

Unwedge 4.0

Underground Wedge Stability Software

Unwedge is a 3D stability analysis and visualization program for underground excavations in rock containing intersecting structural discontinuities. Use Unwedge to quickly create a model, perform a safety factor analysis, place reinforcement and interpret the results.

New Interface

Unwedge's upgraded interface provides an easy to use graphical environment for data entry and visualization that greatly simplifies the analysis and design process. Unwedge now comes with a drop-down menu for easy switching between different views, as well as the same drawing tools as Slide and RS2. The graphical data interpreter provides a rich set of tools, including 3D animation, for the convenient display of wedges surrounding the excavation. A new InfoViewer, upgraded printing, and titleblock design options make report generation easier than ever.

More Powerful Engine

Incorporate induced stress around an excavation and analyze its effect on stability using Unwedge's analysis engine based on Goodman and Shi's block theory. Wedge computation is quick and users have the ability to scale and size wedges, as well as locate possible end wedges. Unwedge now comes with Probabilistic Analysis capabilities and a new 64-bit parallel processing engine.

Probabilistic Analysis

The new Probabilistic Analysis option is used to add statistical distributions to variables such as joint orientation, joint strength, support properties, as well as field stress properties. Two number generation models, and two different sampling methods are included to provide control over the analysis. The new Probability View allows the user to analyze the results and plot desired values on a histogram, cumulative plot, or scatter plot.

Enhanced Modeling

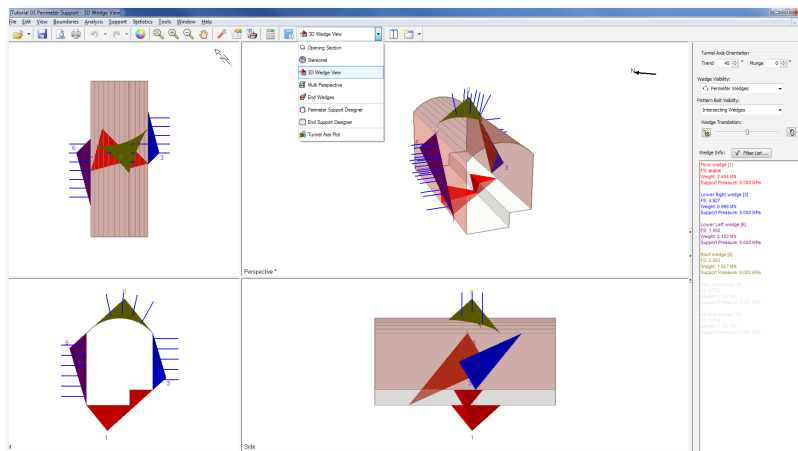
New features also include ground surface wedge truncation, advanced DXF importing options, as well as added joint

properties. Pseudo-static seismic load and a boundary element stress analysis option that allows users to determine how stress affects the stability of wedges are also available. Scaling of wedges now more accurately reflects the values defined for trace length and persistence and Unwedge will also work to determine the maximum volume wedge with user defined trace lengths.

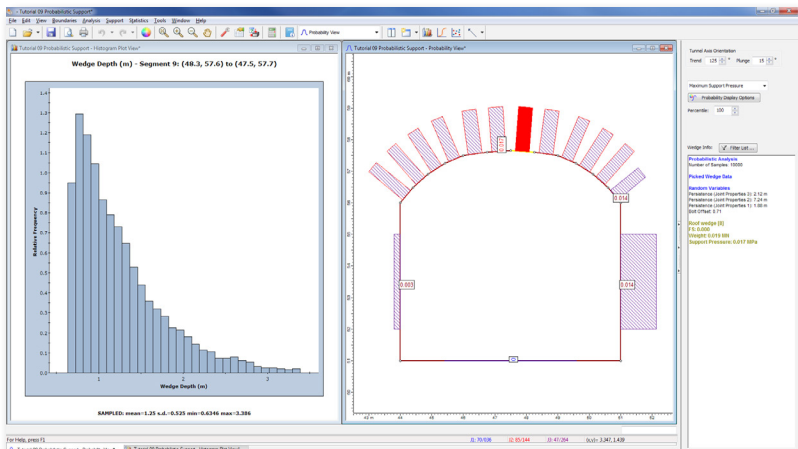
Dozens of Useful Additions

Unwedge contains an Integrated Stress Analysis module and the Tunnel Axis Plot shows how results change as

tunnel orientation changes. The Joint Combination Analyzer will automatically analyze multiple combinations of three different joint sets in a Deterministic Analysis, and the Probabilistic Analysis allows the user to view all results (from multiple joint combinations of three different joints) at once. A new ground surface water pressure model has also been incorporated. Unwedge 4.0 comes with a new Failure Mode Filter, as well as EC7 Design Standards. User-defined design standards can also be incorporated.



The new Unwedge interface provides a drop-down menu for easy switching between views. In this example, pattern bolts have been added.



The Probability View allows the user to view specific wedges and plot results of a specific segment.

Excavation

- define / edit opening section
- import/export in DXF format
- axis trend/plunge
- analyze tunnels, caverns, shafts, intersections

Joints

- orientation (dip/dip direction)
- import from *Dips*
- stereonet view
- multiple joint combinations
- joint combination analyzer
- shear strength (Mohr-Coulomb, Barton-Bandis, Power Curve)
- waviness
- joint structure continuity
- water pressure

Wedges

- tetrahedral or prismatic wedges using Goodman/Shi block theory
- perimeter wedges
- end wedges
- failure modes – falling, sliding, lifting, stable
- scale wedge size
- ground surface wedge truncation
- failure mode filter
- minimum wedge size filter
- EC7 design standards

Probabilistic Analysis

- statistical distributions - normal, uniform, triangular, beta, exponential, lognormal, gamma
- Fisher distribution for joint orientations
- histogram, cumulative, and scatter plots
- import joint set statistics from *Dips*
- Monte Carlo or Latin Hypercube simulation
- random or pseudo-random sampling
- highlight failed wedges on plots
- view all results from multiple joint combinations of three different joints at once

Analysis Information

- wedge information panel
- Info Viewer
- interactive Data Tips
- measure lengths and angles

Support

- 2D design views
- pattern bolting, shotcrete, pressure, spot bolting
- bolt models – anchored, grouted dowel, cables, Swellex, split sets, user-defined
- bolt orientation efficiency
- interactive editing

- bolt force diagrams

Loading

- seismic loading
- field stress
- pressure
- bolt force
- water pressure

Viewing Options

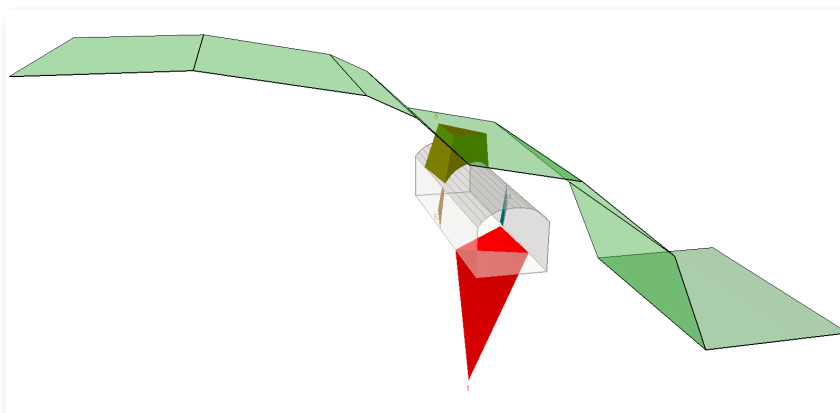
- 3D wedge view (orthogonal and perspective views)
- multi perspective view
- end wedge view
- probability view
- wedge visibility
- move wedges
- easily rotate, zoom, pan
- animation
- display options

Stress Analysis

- constant field stress
- gravity field stress
- advanced analysis options
- view stress contours

Tunnel Axis Plots

- optimize axis orientation
- vary trend and/or plunge
- contour plots or 3D charts
- 2D charts with secondary data
- user defined data



Ground surface wedge truncation

Price & Licensing

Personal License (no USB)

\$1295 USD

Flexible License (no USB)*

\$1895 USD

**add \$200 USD for USB*

Unwedge 4.0 is part of our Maintenance Subscription plan (15% annual fee). Please contact software@rocscience.com for more information. www.rocscience.com