

AFRIROCK

PIONEERING PROGRESS : 2025
THE FUTURE OF ROCK ENGINEERING

Venue: Sun City, Rustenburg, South Africa
21-23 JULY 2025 - Conference



Final Programme

Sunday 20 July 2025

17:00-19:00 Welcome Networking Cocktail and Early Registrations
Venue: Warrior Room Foyer Area, Dress Code: Smart Casual

PLENARY SESSION

Conference Day 1—Monday 21 July 2025

07:30-08:30 Registration Opens & Early Morning Refreshments
08:30-08:40 Welcome and Opening Address
K.B. Le Bron, Conference Chairperson,
MLB Consulting, South Africa
08:40-08:45 Safety Briefing
Venue Official
08:45-09:00 SAIMM Presidential Address
E. Matinde SAIMM President

Session Chair: S. Durapraj, Sibanye-Stillwater, South Africa
09:00-09:30 **Keynote Address: Practical considerations in the selection of ground support**
J. Hadjigeorgiou, University of Toronto, Canada
09:30-09:35 Sponsor Presentation - OHMS

PARALLEL SESSIONS

Ground Support

Session Chair: R. Hammah, Rocscience, South Africa
09:35-09:55 Rockbolts in shear
G. Knox, J. Hadjigeorgiou, University of Toronto, Canada
09:55-10:15 Review of quality assurance methods for hydro-powered resin bolting
J.P. Gouvea, W. Geel, Glencore Northam Platinum Holdings Ltd, South Africa
10:15-10:35 Controlling tailings backfill leakage through fractured pillars
G.M. Mphike¹, D. O'Connor¹, S.M. Sibanda², ¹Minova, ²South Deep Gold Mine, South Africa
10:35-10:55 The development of the fast cable anchor
J. Wang¹, B. Darlington¹, M. Farrington², P. Young¹, S. Weaver¹, ¹Sandvik Mining & Rock Solutions, ²Agnico Eagle, Australia
10:55-11:15 **Mid-morning refreshments and networking**

Geotechnical Data

Session Chair: G. Nkosi, Siyanda Bakgatla Platinum Mine, South Africa
09:35-09:55 Rectifying, conforming and extracting value from existing geotechnical data sets - the importance of good data management for optimal value extraction
M.H. van Aswegen¹, D.H. Mossop², ¹Independent Consultant - Data Governance, ²SRK Consulting, South Africa
09:55-10:15 Influence of saturation fluids on the elasto-plastic deformation behaviour of shale
L. Chen, L. Wang, China University of Petroleum, China
(Online Presentation)
10:15-10:35 Unravelling the past for a safer future: How historic rock mass classification data compare with slope performance monitoring data
M. Pretorius, Vedanta - Gamsberg, South Africa
(Online Presentation)

PLENARY SESSION

Session Chair: E. Pilane, Vice President, Sibanye-Stillwater, South Africa

11:15-11:20 Sponsor Presentation - Reutech Radar Systems
11:20-11:50 **Keynote Address: The implementation of hydraulic fracturing for pillar preconditioning in a deep gold mine**
D. Roberts, Sibanye-Stillwater, South Africa
11:50-11:55 Sponsor Presentation - Horts Mining
11:55-12:00 Sponsor Presentation - Sandvik

AFRIROCK

PIONEERING PROGRESS : 2025
THE FUTURE OF ROCK ENGINEERING

Venue: Sun City, Rustenburg, South Africa
21-23 JULY 2025 - Conference



Final Programme

Conference Day 1—Monday 21 July 2025 (continued)

PARALLEL SESSIONS

Ground Support (continued)

Session Chair: O. Mandingaisa, Valterra Platinum, South Africa

- 12:00–12:20 A review of the stope support system at Impala Bafokeng North Shaft owing to stope closure at shallow mining depths
T. Walsh, University of the Witwatersrand, South Africa
- 12:20–12:40 A proposed method of pre-mining rib pillars and replacing pillars using a cemented aggregate fill
R.M. Arlow¹, I. Malpartida², J. Nyagumbo², ¹Dayenu, ²Alphamin Resources, South Africa
- 12:40–13:00 Performance and mechanical properties of a styrene-free polyester resin produced with water-based catalyst and a new generation catalyst
G. Smolnik^{1,2}, R. Penczek¹, J. Franek¹, D. Bucholc¹, ¹Sandvik Ground Support, Silesian University of Technology, Poland
- 13:00–13:20 Blast-on-Mesh: Transforming deep-level gold mining – success stories from Kusasalethu
R. van Heerden¹, M. Phathu², ¹Harmony Gold Mining Company, ²Geobrugg, South Africa
(Online Presentation)
- 13:20–14:20 **Lunch**
- 14:20–14:40 Do underground excavations mined by non-explosive mining techniques require less support than when mined by blasting? A challenge to rock engineers to review support design practice
R.G.B. Pickering, D. Arnold, J. Porter, Rock Eater (Pty) Ltd, South Africa

Slope stability

Session Chair: T. Dlokweni, Kumba Iron Ore, South Africa

- 12:00–12:20 Stabilisation of highwall instability using numerical modelling and statistical analysis for open pit mining
N.I. Umeh, S. Darries, N.E. Baloyi, T. Rangasamy, Middindi Consulting (Pty) Ltd, South Africa
- 12:20–12:40 Integrating monitoring technologies to understand slope deformation in open-pit mines: A case study from Swakop uranium mine
G. Ockhuizen¹, R. Armstrong², Y. Xiang¹, S. MacLennan³, ¹CGNPC Swakop Uranium, Namibia, ²SRK Consulting, ³University of the Witwatersrand, South Africa
- 12:40–13:00 Rock fall hazard analysis of a natural slope at the Sungun Copper Mine
J.D. Bosman¹, L. Cilliers¹, H. Reza Golchin², ¹Open House Management Solutions Pty Ltd, ²Sungun Copper Mine, South Africa
- 13:00–13:20 Mitigating pit floor instability above a confined aquifer: Assessing mining block dimensions and sequencing strategies
L. Bruyns, M. Rangasamy, T. Rangasamy, Middindi Consulting (Pty) Ltd, South Africa

AFRIROCK

PIONEERING PROGRESS : 2025
THE FUTURE OF ROCK ENGINEERING

Venue: Sun City, Rustenburg, South Africa
21-23 JULY 2025 - Conference



Final Programme

Conference Day 1—Monday 21 July 2025 (continued)

PARALLEL SESSIONS

Caving

Session Chair: E.J. Walls, AMC, South Africa

- 14:40–15:00 The role of stress and geology on the design of block cave mining sequences and layouts - a case study
T. Mtshali¹, N.M. Chiloane², N.M.B. Makgate¹,
T. Chauke², F.K. Mulenga², V.C. Madanda², T. Moyane¹,
R.B. Khumalo¹, ¹Palabora Mining Company,
²University of South Africa, South Africa
- 15:00–15:20 Application of Flac3D to analyse the effects of mining-induced stresses on the behaviour of drawpoint pillars: A case study of a long-hole open stoping mine in Zimbabwe
A. Velepini, Gwanda State University, Zimbabwe

Numerical Modelling

Session Chair: J. Hanekom, CSIR, South Africa

- 14:40–15:00 3D elastodynamic modelling applied in the design of technical blasts in open pit mines
L.M. Linzer^{1,2}, A.J. Rorke³, M.W. Hildyard⁴,
¹SRK Consulting, ²University of the Witwatersrand,
³Independent, South Africa, ⁴Leeds University, UK
- 15:00–15:20 Key block theory for the miner: A novel simplified method for determining block removability
C. van Rooyen, University of the Witwatersrand, South Africa
- 15:20–15:40 Application of large-scale finite element method simulations to determine geomechanical hazard during room-and-pillar mining under a tectonic fault
K. Fuławka¹, L. Stolecki¹, R. Kołodziej²,
¹KGHM CUPRUM Ltd, ²KGHM Polska Miedź S.A. - Mine, Poland

15:40–16:00 Afternoon refreshments

16:00–17:30 Time at leisure

18:00–21:00 Network Cocktail function
Brew Monkey, Valley of the Waves, Dress Code: Smart Casual
(Sponsored by New Concept Mining)



AFRIROCK

PIONEERING PROGRESS : 2025
THE FUTURE OF ROCK ENGINEERING

Venue: Sun City, Rustenburg, South Africa
21-23 JULY 2025 - Conference



Final Programme

Conference Day 2—Tuesday 22 July 2025

07:30-08:30 Registration Opens & Early Morning Refreshments

08:30-08:40 Welcome and Opening Address
K.B. Le Bron, *Conference Chairperson,*
MLB Consulting, South Africa

08:40-08:45 Safety Briefing
Venue Official

Session Chair: M. Motlhageng, *CEO, Impala Rustenburg, South Africa*

08:45-09:15 **Keynote Address: Design of crush pillars and their use in high-stress mining**
B.P. Watson, *University of the Witwatersrand,*
South Africa

09:15-09:20 Sponsor Presentation - MLB Consulting 

09:30-09:35 Advancing geotechnical risk management and seismicity mitigation through interactive guidelines and industry collaboration

H. Greeff, J. Hanekom, *Council for Scientific and Industrial Research, South Africa*

09:35-09:40 Geotechnical and operational risk review for an ultra-long ore pass in a caving operation
E. Walls, *AMC Consultants, South Africa*

09:40-09:45 Stabilisation of open pit wall movements detected by InSAR

J. Pretorius¹, J. du Toit², P. Narshai¹, *1SkyGeo,*
Netherlands, 2First Quantum Minerals, Zambia

09:45-09:50 HelloMac – Intelligent engineering revolutionising underground mine monitoring
W. Greyling, *MACCAFERRI, South Africa*

Poster Session

09:20-09:25 **Applications of Fibre Optic Distributed Sensing (DAS) for mining industry**

S. Dande¹, E. Forbes², T. Butler², A. Senso²,
1ESG Solutions, USA, 2ESG Solutions, Canada

09:25-09:30 **Determining the applicability of muon tomography for monitoring hazards in deep underground mines - a case study from a Polish copper mine**

R. Kołodziej¹, K. Fuławka², L. Stolecki², G. Surányi^{3,5},
M. Holma^{3,4}, H. Gergő⁵, *1KGHM Polska, 2KGHM CUPRUM*
sp. z o.o., 3Muon Solutions Oy, Finland, 4Kerttu Saalasti
Institute, University of Oulu, 5Wigner Research Centre
for Physics, Hungary

AFRIROCK

PIONEERING PROGRESS : 2025
THE FUTURE OF ROCK ENGINEERING

Venue: Sun City, Rustenburg, South Africa
21-23 JULY 2025 - Conference



Final Programme

Conference Day 2—Tuesday 22 July 2025 (continued)

PARALLEL SESSIONS

Seismicity

Session Chair: L. Scheepers, Sibanye-Stillwater, South Africa

09:50–10:10 Application of MEMS accelerometers for continuous near-field monitoring of mining-induced seismicity
L. Stolecki, K. Fuławka, P. Mertuszka,
KGHM CUPRUM Ltd, Poland

10:10–10:30 Seismic-based live tracking of underground fires and cooling period response
M. Wiggins¹, L. Scheepers¹, J. Gerber²,
¹Sibanye-Stillwater, ²IMS – Institute of Mine Seismology, South Africa

Slope stability

Session Chair: G. Knox, Epiroc, South Africa

09:50–10:10 Stability design of slopes in carbonatite complexes characterised by brecciation
D. Moses¹, J.A. Onyango², ¹University of Malawi, Malawi, ²Jomo Kenyatta University of Agriculture and Technology, Kenya (Online Presentation)

10:10–10:30 Slope stability evaluation of gneiss rock slopes using SMR and QSlope
E. Kalhan, C. Kincal, Dokuz Eylul University, Turkey (Online Presentation)

Subsidence

Session Chair: L. Scheepers, Sibanye-Stillwater, South Africa

10:30–10:50 Modern satellite data provide new insights into surface movements above coal longwall mining
A. Vervoort, KU Leuven, Belgium

10:30–10:50 Risk-based slope design: Insights from the Thabazimbi failure
M. Bester¹, T. Dlokweni², I. Basson³, C. Koegelenberg³,
¹Anglo American, ²Anglo American, Kumba Iron Ore, ³Tect Geological Consulting, South Africa

10:50–11:10 Mid-morning refreshments and networking

PLENARY SESSION

Session Chair: O. Rakumakoe, Harmony Gold, South Africa

11:10–11:15 Sponsor Presentation – New Concept Mining  Powered by Epiroc

11:15–11:45 **Keynote Address: The art of rock engineering design and the need for research**
D.F. Malan, University of Pretoria, South Africa

11:45–11:50 Sponsor Presentation – Geobrugge Southern Africa 

AFRIROCK

PIONEERING PROGRESS : 2025
THE FUTURE OF ROCK ENGINEERING

Venue: Sun City, Rustenburg, South Africa
21-23 JULY 2025 - Conference



Final Programme

Conference Day 2—Tuesday 22 July 2025 (continued)

PARALLEL SESSIONS

Modern Analytical Techniques

Session Chair: R. Carstens, Anglo American, South Africa

11:50–12:10 **Machine learning as a catalyst to enhance collaboration across generations and disciplines in South African Rock Engineering**
R.T. Masethe¹, L.N.P. Msimango², ¹University of KwaZulu-Natal, ²Gauteng Department of Education, South Africa

12:10–12:30 **Transforming geotechnical monitoring data acquisition, 3D visualisation and analytics for modern mining**
J.J. Meiring, P.S. Piper, Groundwork Consulting, South Africa

12:30–12:50 **Soft computing techniques for predicting mode-II fracture toughness: A cost-effective approach to advancing rock mechanics' design and sustainability**
N.O. Ogunsola^{1,2}, H. Grobler¹, ¹University of Johannesburg, ²Sibanye-Stillwater, South Africa

12:50–13:10 **Comparison of machine learning classification for rockburst prediction: A case study of South African gold and platinum mines**
N.P. Khumalo, R.T. Masethe, University of Kwazulu Natal, South Africa

13:10–14:00 **Lunch**

14:00–14:20 **Towards ensuring sustainable mining: Application of a pareto-optimised hierarchical structural interaction matrix for prioritising slope stability influencing factors**
N.O. Ogunsola^{1,2}, O. Makinde¹, H. Grobler¹, ¹University of Johannesburg, ²Sibanye-Stillwater, South Africa

14:20–14:40 **Role of machine learning in optimising prediction of blast fragmentation in mines using site-specific geological data**
M.S. Kanongovere, R.S. Suglo, M. Masialeli, Botswana International University of Science and Technology, Botswana

Slope stability (continued)

Session Chair: R. Armstrong, SRK Consulting, South Africa

11:50–12:10 **Calibratable rock mass shear strength for open pit slopes**
J. Venter, AngloGold Ashanti, Australia
(Online Presentation)

12:10–12:30 **Development of a filtered inverse velocity method analyser: A comparative study of smoothing filters in surface mines for optimisation of slope failure predictions**
M.M. Masood, T. Verma, G.Y. Raju, National Institute of Technology, India (Online Presentation)

12:30–12:50 **Learnings from development of an underground sub-level open stope mine below an open pit**
K.B. Le Bron¹, M.C. van Eeden², R. Vermeulen², ¹MLB Consulting, South Africa, ²Koidu Limited, Sierra Leone

12:50–13:10 **Guide to using gravity in the detection of underground voids**
L.M. Linzer^{1,2}, P. Linzer¹, ¹SRK Consulting, ²University of the Witwatersrand, South Africa

AFRIROCK

PIONEERING PROGRESS : 2025
THE FUTURE OF ROCK ENGINEERING

Venue: Sun City, Rustenburg, South Africa
21-23 JULY 2025 - Conference



Final Programme

Conference Day 2—Tuesday 22 July 2025 (continued)

Monitoring

Session Chair: L. Prinsloo, Valterra Platinum, South Africa

- | | | | |
|-------------|--|-------------|---|
| 14:40-14:45 | Sponsor Presentation - Timrite  | 16:55-18:00 | Time at leisure |
| 14:45-15:05 | The MDA CHORUS SAR constellation: A unique perspective for improved slope stability monitoring and geotechnical risk assessment
D. Hickson ¹ , R. Morin ¹ , R. Podmore ² , ¹ MDA Space, Canada, ² Leica Geosystems, South Africa | 18:00-18:15 | Transfer to the Shebeen venue from main conference centre |
| 15:05-15:25 | Afternoon refreshments | 18:30-22:00 | Conference Dinner, Shebeen
Dress Code: Smart Casual |
| 15:25-15:30 | Sponsor Presentation - Rocscience Inc.  | 22:00-22:15 | Transfer back to main conference venue |
| 15:30-15:35 | Sponsor Presentation - Strocac Mining Bedrock   | | |
| 15:35-15:55 | Klipgat boxcut portal entrance and decline system: Long-term stability assessment and monitoring
S. Vezil ¹ , R.T. Masethe ² , ¹ African Rainbow Minerals, ² University of Kwazulu Natal, South Africa | | |
| 15:55-16:15 | Compact radar system for rockmass movement monitoring in underground narrow reef stope
D. van Rooyen ¹ , R. Carstens ¹ , L. Campbell ² , ¹ Anglo American, South Africa, ² Geobotica, Australia | | |
| 16:15-16:35 | Monitoring mining-induced subsidence and sinkholes using multi-band InSAR: A case study from Lubambe Copper Mine
P. Chipola ¹ , R. Sililo ¹ , A. Mkandla ² , M. Douglas ³ , M. Spreafico ³ , ¹ Lubambe Copper Mine, Zambia, ² TRE Altamira, South Africa, ³ TRE Altamira, Italy | | |
| 16:35-16:55 | Closure and accelerometer measurements to enhance mine safety
L. Scheepers ¹ , P. Lenegan ¹ , F. Pienaar ² , H. Hoogenboezem ³ , D. Lamprecht ¹ , ¹ Sibanye Gold, ² Mining Product Developments, ³ Hoogenboezem Industries, South Africa | | |

AFRIROCK

PIONEERING PROGRESS : 2025
THE FUTURE OF ROCK ENGINEERING

Venue: Sun City, Rustenburg, South Africa
21-23 JULY 2025 - Conference



Final Programme

Conference Day 3—Wednesday 23 July 2025

07:30-08:30	Registration Opens & Early Morning Refreshments	08:45-09:15	Keynote Address: Rockburst risk management in deep hard rock mines – a multi tiered approach with dynamic ground support as the last line of defence B. Simser, <i>Glencore Sudbury Operations, Canada</i>
08:30-08:40	Welcome and Opening Address K.B. Le Bron, <i>Conference Chairperson, MLB Consulting, South Africa</i>	09:15-09:20	Sponsor Presentation - Maccaferri MACCAFERRI
08:40-08:45	Safety Briefing Venue Official		

Underground Rock Mechanics

Session Chair: G. Kotze, *OHMS, South Africa*

09:20-09:40	Pillar assessment at Bindura Nickel Corporation's Trojan mine in Zimbabwe F. Kwangwari ¹ , T. Makahamadze ² , W.C. Joughin ¹ , ¹ SRK Consulting, South Africa, ² Bindura Nickel Corporation, Zimbabwe
09:40-09:45	Sponsor presentation - M&J Mining 
09:45-10:05	Mid-morning refreshments
10:05-10:10	Sponsor presentation - MSP Mine Support Products 
10:10-10:40	Keynote Address-Finding signal in a noisy world during a Fourth Turning F.R.P. Basson, <i>Newmont Corporation</i>
10:40-11:00	Geotechnical design of coal bord and pillar panels: Some complementary suggestions A. Vervoort, <i>KU Leuven, Belgium</i>
11:00-11:20	Back analysis of ore pass design at Big Gossan sublevel open stope mine, Indonesia A. Sjadat ¹ , J.P.E. Hamman ¹ , Y. Irab ¹ , D. Putra ¹ , W. De Beer ² , I. Haque ³ , ¹ PT Freeport Indonesia, Indonesia, ² ESG Solutions, Australia, ³ Freeport-McMoRan Inc., USA
11:20-11:40	Seismological and numerical characterisation of stability pillar behaviour at South Deep Mine S.M. Sibanda, B.P. Watson, <i>University of the Witwatersrand, South Africa</i>

Session Chair: S. Durapraj, *Sibanye-Stillwater, South Africa*

11:40-11:45	Sponsor presentation - HEXAGON  HEXAGON
11:45-12:45	Lunch
12:45-12:50	Sponsor presentation - Dwyka Mining Services 
12:50-13:10	Prediction of mine tunnel conditions in a deep Austrian mine by means of numerical back- and forward analysis P. Gams ¹ , B. Moosbacher ² , H. Wagner ¹ , T. Fruehwirt, ¹ Montanuniversität Leoben, ² RHI Magnesita, Austria
13:10-13:30	Development of a multi-stage large excavation crusher chamber at Palabora mining company M. Matsapola ¹ , R.B. Khumalo ¹ , V.C. Madanda ² , F.K. Mulenga ² , ¹ Palabora Mining Company, ² University of South Africa, South Africa
13:30-13:40	Effect of pyroxenite layers on the strength of UG2 pillars T.J. Maphosa, B.P. Watson, <i>University of the Witwatersrand, South Africa</i>
13:40-14:00	Improvements in stope designs, and sequencing at the Big Gossan sub level open stope mine, Indonesia A. Febrian, A. Sjadat, J.P.E. Hamman, <i>PT Freeport Indonesia, Indonesia</i>
14:00	Conference close