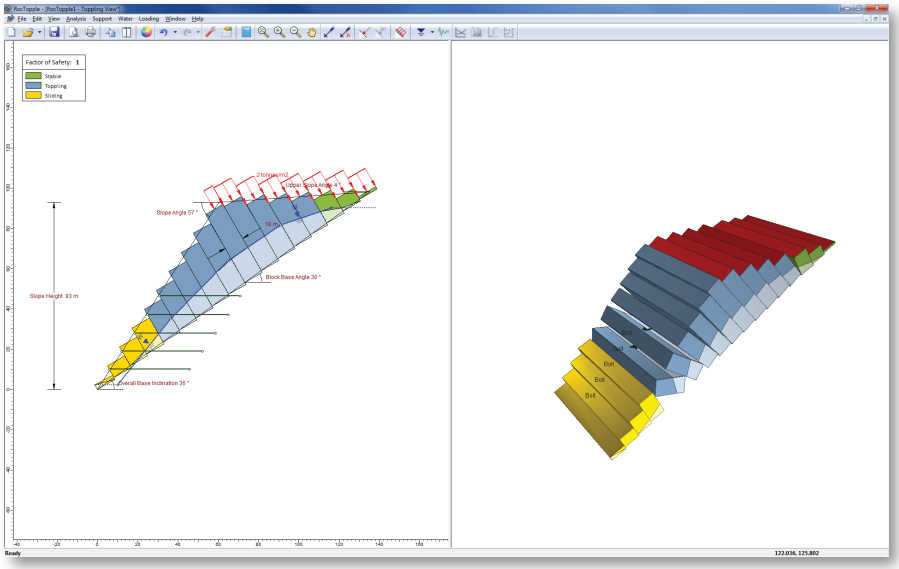
RocTopple 1.0

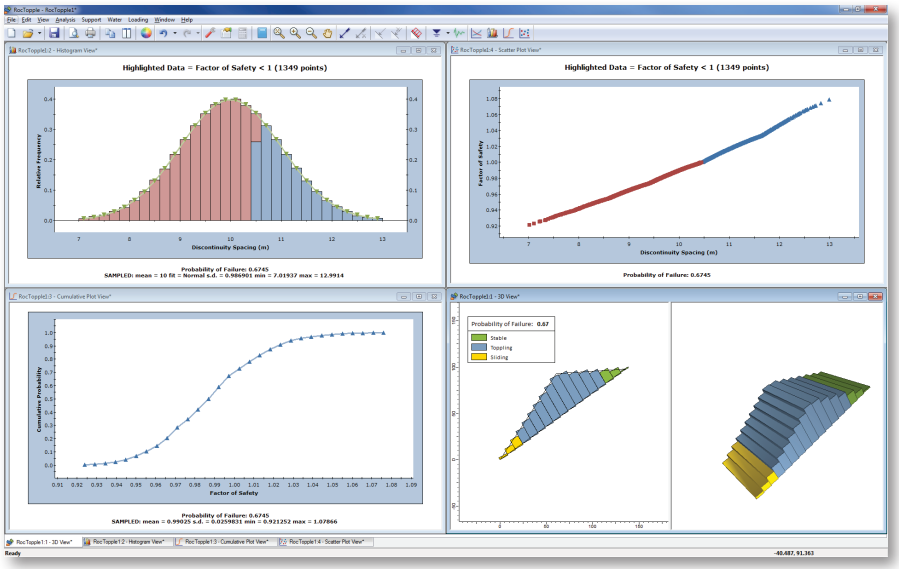
Block Toppling Analysis for Rock Slopes

rocscience software tools for rock and soil

RocTopple is an interactive software tool for performing block toppling analysis and support design. RocTopple makes it easy to visualize the slope failure in 2D and interactive 3D, and to define external loading conditions.



2D and Interactive 3D View of the model. This example shows rock bolts, distributed loads and phreatic surface applied to the slope.



Probabilistic analysis results for bedding width as the statistical parameter. Results are shown in histogram (top left), scatter plot (top right) and cumulative plot (bottom left).

Analysis Options

RocTopple provides a wide range of analysis options, including deterministic, probabilistic and sensitivity analysis. Statistics can be assigned to any geometry, joint strength, or external loading variables. Strength criteria for the discontinuities include Mohr-Coulomb and Barton-Bandis. The analysis method is based on Goodman and Bray block toppling, first published in Rock Slope Engineering in 1976.

Partial factors (Eurocode 7) can also be applied to the above three mentioned analyses through *RocTopple's* Design Standard option.

Support & Loading

A variety of support and external loading options are available. Rock bolts and line loads can be graphically applied and edited in the 2D view. Distributed loading can be applied to either or both the slope face or upper slope face. Water pressure is available in two options: percent fill of joints or user-drawn phreatic surface. *RocTopple* also supports pseudo-static seismic loading in the form of seismic coefficients.

Probabilistic Analysis

In *RocTopple*, any geometric, strength or external load variables can be assigned statistical properties. Using Monte Carlo or Latin Hypercube sampling, the analysis provides a probability of failure as well as histograms, cumulative and scatter plots of the samples. Results can be easily exported to Excel.

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Slope Properties

- Slope angle
- Upper slope angle
- Slope height
- Overall base inclination
- Bedding dip
- Bedding width

Rock Properties

- Unit weight
- Joint shear strength
  - o Mohr Coulomb
  - o Barton Bandis
- Joint tensile strength
- Different strength for base and toppling discontinuities

External Loading

- Rock bolts
- Line loads
- Distributed loads
- Water pressure (phreatic surface, joint percent fill)
- Seismic loads (coefficients)

Deterministic Analysis

- Calculate shear strength reduction factor (factor of safety)
- Display critical mode of failure for each block (toppling, sliding, stable)
- Eurocode design standard

Probabilistic Analysis

- Define statistical distributions for geometric, strength, external loading variables
- Calculate probability of failure
- Distributions – normal, lognormal, uniform, triangular, beta, exponential, gamma
- Monte Carlo and Latin Hypercube sampling
- Pseudo-random sampling
- Histogram (with best fit distribution), cumulative and scatter plots (with regression line)
- Interactive sampler for different plots

Sensitivity Analysis

- Determine effect of individual variables on factor of safety
- Define minimum and maximum values for any geometric, strength or external loading variables
- Multiple variables on one plot

Design Standard

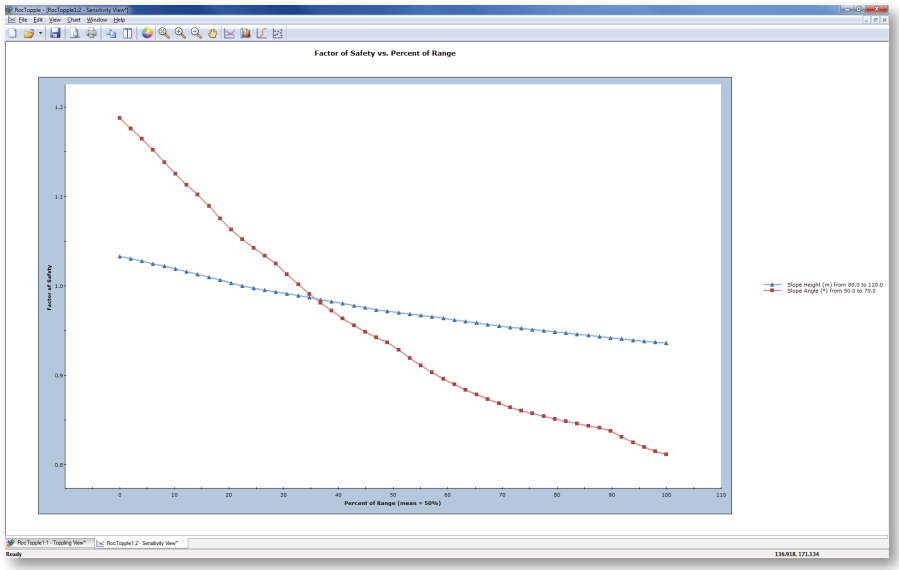
- Eurocode 7 (partial factors)
- Applied to deterministic, probabilistic and sensitivity analyses

Exporting Results

- DXF file for exporting geometry into *Phase*^{2}
- One click export of data and charts to Excel
- Copy to clipboard
- Export image files
- Info Viewer analysis summary

Viewing Options

- 3D Interactive view – rotate, mouse-drag induced toppling
- 2D view with dimensioning and application of external loads
- Customizable display options



Sensitivity analysis results for slope height and slope angle. The factor of safety for this model is more sensitive to the slope angle.

Price & Licensing

RocTopple 1.0 is sold at the prices listed below.

Personal License (no USB key) $595 USD

Portable License (Uses USB key) $895 USD

Network Licenses are also available; they are sold as a yearly subscription, with price based on the number of concurrent users. Please contact software@rocscience.com for more information.

www.rocscience.com