

Syd S. Peng Ground Control in Mining Award

Nomination of Gabriel S. (Essie) Esterhuizen

Education and Training:

- Ph.D. (Mining Engineering) University of Pretoria, South Africa, 1997 M.Eng. (Mining), University of Pretoria, South Africa, 1991
- B.Sc. (Engineering) (Mining), University of Pretoria, South Africa, 1974

Affiliations:

- Board of Directors of the American Rock Mechanics Association Member of the Society for Mining, Metallurgy and Exploration (SME) Member of the International Society for Rock Mechanics
- Member of the Southern African Institute for Mining and Metallurgy

Awards:

- The Salamon Award of the South African National Institute for Rock Engineering, 1999
- The Silver Award for Outstanding Contribution to Science, Federal Executive Board, Pittsburgh Division, 2012
- Silver Medal of the South African Institute of Mining and Metallurgy, 2015 The SME Rock Mechanics Award, 2018.

Professional experience history:

Essie started his career in rock engineering in the deep South African gold mines in 1975 where he was involved in the planning and execution of operations in highly stressed, rock-bursting ground. He returned to the University of Pretoria where he was a Senior Lecturer and later Associate Professor in the Department of Mining Engineering. He entered into full time consulting with SRK Consulting in South Africa and later in Denver, Colorado where he was a Principal Consultant. In 2003 Essie joined the NIOSH Pittsburgh Mining Research Division where was involved in ground control research for underground limestone and coal mines until his retirement in 2021.

Contributions to ground control:

Essie brings international experience in ground stability from his previous work as a consultant, researcher, and rock engineering practitioner at operating mines. His significant contributions in ground control have been through multifaceted research in both coal and limestone mines involving both basic and applied research.

One of his major recent accomplishments is the development of the S-Pillar software that provides systematic procedures for analyzing limestone mine pillar design. These studies involved pioneering research into aspects that impact limestone pillar stability and then translating them into measurable stability factors. This work and the S-Pillar software has become the standard for designing safe room-and-pillar workings in US limestone mines.

Essie was an early adopter of numerical modeling as a tool for engineering design and has been instrumental in the application of numerical analysis procedures for support design to prevent roof instability in coal mine entries. He has developed procedures for analyzing ground response capabilities in FLAC that have become state-of-the-art practices within the NIOSH ground control research branch and academically utilized at several major mining universities. An example of the outcome of his efforts includes the first practical use of the Ground Reaction Concept to analyze longwall tailgate support design.

Essie was also a principal investigator in investigations in various aspects of assessing mine layouts for managing ground stress in underground high extraction mining methods. This work includes both his recent US experiences at NIOSH in coal mines as well as his early work in the South African gold fields. Dr. Esterhuizen started his career in rock engineering in 1975 in the South African Gold Mines where he was a rock engineering practitioner at some of the deepest mines in the world. These early years of practicing rock engineering in extremely challenging conditions provided a sound foundation both in rock engineering and mine safety in the face of real-world economics. He has applied these lessons during his entire career as a ground control specialist.

Because of his knowledge of rock mechanics, Essie was also sought to assist in guiding NIOSH research addressing methane gas migration around high extraction mining panels. This is just a further example of the breadth of his extended contributions to mine safety due to his reputation as a leader in ground control.

Throughout his research and professional career as a rock mechanics engineer, Dr. Esterhuizen has always pursued providing practical solutions to mining engineering problems. He is a recognized leader in ground control throughout the world and has provided his contributions through over 50 publications in the past 2 decades alone. He has been a regular publisher with 25 papers and excellent presenter at the International Conference in Ground Control in Mining. A few of his noteworthy publications include:

- Esterhuizen GS, Dolinar DR and Ellenberger JL, (2008). Pillar Strength and Design Methodology for Stone Mines. Proc. 27th Int. Symposium on Ground Control in Mining. Morgantown, WV: West Virginia University: 241-253.
- Esterhuizen GS, Mark C and Murphy MM, (2010). The Ground Response Curve, Pillar Loading and Pillar Failure in Coal Mines. Proc. 29th International Conference on Ground Control in Mining, Morgantown, WV: West Virginia University: 19-27.

- Esterhuizen GS, Dolinar DR and Ellenberger JL, (2010). Roof Span Design for Underground Stone Mines, Proc. 29th International Conference on Ground Control in Mining, Morgantown, WV: West Virginia University: 318-324
- Esterhuizen GS, Bajpayee TS, Ellenberger JL, Murphy MM (2013). Practical estimation of rock properties for modeling bedded coal mine strata using the Coal Mine Roof Rating. 47th US Rock Mechanics/Geomechanics Symposium, June 23-26, 2013, San Francisco, California. Alexandria, VA: American Rock Mechanics Association, 2013 Jun; 3:1634-1647.
- Esterhuizen G.S. Tulu I.B. (2016). Application of the strength reduction method in coal mine roof support design. Proceedings of the 3rd International Symposium on Mine Safety, Science and Engineering, Montreal, Canada. Mc Gill University, pp. 659 – 665.

Finally, everyone who knows Essie knows that he always has time to talk to you and help you. Beyond his time as a Senior Lecturer and Associate Professor in the Department of Mining Engineering University of Pretoria, he has mentored numerous fellow colleagues throughout his career.

Nominated by Thomas M. Barczak:

It is my privilege to nominate Gabriel S. (Essie) Esterhuizen for the Syd S. Peng Ground Control in Mining Award.