

*Slope stability for 3D slopes*

#### Tools Used



**Slide2**  
2D Limit Equilibrium Analysis



**Slide3**  
3D Limit Equilibrium Analysis



**RS2**  
2D Geotechnical Finite Element Analysis



**RS3**  
3D Geotechnical Finite Element Analysis



**RSPile**  
3D Pile Analysis



**Settle3**  
Settlement and Consolidation Analysis

#### Location

**The Ritz-Carlton, Kuala Lumpur**  
168 Jalan Imbi Kuala Lumpur, 55100 Malaysia

#### Fees

**Registration Fee:** \$400 USD

**Early Bird Fee:** \$350 USD  
(ends January 31, 2020)

Rocscience Maintenance+ subscribers  
receive a 10% discount on registration fees.

**Register:** [courses@rocscience.com](mailto:courses@rocscience.com)

#### Note

All attendees will be provided with temporary, one month Rocscience software licenses for the programs listed above. Attendees must bring a laptop with the licenses installed.

## Numerical Modelling Workshop in Geomechanics and Geotechnical Engineering

### Module I: Overview of Limit-Equilibrium Methods for Slope Stability Analysis

- Failure modes of soil and rock slopes
- Limit-equilibrium methods

### Module II: Slope Stability Analysis

- Model building (Tips and Pitfalls)
- Material behavior models (anisotropic vs. isotropic)
- Interpretation of results

### Module III: Selection of Analysis Methods

- Selection of method for locating minimum factor of safety
- Failure Surface optimization techniques

### Module IV: Modelling Supports for Slope Stability Analysis

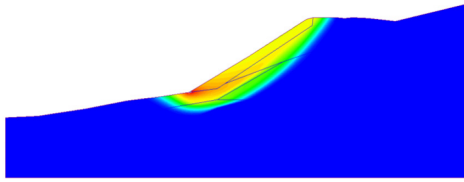
- Selecting supports
- Introducing RSPile
- Landslide stabilization using piles

### Module V: Probabilistic and Sensitivity Analysis

- Overview of basic statistical concepts and distribution
- Probability of failure
- Monte Carlo and Latin hypercube simulations
- Sensitivity analysis

### Module VI: Slope Stability Analysis Using the Shear Strength Reduction Method

- Application of FEM to slope stability analysis
- Shear Strength Reduction approach
- Case studies



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#### Module VII: Groundwater and Consolidation Analysis

- Saturated-unsaturated transient groundwater analysis
- Permeability functions
- Boundary conditions
- Seepage analysis of staged excavations
- Consolidation analysis

#### Module VIII: Deep Excavation Design and 2D Support Analysis Tools

- Model development (construction of geometry, meshing, loads and boundary conditions, analysis options)
- 2D deep excavation model generation with struts and prestressed ground anchors
- Models using advanced constitutive models
- Interpretation of results

#### Module IX: Challenges and Solutions for Sustainable Constructions in Problematic Soft Ground

#### Module X: Groundwater and Consolidation Analysis (1-D Consolidation Analysis)

- Overview of Terzaghi's 1-D consolidation theory
- Modeling raft foundation settlements using Settle3
- Ground improvement options
- Interpretation of results module

## Course Instructors



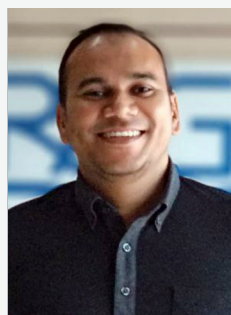
**Thamer Yacoub, Ph.D., P.Eng.**  
President, Rocscience

Dr. Thamer Yacoub, P.Eng. is the President of Rocscience. He has over 25 years of experience in geomechanics numerical modelling, covering topics including slope stability analysis, settlement and foundation analysis, and surface and underground stress analysis. Dr. Yacoub obtained his Ph.D. degree in numerical geomechanics from the University of Toronto, Canada in 1999. In the same year, he joined Rocscience Inc. as a geomechanics specialist where he was involved in developing Examine, RS2, and Slide2. Dr. Yacoub has developed and taught several Rocscience workshops, seminars, and graduate level courses around the world.



**Alison McQuillan, Ph.D.**  
Director, Rocscience Australia

Alison is the Director of Rocscience Australia based in Gold Coast, Australia, providing software training and tech support for Rocscience in the Asia-Pacific region. She is a Chartered Professional (Geotech) and Registered Professional Engineer in Queensland. Alison holds a Masters of Mining Engineering (Geomechanics) from the University of New South Wales and recently completed her Ph.D in rock mechanics at the same university. Alison's area of expertise is open cut slope stability, previously working in both ops and corporate roles for Anglo American, New Hope Coal, and Rio Tinto as well as providing consulting advice for copper, gold, and iron ore operations in Australia and overseas. Alison takes a risk-based design approach to all geotechnical analysis to find a practical solution for customers.



**Mohd Ashraf, Ph.D.**  
Rocscience Representative, Malaysia  
Assoc. Prof. of Geotechnical Engineering, School of Civil Engineering, USM;

Dr. Mohd Ashraf is an Assoc. Prof. at School of Civil Engineering, USM. He obtained his Bachelor of Civil Engineering from USM in 2004 and pursued his Master in Geological Engineering at Gadjah Mada University under the sponsorship of AUNSEED Net JICA Project. In 2010, he obtained his Ph.D in Geotechnical Engineering in the research area of Underground Energy Storage and Hydrodynamic Containment for hydrocarbon storage cavern from Kyoto University under JICA scholarship. He has conducted researches specializing in various aspects of geotechnical and rock engineering such as, evaluation of rock over stressing in hard rock tunnel, urban tunnelling, slope stability analysis, geohazard and geophysical applications in Civil and Geological Engineering. Recently he has been involved in aerial mapping and photogrammetry analysis using UAV for building maintenance, landslide forensic and landslide disasters evaluation, construction planning and progress monitoring including landfill and quarry assessment. He has been integrating UAV technology and reality modelling into his teaching and research interests since 2015.



**Ir. Liew Shaw Shong, M.Sc.**  
President, Malaysian Geotechnical Society; Senior Director, G&P Geotechnics Sdn. Bhd.

Ir. Liew Shaw Shong obtained his Bachelor of Science Degree in Civil Engineering with First Class Honours from National Taiwan University at Taipei in 1991 and obtained his Master of Engineering Science in 1993 at University of New South Wales in Sydney, Australia. In the past 26 years of his professional career, he has involved in numerous forensic investigations of landslide problems at mountainous roads and is one of the project team members in the National Slope Master Plan Study commissioned by JKR. He also conducted a number of short courses and delivered lectures on subjects covering subsurface investigation, instrumentation, dam engineering, slope engineering, soft ground engineering, pile and retaining wall designs, geotechnical case histories and forensic engineering. Ir. Liew was the past chairman of Geotechnical Engineering Technical Division of the Institution of Engineers, Malaysia (IEM) for Session 2010 to 2013. He is now the President of Malaysian Geotechnical Society (MGS) for Session 2019 to 2020 and a senior director of G&P Geotechnics Sdn Bhd, a geotechnical consultant firm in Malaysia.