

AFRIROCK

PIONEERING PROGRESS : THE FUTURE OF ROCK ENGINEERING

VENUE: Sun City, Rustenburg, South Africa

20 JULY 2025 – Rocscience Workshop

TIME: 08:00-12:00



Rocscience Workshop | 20 July 2025 | Time: 08:00-12:00

Tips for Efficient 3D Excavation Modelling in RS3

Rocscience is pleased to announce a half-day training course at Afrirock 2025 on applying the company's 3D finite element software, RS3, to modelling rock excavations. This course is designed for all experience levels and will be taught by a world-class specialist.

Using Rocscience's powerful RS3 software, you will learn tips and tricks for 'quickly' creating and analyzing 3D models of underground/surface excavations. You will master the fundamentals of geometry clean-up, developing complex multi-material geological models, specifying excavation sequences and meshes, and interpreting results. By the end of the day, you will have built multi-sequence models that start with problematic input geometries, just like a professional, equipped with advanced skills. Whether you are new to 3D modelling or looking to sharpen your abilities, this course will help you deepen your excavation modelling skills.

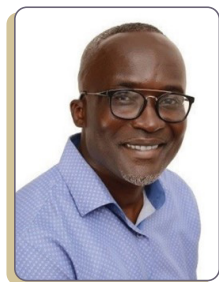
This half-day course will help participants achieve these goals by using RS3 to build a not-so-simple underground excavation model from scratch.

Objectives

This hands-on training course will help participants to do the following:

- Appropriately refine input real-world geological and excavation geometries using clean-up tools in RS3
- Develop 3D models with overlapping input geometries that create problematic thin, small volumes (which pose significant meshing challenges)
- Generate efficient finite element meshes that produce accurate results in regions of interest while minimizing total element numbers
- Improve insights gained from results by using interpretation tools such as iso-surfaces, deformed shapes, and user-defined quantities

Rocscience Course Instructor



Dr. Reginald Hammah holds a Ph.D. in Civil Engineering from the University of Toronto and brings over 25 years of experience in rock mechanics and geotechnical engineering. He uniquely blends practical problem-solving experience with software tools and theoretical understanding of geotechnical behaviour. He is well known for breaking down complex problems into simpler, more familiar, and solvable components.

Reginald Hammah,

Ph.D., Chief Scientific Officer and Director of Africa, Rocscience

FOR FURTHER INFORMATION, CONTACT:

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Conferences and Events
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ECSA and SACNASP Validated CPD Activity
Credits = 0.1 per hour attended

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Course Agenda

Through a mix of presentations and a “hands-on” tutorial, involving the step-by-step construction of a not-so-simple underground excavation model, the course will cover the following topics:

Introduction to 3D Modelling in RS3

- Overview of the RS3 program interface
- Navigating the main workflow tabs (e.g., Geology, Excavations, Mesh, Compute, Results)
- Input 3D geometries: challenges and solutions
- Importing and creating geological and excavation geometries
- Common pitfalls: overlapping, thin, or small volumes
- Tools for geometry clean-up and repair
- Introduction to the finite element method (FEM) in geotechnical modelling
- Brief explanation of FEM principles relevant to RS3
- How FEM is used in RS3 for stress and deformation analysis
- Model boundaries and boundary conditions
- Where to place model boundaries for accurate results
- Types of boundary conditions and their impact on model outcomes
- Meshing principles and strategies
- Generating efficient meshes for complex geometries
- Balancing mesh refinement and computational efficiency
- Use of hybrid meshes for optimized accuracy and speed
- Stress-deformation analysis overview
- How RS3 computes and displays results (displacements, strains, stresses, pore pressures)
- Interpreting these results for excavation stability and performance

Advanced Model Building and Analysis

- Building complex multi-material geological models
- Assigning material properties and constitutive models
- Handling multiple material layers and fault zones
- Modelling excavation sequences and support installation
- Setting up staged excavation and construction sequences
- Incorporating support elements (liners, bolts, etc.)
- Handling problematic input geometries
- Techniques for repairing and refining complex or overlapping geometries
- Managing thin or small volumes that challenge meshing
- Efficient meshing strategies
- Using mesh grading and hybrid meshes to focus computational effort
- Minimizing total element numbers while maintaining accuracy in regions of interest

Result Interpretation and Visualization

- Visualizing results using advanced tools
- Iso-surfaces, deformed shapes, and user-defined quantities
- Comparing results across excavation stages
- Assessing excavation stability and performance
- Interpreting stress and deformation results for safety and design
- Using results to identify potential failure zones and optimize support

Troubleshooting common issues during model building and analysis

Registration Fee: R2 000

Online: R1 000

Students: Free (Proof of full-time student status required)

Rocscience Workshop combined with Geotech Workshop: R3 000

Register Here

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