AfriRock International Symposium—Programme

Pre-Conference 2 October 2017
07:30-17:00 Dr Nick Barton and Prof. John Cosgraeve Workshop Meeting Room 2.64-2.66

COMMISSION MEETINGS
08:30-10:30 Design Methodology (Meeting Suite 1.51)
10:30-12:30 Testing Methods (Meeting Suite 1.51)
08:30-10:30 Petroleum Geomechanics (Meeting Suite 1.52)
10:30-12:30 Preservation of Ancient Sites (Meeting Suite 1.53)
08:30-10:30 Radioactive Waste Disposal (Meeting Suite 1.55)
08:30-10:30 Soft Rocks (Meeting Suite 1.91)
10:00-12:00 Asian Council Meeting (Meeting Suite 1.71)
13:00-19:00 ISRM Council Meeting (Meeting Suite 2.44–2.46)
17:00-19:00 Welcome Network Cocktail & Conference Registration

Conference Day 1—Plenary Ballroom East
3 October 2017–Tuesday
08:30-08:35 Registration and early morning refreshments
08:30-08:35 Emergency Procedures–CITCC

OPENING CEREMONY
08:35-08:40 Opening Address

SUPPORT DESIGN—BALLROOM EAST
Session Chair: C. Li
13:30-13:45 Supporting method for underground engineering in hard rock with high geostress: a case study of the Bahletan hydropower project, China
G. Jiang*, A.T. Fenyi*, Y. Fan*, L. Xue*, H. Chen†, *Institute of Rock and Soil Mechanics, Chinese Academy of Sciences and †China Three Gorges Project Corporation, China
14:00-14:15 Parameters required for the design of rock support in high-stress rock masses
C.C. Li Norwegian University of Science and Technology (NTNU), Norway
14:15-14:30 Stable span re-design and support mechanism for a shallow hard-rock bord-and-pillar mine on the Great Dyke: the case of Unki Mine, Zimbabwe
O. Mandingaisa and C. Musa, Anglo American, Unki Mines, Zimbabwe
14:30-14:45 Improving mining efficiencies by means of a new support design at Unisel Gold Mine, Welkom, South Africa
P.M. Cools, Bentley, Lucas and Associates Mining Consultants, South Africa
14:45-15:00 Numerical simulation of fully grouted rockbolts by considering nonlinear bond-slip behaviour
S. Ma, Z. Zhao, and W. Nie, Nanyang Technological University, Singapore
15:00-15:15 Mining with crush pillars
M. du Plessis and D.F. Maolan†, Lonmin Platinum, Marikana and †University of Pretoria, South Africa
15:15-15:30 Use of plastic composites as friction rockbolts material
E. Komurlu and A. Kesimer, Karadeniz Technical University, Turkey
15:30-15:45 Preliminary investigation of the effect of areal shape on pillar strength
J. Maritz, University of Pretoria, South Africa
15:45-16:00 Mid Afternoon Refreshments

SURFACE MINING SLOPE STABILITY—BALLROOM EAST
Session Chair: R. Armstrong
16:00-16:15 Slope design considerations for shallow open pit mines: a case study at Mamatwan Mine, Northern Cape Province, South Africa
S.N. Epiga and S.M. Ruprecht, University of Johannesburg, South Africa
16:15-16:30 Identification of potential rock wedge controlled rockfalls using groundbased LIDAR Techniques: A case study in Eastern Taiwan
M.-C. Tsao and T.-T. Wang, National Taiwan University of Technology, Taiwan
16:30-16:45 Optimization of slope design in rapakivi at Kansanshi
T.O. Moore, First Quantum Minerals Limited, Zambia
16:45-17:00 Techniques for measuring three-dimensional displacement vector using ground-based interferometric synthetic aperture radar
C. Thomson*, N. Cow*, and L. Leoni†, *Hexagon Mining, South Africa and †Geodesy Section, South Africa
17:00-17:15 Ojiikodo gold mine — a case study in pit slope design
O. Pillay, R. Armstrong, and P.J. Terbrugge, SRK Consulting, South Africa
17:15-17:30 A holistic open pit mine slope stability index using artificial neural networks
M. Fakir and M. Ferentinou, University of Johannesburg, South Africa
17:30-17:45 The significance of identifying potential failure mechanisms from conceptual to design level for open pit rock slopes
C. Romer* and M. Ferentinou†, *University of KwaZulu-Natal and †University of Johannesburg, South Africa
17:45-18:00 Investigation of failures associated with a major shear zone in the Main Pit 3 West, at Lebelaing Diamond Mine, Lesotho
N. Lebu*, E.D.C. Hingston†, and N. Lephato‡, *Leibeling Diamonds, Lesotho and †University of KwaZulu-Natal, South Africa
18:00-18:15 ISRM Advisory Forum—Meeting Room 1.43 and 1.44

SEISMICITY—MEETING ROOM 2.41–2.46
Session Chair: F. Esrich
13:30-13:45 Relating seismic source mechanisms to damage phenomena in platinum mines of the western Bushveld Complex
G. van Aswegen, Consultant, Mine Seismology, South Africa
14:00-14:15 Observational studies in South African mines to mitigate seismic risks: challenges and achievements
R.J. Durheim†, H. Ogasaawara†, M. Nakatani†, Y. Yabe†, M. Naoi†, H. Moriy†, A. Chuczowic‡, T. Satoh‡, H. Kawashita‡, A. Miyer†, T. Kimagure†, Y.Z. Bisk‡, A.K. Ward‡, L. Ribeiro‡, M.S.D. Manzi‡, and S. Megazu, the SATREPS Team, †University of the Witwatersrand, South Africa, ‡Ritsumeikan University, Japan, *The University of Tokyo, Japan, †Tohoku University, Japan, ‡Hokkaido University, Japan, *Council for Geoscience, South Africa, †IST, Japan, ‡CSIR, South Africa, ‡Seismogen CC, South Africa
14:15-14:15 Investigations of rockburst propensity of artificial samples containing different aggregates
A. Klammer, C. Peinert, M. Lagger, M. Bluemel, and W. Schubert, Graz University of Technology, Austria
14:15-14:30 Microseismic events for slope stability analysis — a case study at an open pit mine
X. Luo†, M. Salviori†, P. Dight†, and J. Duan‡, *CSIRO Energy and †University of Western Australia, Australia
14:30-14:45 Excavation-induced seismicity: mechanism and implications
W. Wu†, Z. Zhao†, and K. Duan‡, *Nanyang Technological University, Singapore and ‡Tsinghua University, China
14:45-15:00 Early access microseismic monitoring using sensors installed in long boreholes
15:00-15:15 Drilling into seismogenic zones of M2.0–M5.5 earthquakes from deep South African gold mines (DSeis): establishment of research sites
15:15-15:30 Location and source mechanism of a microseismic event in a mine using a single seismogram
R.A. Lynch†, S. Jardas†, B. Brignall†, and S. Moolla*, *Institute of Mine Seismology, South Africa, ‡Seismogen CC, South Africa
15:30-15:45 Calibration of modelled seismicity in South African mines using a potency-based method
J. Gerber and S. Kohler, Institute of Mine Seismology, South Africa
15:45-16:00 Mid Afternoon Refreshments

Session Chair: T. Butler
Technology transfer for minimizing seismic risk in South Africa’s platinum mines
F. Esrich†, J.W.L. Hanekom†, and J. Bowier‡, *ISM Mining Consultants, †Mistdel Mining Consultants, ‡Prospero Training Solutions, South Africa
16:15-16:30 Microseismic monitoring and stability analysis of the deep underground caverns at Lianghekou hydropower station, southwest China
A. Li†, F. Dai†, Z. Zhou1†, C. Sha1†, and N. Xu†, *Sichuan University and †Powerchina Chengdu Engineering Corporation Limited, China
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Conference Day 2—Plenary Ballroom East

4 October 2017—Wednesday

07:30–08:30 Registration & early morning refreshments
08:00–08:20 Keynote Session: Stress measurements for underground powerhouses—three recent cases
L. Lamas*, M. Espada*, B. Figueiredo†, and J. Muralha†, *National Laboratory for Civil Engineering—LNEC, Portugal, †Uppsala University, Sweden
09:10–09:20 Sponsor Presentation
IDS GEORADAR SRL
09:20–09:35 Mid Morning Refreshments

UNDERGROUND MINING—BALLROOM EAST

Session Chair: P. Couto
09:35–09:50 An empirical and numerical approach to quantifying raisebore-hole stability
Y. Rajal* and J.W.L. Hanekom†, *Middlini Consulting (Pty) Ltd and †University of Pretoria, South Africa
09:50–10:05 Reassessing continuous stope closure data using a limit equilibrium displacement discontinuity model
D.F. Malan and J.A.L. Napier, University of Pretoria, South Africa
10:05–10:20 A study of multi-refill pillar extraction in the Venterdorp tunnel and residential buildings
P. Konicek* and J. Schreiber†, *Institute of Geonics of the CAS and †Vodochody, Czech Republic
10:20–10:35 A tool for the evaluation of departmental effectiveness
K. Bait† and T.R. Stacey†, *Advisian, Worley Parsons Group, Sub-Sahara Africa and †University of the Witwatersrand, South Africa
10:35–10:50 Estimation of closure by the timber pack assessment method, and comparison to modelled elastic convergence
H. Yilmaz* and O. Rakumako*, University of the Witwatersrand, South Africa
10:50–11:05 Microseismicity-based feedback analysis of the stability of deep underground caverns at the Houziyan hydropower station, China and †Hydropower, Sichuan University, China
11:05–11:20 Optimising stope panel spans at an eastern Bushveld Platinum Mine by probabilistic analysis
L.J. Gardner*, L. Bronkhorst†, †University of Pretoria, South Africa
11:20–11:35 Time-dependent failure of open stopes at Target Mine
P.J. Le Roux and K.R. Brentley, Bentley, Lucas and Associates, South Africa
11:50–12:00 Sponsor Presentation: Sandvik
12:00–13:20 Lunch

TUNNELS, CAVERNS and DAMS—BALLROOM EAST

Session Chair: L. Lamas
13:20–13:35 Microseismicity-based feedback analysis of the stability of deep underground caverns at the Houziyan hydropower station, China
B. Li*, Z. Zhou†, †University, Turkey, and ‡University of the Witwatersrand, South Africa
13:35–13:50 Cautious blast design and practice in close proximity to a railway tunnel and residential buildings
H.A. Bilgin*, Y. Dagasan†, and B. Unuturk‡, *Middle East Technical University, Turkey, †Curtin University, Australia and ‡Polyak Energy Coal Mine, Turkey
13:50–14:05 Geotechnical design refinement in parallel with construction – Boschkop Abstraction Works, South Africa
A.T.M. Morgan, Geod Geotechnical Engineers, South Africa
14:05–14:20 Afternoon Refreshments

INVESTIGATION TECHNOLOGY—MEETING ROOM 2.41–2.46

Session Chair: S. Read
09:35–09:50 The determination of crustal stress orientation based on the borehole geometric shape using panoramic stereopair imaging technology
C. Wang, X. Zou, and Z. Han, Chinese Academy of Sciences, China
09:50–10:05 The Sub Surface Profile: a giant leap for ground penetrating radar
A. Penaar, Reutech Mining, South Africa
10:05–10:20 Rock failure modes under uniaxial compression and indirect tension
A. Basu, Indian Institute of Technology Kharagpur, India
10:20–10:35 Innovative technologies for monitoring underground excavations during construction and usage
A. Carri, L. Chiappori, R. Savi, and A. Segalini, University of Parma, Italy
10:35–10:50 An acoustic approach to the estimation of rock mass state and prediction of induced seismicity parameters: theory, laboratory experiments, and case study
L.A. Nazarova, L.A. Nazarov, V.L. Shkuratnik, M.I. Protasov, and P.V. Nikolenko, Russian Academy of Science, Russia
10:50–11:05 Experimental studies of variably saturated flow from a horizontal discontinuity to the vertical with and without an intersection
B.R. Jones†, L.B. Brouwers†, M.A. Dippenaar†, and J.L. Van Rooy†, †Geotechnical Consulting Pty Ltd, South Africa and ‡Fugro Middle East, United Arab Emirates, and †University of Pretoria, South Africa
11:05–11:20 Design of an in situ testing device for the backfill of mechanized driven tunnels in hard rock
M. Lagger, M.R. Hentzinger, and W. Schubert, Graz University of Technology, Austria
11:20–11:35 Analytical and experimental investigation of the hard rock indentation process
S. Souissi and E. Hamdi, Université de Tunis El Manar, Tunisia
11:35–11:50 Characterizing microtremor signals of a slope with deep-seated gravitational deformation
Y.C. Chiu, P.C. Lo, and T.T. Wang, National Taipei University of Technology, Taiwan
11:50–12:05 Progress of brittle microfracturing in crystalline rocks under cyclic loading conditions
E. Ghazvinian† and M.S. Diederichs†, †Mine Design Engineering, and †Queen’s University, Canada
12:05–12:20 InSAR monitoring for mines: an integrated approach
D. Colomb†, F. Belkoui†, F. Faiss†, A. Jonson†, and I. du Toit†, †Te Altimaria, Italy and †Optron (Pty) Ltd, South Africa
12:20–13:20 Lunch

EARLY CAREER FORUM—MEETING ROOM 2.41–2.46

Session Chairs: E. Quadro and M. He
EARLY CAREER FORUM
13:20–14:05 Early Career Forum Presentations
14:05–14:20 Afternoon Refreshments
14:20–17:00 Early Career Forum Presentations

18:00–18:30 Transport from CTICC to the Castle
19:00–22:00 Conference Dinner
22:00–22:30 Transport to CTICC
10:00–10:15 Benchmarking of debris flow experimental tests using combined finite-discrete element method, FEMDEM
N. Verron*, T. Bazile*, and T. Desmet
*Geotechnical and Structural Engineering, University of Mons, Belgium

10:15–10:30 Numerical model calibration: process or luck?
J. W. van Heeswijk and B. C. Okhaya
Midnite Consulting (Pty) Ltd and University of Pretoria, South Africa

10:30–10:45 Modelling salt rock dissolution in the foundation of a large dam
C. Vibert*, J. Schellekens, and V. Libard
*Tractebel-Goyne et Bellère, France and Université de Liège, Belgium

10:45–11:00 A multi-objective hybrid prediction model of slope deformation based on fuzzy optimization algorithm
J. B. Zhu and C. Li
Yangtze River Scientific Research Institute, China

11:00–11:15 Comparison of observational, empirical, and 3D discrete numerical methods to estimate subsidence over longwall coal faces
I. Pérez-Rey*, L. R. Alejano*, and P. Velasco*
*University of Vigo and **MBA Consulting Group, Spain

11:15–11:30 Characterisation and numerical modelling of standard and cabled-strapped pillars in a haematite mine
L. R. Alejano*, U. Castro-Figuera*, I. Pérez-Rey*, F. Garcia-Bastante* and J. Arzalliz
*University of Vigo, Spain and **Universidad Católica del Norte, Chile

11:30–11:45 Geotechnical characterisation and revision of the pillar design for a hard-rock and bord and piller mine
J. Walls* and P. Munyar
*SRK Consulting and †Jewel Geotechnical (Pty) Ltd, South Africa

11:45–12:00 A remote sensing approach for the derivation of numerical modelling input data: insights from the Hope Slide, Canada
D. Donali*, D. Stead*, M-A. Brideau*, and Simon Fraser University, Canada

12:00–12:15 Discrete element modelling of rock-cutting experiments under confining pressure
N. Gorize and J-P. Tshibangu, University of Mons, Belgium

12:15–13:30 Lunch