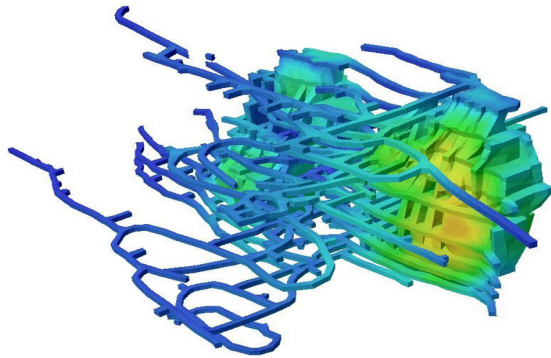


EX3

3D Stress Analysis for Underground Excavations



Underground mining model

What is EX3?

EX3 (formerly Examine3D) uses the boundary element technique to analyze large and complicated 3D underground models in a fraction of the time compared to other numerical approaches.

The program lets you easily create 3D models, surface meshing, and visualize and interpret data. Since only surface meshes are implemented, the models require very few material input parameters and simple discretization and meshing, making the program extremely fast.

With its superior speed and elegant simplicity, EX3 is the ideal tool for performing complex stress analyses of underground mines.

What's New in EX3

- Full 3D model geometry creation
- Powerful import from all types of surfaces
- Embedded multiple staging
- Ability to model joints with three different failure criteria

Model

The model is used to create the excavation geometry and boundary element mesh and define material properties and loading conditions. Model geometry can be imported from AutoCAD or created in EX3 using powerful CAD-based drawing and editing tools. Advanced mesh generation options simplify the task of generating a high-quality mesh. The mesh is automatically checked for validity to ensure that there are no gaps and that elements do not intersect or overlap.

Compute

EX3 uses the indirect boundary element method to compute the three-dimensional elastic stress state around underground excavations. Stress, displacement, and strength factor are computed at user-defined locations, including planes, volumetric grids, points, or on the excavation surface. The compute engine is optimized for speed and accuracy.

Interpret

The Interpret module of EX3 is used to visualize analysis results. Contouring, iso-surface generation, stress flow ribbons, and trajectories can be viewed. Advanced shading, transparency, and animation algorithms provide state of the art graphical output. In addition to stress analysis, EX3 can be used for a variety of other data visualization purposes. For example, it can be used to visualize micro-seismic datasets such as seismic velocity, source parameters, and event density.

Find more details: rocscience.com/software/ex3

Plans & Pricing

Personal License: Locked to one computer.

- Lease: **USD \$2,795/year***
Leased annually. Includes Maintenance+.
- Perpetual: **USD \$5,495***
Purchased outright. Includes 12 months of Maintenance+.

Flexible License: Installed on any number of machines. The license file sits on the server.

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*Introductory prices. Subject to change.

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Maintenance+ is our enhanced maintenance and support services subscription, purchased annually at 20% of the license cost.

With Maintenance+ Continuous Software you get access to all feature releases, enhancements, and bug fixes throughout the year and as soon as they're available. You also have access to convenient License Services, the support of our experts, and exclusive learning offerings.

Contact us at software@rocscience.com

Compute

- Parallel 64-bit processing
- Fully optimized
- Direct or iterative solver

Data Interpretation

- 2D/3D view
- Plot contours on horizontal, vertical, or arbitrary planes
- Plot contours on boundaries
- View stress, displacement contours
- Contour user-defined data
- Deformation vectors
- Display deformations to user-defined scale
- Query and graph material data
- Show values directly on model
- Highlight yielded joint elements
- Display iso-surfaces
- Data tips for any object
- Annotation and dimensioning tool kit
- Export to Excel
- Export image files
- Export contour surfaces
- Import IDS Live GeoRadar data

Far-Field Stress

- Constant stress field
- Gravity stress field
- Stress field per material

Loads

- Distributed load
- Staged loading

Materials

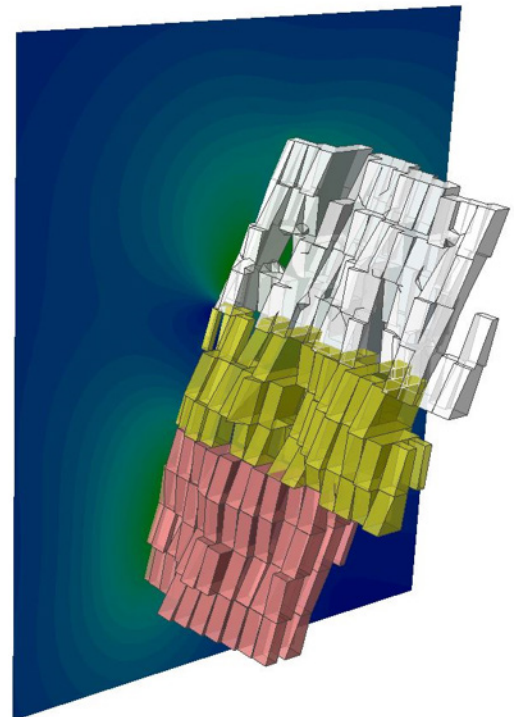
- Multiple materials
- Mohr-Coulomb, Hoek-Brown, Generalized Hoek-Brown material models

Meshing

- 3-noded surface elements
- One-click mesh generation
- Graded meshing
- Uniform meshing
- Check/Define mesh quality
- Define mesh refinement region

Modeling

- Create 3D models with CAD tools
- Multiple excavations
- Interactive geometry entry
- Vertex/Object snapping
- One-click material assignment
- Import 3D .dxf, .dwg, .obj, .stl, .step, .iges, .tin, .asc, .xyz files
- Surface Triangulation and Geometry Repair Tools
- Import from RS3
- Right-click editing shortcuts
- Interactive sidebar
- Interactive staging timeline
- Tunnel profile tool



Stope excavation analysis for multi-mining scenarios with backfills