

COURSE 3 days

Title:

2D/3D Geotechnical Modelling for Mining Applications

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Date: May 22th to 24th, 2019

Duration: 8:30am to 5:30pm

Investment: R\$ 2.400,00– 3 days of course
R\$ 1.900,00– 2 first days of course

Discounts: 25% off discount for students (Graduate and Postgraduate)
15% off discount for a group of three or more professionals
Discounts available until 20th April, 2019

Location: Belo Horizonte/MG, Brazil

Included: 2 weeks of SVOFFICE 5/GT Free Trial
Coffee Break
Material
Certificate

Overview:

Slope stability analysis is the most common analysis performed by geotechnical engineers. 2D numerical approaches have dominated the analysis performed by geotechnical consultants, and the need for technological innovations that provide powerful, flexible and efficient analysis platform is a real geotechnical market demand.

Over the past few years, interest in performing three-dimensional (3-D) slope stability analyses has surged. This is especially true for Mining applications involving the analysis of tailings dams, waste rock piles, heap leach stability and open pit sidewall stability. Tailings dam failure is an important issue engineers must consider during the filling of the tailings management facility (TMF). Factors such as liquefaction or pore-water pressure buildup in clay layers, internal erosion and piping failure caused by seepage can lead to dam failure with disastrous consequences. 3D analysis is required to model Open Pit stability due to the highly varying topography and geo-strata which can vary in all three dimensions. Slope stability, seepage analysis and stress-deformation analysis are often required to be performed in 2D or 3D.

SoilVision along with Water Services and Technologies is providing this course focused on the transition to 3D analysis for Mining Applications through the SVOFFICE 5/GT, which is used in major areas of geotechnical analysis. This course is intended to be an in-depth training related to 2D/3D analysis of the typical geotechnical analysis methods of slope stability, groundwater seepage (saturated/unsaturated), and stress/deformation analysis.

Focuses of the course will include:

- **2D/3D slope stability analysis for Tailings Dam and Open Pit**
- **Combined Groundwater and Tension/Deformation Analysis for Tailings Dam**



- **Combined Groundwater and Slope Stability Analysis for Tailings Dam**
- **Building 3D Conceptual Models for geotechnical application**
- **Integration of piezometric real-time field data and geotechnical conceptual models**

The first day will focus on the new conceptual model builder (SVDESIGNER™), which can be used to ease the development of complex 3D numerical models. Methodologies for placing geotechnical designs on complex topologies will be discussed. Methodologies for quickly extracting 2D cross-sections or full 3D numerical models will also be covered. Techniques to reduce 3D modeling times significantly will be covered.

Integration with real-time pore pressure field data to build models for real-world example sites will be covered.

The second part of the first day will focus on slope stability. This course will present advanced topics related to both 2D and 3D slope stability analysis and conceptual model design. The course will include a brief theoretical review of 2D theory but focus on 3D theory and applications. The management of complex 3D spatial data will be discussed as well as modeling methodologies related to 3D numerical modeling. The focus will be on advanced concepts of slope stability analysis and their application. Analysis of slopes considering both saturated and unsaturated conditions will be covered. Applications of 3D solutions to real-world problems will be presented.

The second day of the course will examine the use of 2D/3D seepage analysis and its correlation with Slope Stability. The application SVSOILS will be used to demonstrate how easy it is to estimate saturated and unsaturated hydraulic properties for different types of soils. The user will come away with a practical knowledge of how to create and solve 2D and 3D groundwater seepage numerical models.

The third day will cover the concepts related to 2D/3D stress/deformation analysis as a stand-alone analysis or as integrated with slope stability or groundwater modeling. Uncoupled stress/deformation analysis will be considered as well as coupled small and large-strain consolidation. The user will come away with a practical knowledge of how to create and solve 2D and 3D stress/deformation numerical models.

Who should attend?

The course is designed for practicing geotechnical and mining engineers and geologists that want to utilize the benefit of 3D numerical modeling for increasing the capabilities of their consulting firm or university research. The course also introduces the new SVOFFICE™5/GT Geotechnical Analysis Suite, which brings new and improved cutting-edge 3D analysis capabilities to the practicing geotechnical engineer. Participants are invited to bring their own laptops to the course. They will be provided with copies of the SVOFFICE™5/GT software to follow along during the short course. 50% of the cost of the short course can be applied to subsequent software purchases made within the following 6 months.

COURSE DETAILED OVERVIEW

DAY 1 – 3D Conceptual Model and Slope Stability Analysis for Mining Applications - SVDESIGNER™ & SVSLOPE®

AM Conceptual Model Design

- SVOFFICE™5/GT – What’s changed?
- Conceptual model design using SVDESIGNER™
- Managing complex 3D geometry
- Managing piezometers and Water Surface Interpolation
- Advanced surface intersection
- Example 3D conceptual model of tailings dam and facility – Model Construction

PM Slope Stability Analysis

- Trends in theory & development of 2D/3D slope stability analysis
- Advanced probabilistic analysis: Theory and Application
- What are typical variations between 2D and 3D analysis?
- Basics of 3D limit equilibrium theoretical overview
- Tutorial: Tailings Dam – 2D and 3D slope stability analysis
- Tutorial: Applying Multi-Plane Analysis (MPA) for Open Pit models

DAY 2 – Saturated and Unsaturated Groundwater Seepage Analysis coupled with Slope Stability: Theory and Application using SVFLUX™ & SVSLOPE®

AM Groundwater Seepage and Slope Stability Analysis – 2D/3D

- Modeling unsaturated soils in engineering practice – theory overview
- Estimation of unsaturated hydraulic properties
- 3D groundwater seepage theory overview
- Solution of 2D/3D seepage numerical models
- Tutorial: Unsaturated and Saturated Earth Dam Analysis

PM Groundwater Seepage and Slope Stability Analysis – 2D/3D

- Understanding of coupling seepage and slope stability using SVFLUX™ & SVSLOPE®
- Solution of typical 3D models with SVFLUX™ & SVSLOPE®
- Tutorial: Rapid drawdown analysis in Tailings Dam
- Understanding staged construction for Tailings Dam seepage analysis

DAY 3 – Stress Deformation Analysis: Theory and Application using SVSOLID™

AM Stress/deformation Analysis – 2D

- 2D theory of stress/deformation analysis
- Solution of 2D stress deformation numerical models
- Understanding staged construction for Tailings Dam
- Analysis of 2D slopes using the Shear Strength Reduction (SSR) method
- Understanding of Consolidation analysis for Tailings Dam using SVFLUX™ and SVSOLID™

PM Stress/Deformation Analysis – 3D

- 3D theory of stress/deformation analysis
- Solution of 3D stress deformation numerical models
- Analysis of 3D slopes using the Shear Strength Reduction (SSR) method
- Solution of 3D consolidation analysis for Tailings Dam using SVFLUX™ and SVSOLID™