



3DEC™ VERSION 4.1 TRAINING COURSE

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The *3DEC* Version 4.1 Training Course introduces users to the application of *3DEC* for geotechnical numerical analysis. The three-day course provides an overview of the capabilities and features of *3DEC* and covers software fundamentals with discussions on the theoretical background, basic concepts and modelling principles for geotechnical analysis.

Course topics include: model creation, application of boundary conditions, selection of appropriate constitutive (material) models for blocks and joints, solution of the static equilibrium state, simulation of the construction stages and installation of structural support.

The course includes discussion on using the built-in programming language in *3DEC* (called *FISH*) to manipulate the *3DEC* model. This is "hands-on" training, and exercises with *3DEC* are provided throughout the course.

Day 1

- **Introduction to 3DEC**
 - Overview of potential applications and capabilities in geo-engineering analysis and design
 - New features in *3DEC*
- **Introduction to the 3DEC graphical interface**
 - Menu-driven versus command-driven operation
- **DEM Theoretical Background**
 - Discontinuum analysis
 - Distinct element method
 - Explicit finite-difference solution scheme
- **3DEC Operation**
 - Recommended solution procedure
- **Model Generation**
 - Fitting the *3DEC* model to a problem region
 - Joint generation

Day 2

- **Basic Material Models**
 - Deformable versus rigid blocks
 - Deformable-block material models
 - Joint material models
- **Boundary conditions / Initial conditions**
 - Applying boundary conditions
 - Initializing variables
- **Solution**
 - Solving for force equilibrium
 - Cycling to monitor material failure
- **Soil/Rock structure Interaction**
 - Local reinforcement elements
 - Cable elements
 - Beam elements
 - Support elements

Day 3

- **Factor of Safety Calculation**
 - Implementation of the strength reduction method in 3DEC
- **Introduction to FISH in 3DEC**
 - FISH variables, arithmetic, syntax and data types
 - Writing FISH functions
- **Use of third-party model generators (Rhino + Kubrix)**
 - Generation of complex model geometries
- **New graphics tools in 3DEC Version 4.2**
- **User questions and general modelling advice**