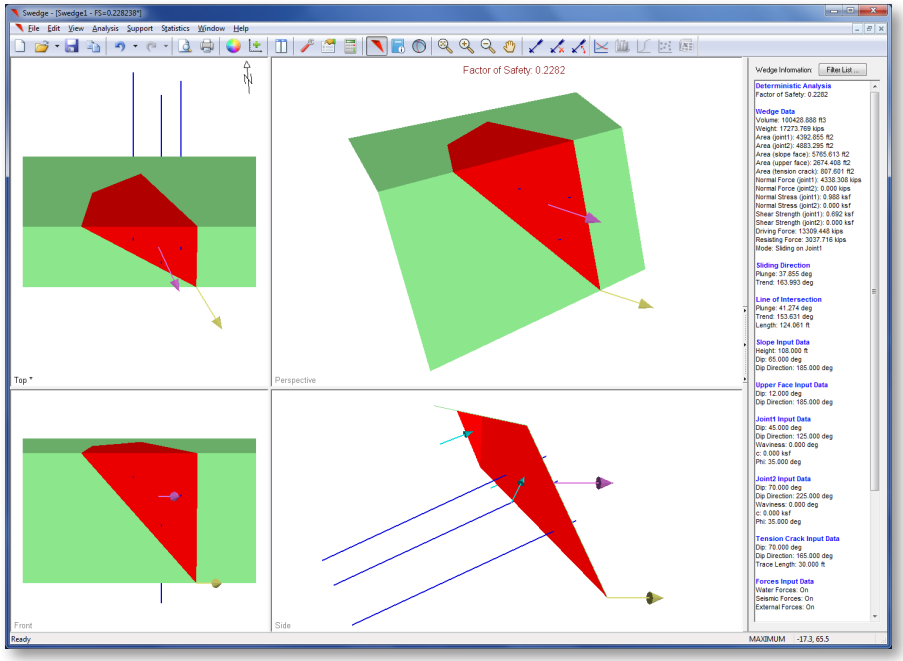
Swedge 6.0

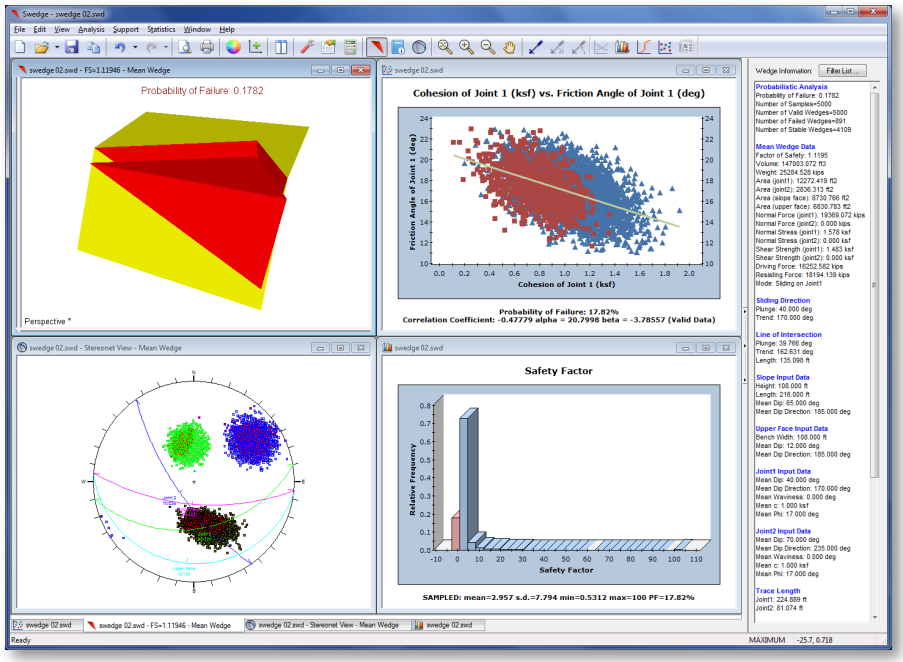
Surface Wedge Stability Software

rocscience software tools for rock and soil

Swedge is an easy to use analysis tool for evaluating the geometry and stability of surface wedges in rock slopes. Wedges are defined by intersecting discontinuity planes, the slope surface and an optional tension crack.



Orthogonal (top, front, side) and perspective views of the model are displayed in a 4-view split screen format. This example shows rock bolts and various external forces applied to the wedge.



Probabilistic or combination analysis results can be plotted on histograms, scatter plots and the stereonet. Failed wedge data can be highlighted in red.

Analysis Options

Swedge 6.0 offers a variety of analysis options including Probabilistic, Combination, Sensitivity, and Persistence analysis. Probabilistic analysis allows you to define statistical distributions of input data and calculate probability of failure. Sensitivity analysis allows you to determine the effect of individual variables on safety factor. New options in version 6 include Bench Analysis for open pit design, Eurocode design standards and basal plane failure (third joint plane).

Support & Loading

Rock bolts, shotcrete or support pressure can be applied to increase the wedge safety factor. Bolt orientation can be optimized with a mouse click, and the support capacity for a required factor of safety can be determined. The Pressure option can be used to simulate pattern bolt application or surcharge loading. De-stabilizing forces due to water pressure on the joint planes, seismic loads or external forces can also be easily modeled.

Import from *Dips*

Swedge 6.0 provides integration with the new *Dips* 6.0 upgrade. With the Combination analysis option, a complete *Dips* file can be imported into *Swedge*. Any number of discrete joint planes can be defined, and *Swedge* will compute all possible combinations of joint intersections which can form a wedge. Joint set statistics (Fisher Distribution) can be imported from *Dips* for a Probabilistic analysis.

Swedge 6.0

Technical Specifications

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Slope

- slope plane / upper face
- slope height, length, bench width
- overhanging slope
- metric or imperial units
- Eurocode design standards

Joints

- two sliding planes (tetrahedral wedges)
- optional basal joint plane (pentahedral wedges)
- shear strength – Mohr-Coulomb, Barton-Bandis, Power Curve
- waviness angle
- import planes from *Dips*

Tension Crack

- optional tension crack plane
- arbitrary orientation
- location – user-defined or automatic

Wedge Size

- scale wedge size by slope height, slope length, bench width, trace length, persistence, wedge weight, volume
- truncate wedge with tension crack
- persistence analysis (probabilistic)
- minimum wedge size

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
- shear strength – define variability of mean strength envelope or individual strength parameters
- correlation coefficient for cohesion and friction angle
- best fit distribution, regression line
- highlight failed wedges on plots
- filter wedges by sliding mode
- probability of failure, reliability index

Combination Analysis

- unlimited number of joints
- analyze all possible combinations
- find minimum safety factor wedges
- import joints from Dips
- view results on histogram, scatter plot, stereonet

Sensitivity Analysis

- determine effect of individual variables on safety factor
- multiple variables on one plot
- vary strength of all joints simultaneously

Persistence Analysis

- randomly vary wedge height and/ or joint persistence
- allowable persistence determines if wedge can form

Bench Analysis

- Optimize bench design for open pit mines

Support

- rock bolts
- shotcrete
- pressure
- active or passive support
- optimize bolt orientation
- calculate support force for required safety factor

Loading

- water pressure on joints
- seismic coefficient
- external forces
- pressure (surcharge or support)

Stereonet View

- plot great circles, poles
- show joint intersections
- highlight failed data
- equal angle / equal area

Import from *Dips*

- import mean planes
- import joint set statistics (probabilistic analysis)
- import all planes (combination analysis)

Analysis Results

- sidebar information panel
- Info Viewer analysis summary
- one-click export of data and charts to Excel

Viewing Options

- 3D wedge view
- interactively rotate, zoom, pan
- move wedge along sliding planes
- customize display options
- export image files

Price & Licensing

Swedge 6.0 is sold at the prices listed below.

Personal License (no USB key)
$1295 USD ($1295 CAD)

Portable License (Uses USB key)
$1895 USD ($1895 CAD)

Flexible 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.

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