Symposium Co-chairs

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Table of Contents

iii	Australian Centre for Geomechanics
v	Advisory Committee
vii	Technical Reviewers
ix	Preface
xi	Symposium Major Sponsors

Keynote addresses

3	Ground support from a corporate perspective <i>M Board, Hecla Ltd., USA</i>
15	Ground support selection rationale: a Gold Fields perspective <i>PG Andrews, Gold Fields Ltd, Australia</i>
29	Ground support: a mine manager's perspective <i>F Mercier-Langevin, Agnico Eagle Mines Ltd., Canada</i>

Ground support monitoring

43	Laser-based scanning to manage geotechnical risk in deep mines <i>DB Counter, Glencore Canada Corporation, Kidd Creek Operations, Canada</i>
59	Advanced geotechnical monitoring technology to assess ground support effectiveness <i>LP Gélinas, Agnico Eagle Canada Inc., Canada; V Falmagne, B Bédard, Agnico Eagle Canada Inc., Canada; O Matte, Université Laval, Canada</i>
75	A new paradigm in ground support monitoring through ultrasonic monitoring of clusters of rockbolts <i>Z Sun, KT Wu, SE Kruger, D Levesque, D Gagnon, Y Quenneville, National Research Council of Canada, Energy, Mining and Environment Research Centre, Canada; R Lacroix, R Royer, Natural Resources Canada, Canada</i>
85	Development of a single-pass detailed damage mapping application <i>D Cumming-Potvin, Y Potvin, J Wesseloo, P Harris, C Ho, M Heinsen Egan, Australian Centre for Geomechanics, The University of Western Australia, Australia</i>
101	Relating measured deformation to support load <i>DM Milne, University of Saskatchewan, Canada</i>
109	Technologies of ground support monitoring in block caving operations <i>T Dawn, Canary Systems Inc., USA</i>

Ground support in challenging conditions

125	Response of a support system to seismic events: a case study of Mina Uchucchacua, Peru <i>CV Gonzalez, MIRARCO Mining Innovation, Laurentian University, Canada; R Beltran, Compañía de Minas Buenaventura S.A.A., Peru; J Henning, BBA, Canada</i>
-----	---

- 139 Ground support challenges in arctic mining conditions**
V Falmagne, N St-Onge, Agnico Eagle Mines Ltd., Canada
- 155 Assessing the contribution of seismicity to the demand on ground support elements at LaRonde mine**
G Sasseville, M Grenon, Université Laval, Canada; P Morissette, Agnico Eagle Mines Ltd., Canada
- 169 Ground support design for weak rock mass: quantifying time-dependent closure in squeezing ground**
SN Warren, National Institute for Occupational Safety and Health, USA; R Pakalnis, Pakalnis & Associates, and The University of British Columbia, Canada; MJ Raffaldi, RESPEC Consulting, USA; DJ Benton, National Institute for Occupational Safety and Health, USA; L Sandbak, Barrick Gold Corporation, USA; CK Barnard, Golder Associates Inc., USA
- 185 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, Boliden Mineral AB, Sweden; J Sjöberg, Itasca Consultants AB, Sweden

Dynamic testing of ground support

- 201 Development of a new Sandvik 'little brother' dynamic rockbolt and the in situ dynamic evaluation of bolts**
W Roach, M Rataj, B Darlington, Sandvik Mining and Rock Technology, Australia
- 213 About the likely performance of ground support systems submitted to dynamic loading**
D Gaudreau, Newmont Goldcorp, Australia
- 231 Dynamic testing: determining the residual dynamic capacity of an axially strained tendon**
G Knox, New Concept Mining, South Africa; A Berghorst, New Concept Mining, USA
- 243 Dynamic testing of surface support systems**
R Brändle, Geobrugg AG, Switzerland; R Luis Fonseca, Geobrugg Ibérica S.A., Spain

Case studies and mechanised installation

- 253 Failure mechanisms and ground support observations at Coleman mine, Sudbury Basin**
D Landry, E Reimer, Vale Canada Ltd., Canada
- 267 The evolution and performance of the Henderson Mine's C-arch shotcrete drawpoint support**
NA Shea, Climax Molybdenum Co., USA
- 277 Mechanised installation of rolled high tensile strength steel wire mesh for ground support: Canadian trial observations**
C Pritchard, Pritchard Mining Technologies Inc., Canada; E Rorem, Geobrugg North America, LLC, USA; D Landry, B Whitmell, Vale Canada Ltd., Canada
- 283 A review of mining practices for surface support: an international survey**
H Schunnesson, G Shekhar, A Gustafson, D Johansson, Luleå University of Technology, Sweden
- 295 Mining initiative on ground support and equipment: 12 years of accomplishments**
G Swan, Rock Mechanics and Mine Design, Canada; J Hedlin, Rock Tech Centre AB, Sweden

Numerical modelling

- 311 Stability assessment of initial shotcrete lining using two-dimensional continuum numerical modelling**
S Naseri, N Bahrani, Dalhousie University, Canada

- 327 Explicit discrete fracture network numerical analyses of the stability of underground stopes and effects of cable bolt support at Raglan Mine**
T Lavoie, P Andrieux, S Guido, Andrieux & Associates Geomechanics, L.P., Canada; R Caumartin, Glencore, Canada
- 341 Evaluation of ground support design at Eleonore Mine via Bonded Block Modelling**
T Garza-Cruz, L Bouzeran, Itasca Consulting Group, Inc., USA; M Pierce, Pierce Engineering, USA; A Jalbout, M Ruest, Newmont GoldCorp Corporation, Canada
- 357 Progress in the numerical modelling of dynamic testing for reinforcement and retaining elements used in underground excavations**
JA Vallejos, Department of Mining Engineering and Advanced Mining Technology Center, University of Chile, Chile; E Marambio, Y Marulanda, L Burgos, Advanced Mining Technology Center, University of Chile, Chile; CV Gonzalez, MIRARCO Mining Innovation, Canada
- 375 Finite element analysis of the Superbolt under dynamic loading**
BV Nguyen, M Cai, K Challagulla, Laurentian University, Canada
- 387 Numerical investigation of dynamic response of a rockbolt under drop testing and simulated seismic loading conditions**
P Zhang, E Nordlund, Luleå University of Technology, Sweden

Ground support corrosion

- 401 Corroded rock support issues: implementation of an investigation and rehabilitation program**
JF Dorion, Raglan Mine, Canada
- 415 Analysis of in situ and laboratory corrosion coupons**
AJ Chambers, CB Sunderman, CC Clark, MJ Powers, National Institute for Occupational Safety and Health, USA
- 423 Rusty bolts: planning for corrosion of ground support in underground mines**
RP Preston, JM Roy, RP Bewick, Golder Associates Inc., Canada
- 437 Microbiologically induced cable bolt corrosion in underground coal mines**
H Chen, O Kimyon, HL Ramandi, B Hebblewhite, A Crosky, S Saydam, UNSW Sydney, Australia; AH Kaksonen, C Morris, Commonwealth Scientific and Industrial Research Organisation, Australia

Ground support design considerations

- 445 Limitations of standard analytical methods of shaft liner design**
N-A Hentrich, DMT GmbH & Co. KG, Germany; DS Calderón, DMT Geosciences Ltd., Canada; S Bock, J Franz, DMT GmbH & Co. KG, Germany
- 459 Application of the Geological Strength Index in Peruvian underground mines: retrospective 18 years after its implementation**
LA Mejia Camones, RockEng Inc., Canada; C Chacon Nunez, Pan American Silver, Peru
- 471 Suppression of tunnel spalling by engineered rock mass damage**
AC McDonald, SD McKinnon, Queen's University, Canada
- 479 The creation and application of a geotechnical block model for an underground mining project**
D Sewnun, W Joughin, M Wanless, P Mpunzi, SRK Consulting (South Africa) (Pty) Ltd, South Africa

- 493 Towards optimising ground support systems in underground mines**
Y Potvin, Australian Centre for Geomechanics, The University of Western Australia, Australia;
J Hadjigeorgiou, University of Toronto, Canada; J Wesseloo, Australian Centre for Geomechanics,
The University of Western Australia, Australia

New ground support products

- 505 Polyester resin injection of dynamic resin and cable bolting systems to improve development efficiency**
T Roberts, Jennmar Australia Pty Ltd, Australia; D Faulkner, Jennmar Corporation, USA
- 519 Developments in stiff ground support in deep potash operations at the Vanscoy Mine**
TJ Coleman, SRK Consulting (Canada) Inc., Canada; DD Neely, Nutrien, Canada
- 533 Development of a new cementitious grout for permafrost conditions**
S Reny, J Pena Cruz, W Clements, King Packaged Materials Company, Canada
- 545 Development of a new deformation-controlled rockbolt: numerical modelling and laboratory verification**
Y Yokota, Kajima Technical Research Institute Singapore, Singapore; Z Zhao, W Nie, Nanyang
Technological University, Singapore; K Date, Kajima Technical Research Institute Singapore, Singapore;
K Iwano, Y Koizumi, Y Okada, Kajima Technical Research Institute, Japan

QA/QC and management plan

- 559 Early strength development of shotcrete for rapid mine development and behaviour under dynamic loads**
F Erismann, Sika, Switzerland; M Hansson, Sika, Sweden
- 571 How convincing is the quality of our resin rebar installation? A case study**
O Gibbons, C Lee, SRK Consulting (Canada) Inc., Canada
- 581 Ground support installation quality controls and possible pitfalls: a case study from a critical fall of ground contract rehabilitation project**
BN Viljoen, BA Murphy, SRK Consulting (Canada) Inc., Canada
- 593 Utilising database algorithms and three-dimensional visualisation software to optimise ground-control management**
KG Veltin, RP Preston, AL Pakula, D Kennard, Golder Associates Ltd., Canada
- 601 Proceedings Author Index**