Robert John Lowther – ITASCA Australia

Principal Geotechnical Engineer

Geotechnical Expertise	Surface and underground hard rock mining, rock mechanics, rock slope geomechanics, block and sub-level caving geomechanics, hydraulic fracturing, cave propagation, surface and underground deformation monitoring, rock mass characterization, tunnelling, static and dynamic ground support, numerical modelling using *FLAC3D* software, advanced CAD using Rhinoceros and Griddle Software, numerical model interpretation using Paraview software, mine seismicity, risk assessments, trigger-action-response-plan development, reverse engineering and back analysis, surface and underground geohazard management, mine recovery and geotechnical crisis management, feasibility studies.
Software Expertise	FLAC3D, Rhinoceros, Griddle, Paraview.
Education	Master of Engineering (Rock Mechanics), 2008-2013 University of NSW, Sydney, NSW, Australia Master of Engineering Science (Mining Geomechanics), 2003-2008 University of NSW, Sydney, NSW, Australia Bachelor of Engineering (Mining Engineering), 1997-2000 University of NSW, Sydney, NSW, Australia
Registration	Registered Professional Engineer, Papua New Guinea
Professional Affiliations	Member: The Australasian Institute of Mining & Metallurgy.
Honors	BE Hons Class 2, Division 1 (2000)

Employment History

2022 – Present	ITASCA Australia Pty Ltd, Orange, NSW, Australia Principal Geotechnical Engineer, Numerical Modeller, Block & Sub-level Caving Specialist.
2018 – 2022	Newcrest Mining Ltd, Group Geotechnical Services, Specialist Geotechnical Engineer (Feasibility Studies)
2017 – 2018	Newcrest Mining Ltd, Cadia, NSW, Australia Specialist Geotechnical Engineer (Projects)
2015 – 2017	Newcrest Mining Ltd, Lihir Open Pit, New Ireland Province, PNG Senior Geotechnical Engineer (Geotechnical and Mine Geothermal Operations)
2013 – 2014	Newcrest Mining Ltd, Cadia East Panel Cave, NSW, Australia Senior Geotechnical Engineer (Intensive Pre-conditioning)

2010 – 2012	Newcrest Mining Ltd, Ridgeway Deeps Block Cave, Halo Sub-Level Cave, Cadia Hill Open Pit, NSW, Australia Senior Geotechnical Engineer (Operations)
2009 – 2010	Newcrest Mining Ltd, Ridgeway Deeps Block Cave, NSW, Australia Geotechnical Engineer (Operations)
2006 – 2009	Newcrest Mining Ltd, Cadia Hill Open Pit, NSW, Australia Geotechnical Engineer (Operations)
2001 – 2006	Newcrest Mining Ltd, Ridgeway Sub-Level Cave, NSW, Australia Mining Engineer (Production, Development, Ventilation, Underground Operations, Survey)

Project Experience

(2024). Gold Fields, Gruyere Underground Concept Study. Conducted an empirical assessment and review of underground mining methods suitable for a potential Gruyere underground expansion.

(2024). BHP, Carrapateena Deeps Block Cave Stability Assessment. Conducted a numerical stability assessment of block cave footprint designs and mining sequences for the Carrapateena Deeps Block Cave Feasibility Study.

(2023-2024). Rio Tinto, Oyu Tolgoi Block Cave Stability Assessment. Conducted a numerical stability assessment of block cave footprint designs and mining sequences for the Oyu Tolgoi Lift 2 Feasibility Study.

(2023) Evolution Mining, Ernest Henry Mine Global Stress Model. Conducted detailed CAD work for the Ernest Henry Mine global mine stress model.

(2023) IGO Limited, Odysseus Tunnel Stability Assessment. Conducted a numerical stability assessment of a high stress tunnel being developed through a fault zone.

(2023). New Century Resources, Prince Lyell SLC Sequencing & Mine Design Optimisation. Conducted a numerical stability assessment of SLC sequencing and mine design options for the Prince Lyell Pre-feasibility Study.

(2022). Oz Minerals, Carrapateena Deeps Crusher Chamber Stability Assessment: Conducted a numerical stability assessment of the planned block cave crusher chamber for the Carrapateena Deeps Feasibility Study.

(2022). Rio Tinto, Resolution Open Stope Mine Design & Sequence Optimisation. Conducted a numerical stability assessment of open stope designs and sequencing options for the Resolution Feasibility Study.

(2020-2022). Newcrest Mining Ltd, Pre-Feasibility & Feasibility Study for Cadia East Panel Cave 1 Stage 2 Expansion (Numerical Analysis, Monitoring Design, Hydraulic Fracturing Design, Ground Support Design): Conducted a full geotechnical assessment of the Cadia East Panel Cave 1 Stage 2 Expansion project to fulfil both the Pre-Feasibility and Feasibility Study requirements. The project involved numerical modelling using FLAC3D to assess mine sequencing options and excavation stability, design of the surface-based hydraulic fracturing program for cave propagation, formulation of a detailed tunnel deformation and cave propagation monitoring plan using state-of-the-art technology, and design of

the mine's ground support systems using a displacement-based approach for both static and dynamic ground conditions.

(2018-2020). Newcrest Mining Ltd, Pre-Feasibility & Feasibility Study for Cadia East Panel Cave 2 Stage-3 Expansion (Numerical Analysis, Sequence Assessment, Hydraulic Fracturing Design): Conducted a geotechnical assessment of the Cadia East Panel Cave 2 Stage 3 Expansion project to fulfil both the Pre-Feasibility and Feasibility Study requirements. The project involved numerical modelling using FLAC3D to conduct a mine wide stress analysis to back analyse and forward predict depth of damage and strain-bursting potential to inform ground support design, a numerical assessment of advanced undercut and post undercut sequencing options, and design of the underground-based hydraulic fracturing program to control cave propagation.

(2014). Newcrest Mining Ltd, Project Management of a Surface-Based Hydraulic Fracturing Program for Cave Propagation Through Hard Near-Surface Rock Masses: Project managed the design and implementation of a surface-based hydraulic fracturing program to successfully propagate the Cadia East Panel Cave 1 cave zone to surface through hard near-surface rock masses.

(2013-2014). Newcrest Mining Ltd, Project Management of an Underground Hydraulic Fracturing Program: Project managed the design and implementation of over 2,000 hydraulic fractures for the Cadia East Panel Cave 2 intensive pre-conditioning program for cave propagation purposes.

Papers and Publications

Lowther, R. J., J. De Ross, C. Orrego and D. Cuello, 2022. 'A probabilistic evaluation of the displacement-based ground support design approach', in *Caving 2022: Fifth International Conference on Block and Sublevel Caving, Australian Centre for Geomechanics, Perth*, pp. 241-254, Y Potvin (ed.), 2022.

Orrego, C, R. **Lowther** and G. Newcombe, 2020, 'Undercutting method selection at Cadia East PC2-3 extension', in *MassMin 2020: Proceedings of the Eighth International Conference & Exhibition on Mass Mining*, pp. 370-384, R Castro, F Báez & K Suzuki (eds),University of Chile, Santiago, 2020.

Lowther, R. J., L. Olivier, J. Lett and I. Brunton, I 2016. 'Implementation of a surface-based hydraulic fracturing program to successfully propagate a large cave through hard competent near-surface rock masses to achieve breakthrough', in *MassMin 2016: Proceedings of the Seventh International Conference and Exhibition on Mass Mining*, pp. 83–96, 2016C, Carr & G Chitombo (eds), The Australasian Institute of Mining and Metallurgy, Melbourne, 2016.

Lowther, R. J. Modelling Brittle Damage to Tunnel Excavations in a Block Cave Operation 1211 Using Linear Elastic Damage Criteria. *ME(Res) Thesis. University of New South Wales.* 2013.

Capes, G., G.B. Sharrock and R. **Lowther**. 'Quantifying Undercut Excavation Damage at Ridgeway Deeps Block Cave Mine,' in *MassMin 2012 (Sudbury, Ontario, Canada, June, 2012)*, 2012.

Lowther, R. J., G.W. Capes and G.B. Sharrock. 'A Deformation Monitoring Plan for Extraction Level Drives at Ridgeway Deeps Block Cave Mine,' in *Caving 2010 (Proceedings, Second International Symposium on Block and Sublevel Caving, Perth, Australia, April 2010)*, pp. 93-106, Y. Potvin, Ed. Perth: Australian Centre for Geomechanics, 2010.Use Publications List style.