

## ISRM YOUNG MEMBERS' SEMINAR SERIES

### Quality Control of Cable Bolt Support in Underground Mines

Thovhedzo Gcuda

(Full-time lecturer at the University of the Witwatersrand and a  
director of DRT Global Geotechnical Consulting Group, South  
Africa)

### Re-design of the Mogalakwena Pits Using Discrete Fracture Network Modeling to Enhance Slope Critical Control Implementation and Slope Optimization

Thlologelo Daddy Mametja

(Chief Rock Engineer at Valterra Platinum Mogalakwena Mine,  
South Africa)

### Rock Engineering Systems employed at an underground Mine to combat rockfalls

Omphile Diale

(Rock Engineer at Sefateng Chrome Mine, South Africa)

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## Quality Control of Cable Bolt Support in Underground Mines

### Abstract

In the complex realm of underground mining and civil tunneling, the stability of excavations hinges on the meticulous design and implementation of reinforcement systems, with cable bolts emerging as pivotal elements. Cable bolts have garnered attention for their distinctive capability to offer enduring support in weak and jointed rock formations. The research elucidates the significance of cable bolt support quality control and quality assurance framework from manufacturing to installation. Cable bolt support quality control is an essential technique that enhances the reliability of the load-bearing capacity of these support systems while mitigating displacement through proactive clamping of rock blocks before substantial deformation occurs.

### Speaker

**Thovhedzo Gcuda** is a full-time lecturer at the University of the Witwatersrand and a director of DRT Global Geotechnical Consulting Group. She is a distinguished Professional Rock/Geotechnical Engineer with experience in the Mining and Minerals Industry. Her multidimensional expertise encompasses slope design, support design, innovative design optimization, and project management, showcasing a robust technical proficiency that is evident in her adept application of advanced research and innovative support design methodologies.

Beyond her professional accomplishments in the mining industry, Thovhedzo is deeply passionate about youth development and education. She is committed to empowering the next generation of mining professionals by imparting essential skills and knowledge. This dedication is exemplified through her role as a lecturer and a PhD candidate, where she inspires and nurtures young minds.

Her active involvement with organizations such as the South African National Institute of Rock Engineering (SANIRE) and The Southern African Institute of Mining and Metallurgy (SAIMM) further underscores her commitment to fostering educational initiatives and supporting youth engagement within the mining sector. Thovhedzo's unwavering dedication not only enhances the industry but also paves the way for a brighter future for aspiring mining and Rock/Geotechnical Engineering professionals.



## Re-design of the Mogalakwena Pits Using Discrete Fracture Network Modeling to Enhance Slope Critical Control Implementation and Slope Optimization

### Abstract

This presentation outlines the slope stability analysis conducted in a strong rock mass (~200 to 250 MPa UCS) exhibiting significant structural features, primarily faultings and jointing. Structural influences, such as crest loss and wedge formation, have presented challenges across several benches, resulting in low bench retention and poor compliance with critical controls. The objective of the redesign is to understand the contributing factors to excessive backbreak and the underperformance of critical controls, and to provide slope design recommendations for the Central and North pits. The presentation includes a review of the structural model, a key component in constructing the Discrete Fracture Network (DFN). Bench-scale analyses (DFN) were based on structural fabric data derived from LiDAR, while wall-scale analyses incorporated both the DFN and 3D major structures. Different inter-ramp designs were recommended for each domain. The outcome led to improved implementation of critical controls and optimized slope configurations in accordance with geotechnical domains.

### Speaker

**Thlologelo Daddy Mametja** is Chief Rock Engineer at Valterra Platinum Mogalakwena Mine, operating Limpopo, South Africa. He holds a Bachelor's degree in mining engineering, a postgraduate diploma in business administration as well as a Chamber of Mines rock mechanics certification. He is deeply committed to safety in the workplace and strongly believes in achieving Zero Harm and scratch-free production.

He published a paper following a slope monitoring enhancement project, which laid the foundation for slope optimization initiatives at the Mogalakwena open pit operation.

He became a permanent member of Team Mogalakwena as a rock engineering graduate in the year 2016. Over the years, he advanced through various roles, including strata control officer, section rock mechanics engineer and pit rock engineer, accumulating nine years of experience at Mogalakwena Complex. Daddy has a decade of experience in the mining industry having started his career as a learner official at Rustenburg's underground mines.

Outside of his professional life, Thlologelo is an avid sports enthusiast with a passion for Formula 1, soccer, and cricket.



## Rock Engineering Systems employed at an underground Mine to combat rockfalls

### Abstract

This presentation details the comprehensive application of modern Rock Engineering Systems (RES) in the design and operational phases of a new underground mine, specifically addressing the critical challenge of rockfall prevention. As mining operations venture deeper and into more complex geological environments, the proactive integration of robust RES becomes paramount to ensuring worker safety, operational continuity, and economic viability. This presentation outlines a systematic approach, from initial geotechnical investigations and rock mass characterization to numerical modelling, ground support optimization, and real-time monitoring strategies. Emphasis is placed on the methodologies employed to predict rock mass behaviour, design innovative and adaptable support systems, and implement a continuous feedback loop for validation and improvement. The insights presented aim to demonstrate how a holistic and integrated RES framework significantly reduces rockfall incidents, enhances overall ground stability, and fosters a safer, more productive underground mining environment.

### Speaker

**Omphile Diale** is an Acting Rock Engineer at Sefateng Chrome Mine in South Africa. She holds a BSc in Geology and Environmental Management from the University of Johannesburg. She is currently completing her Honours degree part time with the University of South Africa and endeavours to do her Masters in Rock Engineering. She is currently also busy with her Map3D classes and studies. She has several years in the Rock Engineering Department and has tasked herself to develop her skills to enable her to grow in the Department and mining as a whole. She is also part of the WIM (Woman In Mining structure) structure and aims to use her voice to empower women in the industry.

