PRODUCT DATA SHEET

Bentley
Advancing Infrastructure

SVSLOPE®

Slope Stability Analysis Software

When modeling behaviors of earth materials, you need reliable expertise and software applications that meet slope stability challenges of soil of rock slopes. You also look for geotechnical analysis software that improves design, is efficient to use, and provides a return on investment. You expect software that supports integrated digital workflows and digital twin representation in 3D space and time.

Bentley's SVSLOPE provides you with the capabilities to handle simple to complex geotechnical analysis of soil or rock slopes. Large datasets from varied sources can be rapidly interpreted, prototyped, analyzed, and visualized. Advanced functionality allows for comprehensive analysis of extensive sites, combined with the efficient solution of multiple concurrent locations for spatial stability analysis.

Limit Equilibrium Methods and Stress-based Methods of Slope Analysis

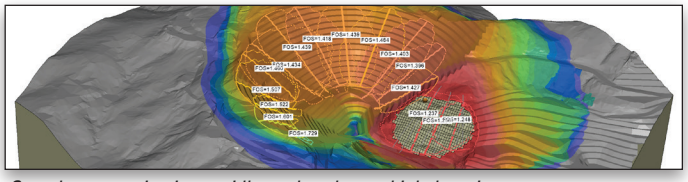
Three-dimensional analysis gives more rigorous consideration to site geology and increases accuracy when calculating safety factors. The process ensures that you are keeping infrastructure safe and reliable. With SVSLOPE, you can perform over 15 methods of analysis with classic limit equilibrium method of slices or by newer stress-based methods, as well as Kulhawy analysis with stress fields from SVSOLID™ and other sources. You can also combine SVSLOPE with SVFLUX™ for coupled, unsaturated, steady-state or transient groundwater analysis, including climatic effects, to study slope stability in the most environmentally sensitive areas.

Advanced Material Representation, Loading, and Reinforcements

Choose the appropriate representation of soil and rock site materials from over 20 different strength models, including Mohr-Coulomb, Hoek-Brown, Undrained, Anisotropic, Bilinear, Frictional-Undrained, Anisotropic Linear Model (ALM), and unsaturated shear strength models. Complex geometry paradigms—such as block models, enclosed material volumes (MVM), and bedding guides—allow you to model challenging geostratas and material zones. Seismically active zones can be modeled with a variety of methods. There is extensive support for reinforced slopes including grouted anchors, micro-piles, and geomembranes.

Rapid and Comprehensive Analysis

SVSLOPE accomplishes more, faster with multi-plane slope stability analysis (MPA) that rapidly determines the full 3D slip surface at hundreds of locations in extensive models, such as open-pit mines, riverbanks, and road and rail corridors. Orientation analysis features automatically calculate the slip direction at each location. Consideration of faults, weak planes, and pore-water pressures, along with the most available search methods on the market, provide confidence in the design process. Search methods include Greco, Cuckoo, Wedges.



Complex open pit mine rapidly analyzed at multiple locations.

Use probabilistic analysis—such as Monte Carlo, Latin Hypercube, and the Alternative Point Estimation Method (APEM)—to build robust digital twins. Sensitivity analysis and spatial variability features offer further model refinement.

Visualizing Digital Twins

Access state-of-the-art, report-ready graphical presentation of results without additional manipulation. The 3D immersive graphics engine provides performance advantages and responsiveness when creating and manipulating large, complex models. SVSLOPE delivers high-quality digital twin visualizations of designs and integrates with other Bentley design and analysis applications.

SVDESIGNER™ conceptual model builder allows you to develop geometrically complex digital twin 3D models. You can import data directly from sources including gINT® borehole data, DXF, SHP, Esri, CLARA-W, Slope/W, Slide, ASCII, CSV, and XLS files. The software lets you use multiple 3D model-building methodologies, such as extrusions, 2D cross-section stitching, 3D layer cake, block models, and material volume method. You can also slice 3D models into 2D cross-sections and generate triangulated surfaces (TINS) for detailed topology and geostrata representations.

Continuous Innovation and Time Savings

SVSLOPE offers a heavily benchmarked solver with a history of research dating back to 1993 based on many peer-reviewed publications. With thought leadership continually advancing applications with valuable expertise and knowledge, users can have confidence in their design analysis and solutions.

Parallel processing, CPU core sensing, and management controller techniques, along with ongoing solver efficiency improvements, offer time savings in all aspects of the digital workflow, allowing multiple locations, multiple trials, and multiple computations to be achieved.

System Requirements

Operating System
Windows 7 (SP1 or later), Windows 8, Windows 10

Processor
Intel Pentium-based or AMD Athlon-based PC or workstation

Memory
1 GB minimum, 2 GB recommended, (more memory typically results in better performance)

Video
256 MB VRAM minimum, with full support for Open GL 3.3

Display Resolution
1024 px x 768 px or better

Disk Space
2 GB free disk space

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SVSLOPE At-A-Glance

Calculation Methods
- Over 15 analysis methods including classic method of slices such as Bishop, Janbu, Spencer, MP, GLE, Sarma Non-Vertical
- Stress-based methods including Kulhawy using Finite-Element input
- Groundwater coupling considering unsaturated transient SVFLUX results
- Climate effects
- Rapid draw-down (Duncan and Wright, Effective stress + B-bar)
- Define water pressure as Ru/B-bar/Phreatic correction/ Piezometric lines/water tables/Discrete points/grids

Geometry/Modeling
- Creation of geometrically complex digital twin 3D models with the SVDESIGNER conceptual model builder
- Creation of 3D models from triangulated surfaces (TINS)
- Multiple 3D model-building methodologies (extrusions, 2D cross-section stitching, 3D layer cake, blocks, or enclosed volume method)
- Slice 3D models into 2D cross-sections
- Import from boreholes and other analysis software
- Import OBJ, 3DS, DEM, DTM, DXF, SHP, and more
- Import ASCII/CSV/XLS

Loading and Supports
- Point loads
- Distributed loads (uniform or variable)
- Seismic loads (Pseudo-Static Constant or Spectral Pseudo-Static)
- Over 11 supports including soil nails, grouted tiebacks, geotextiles and user-defined

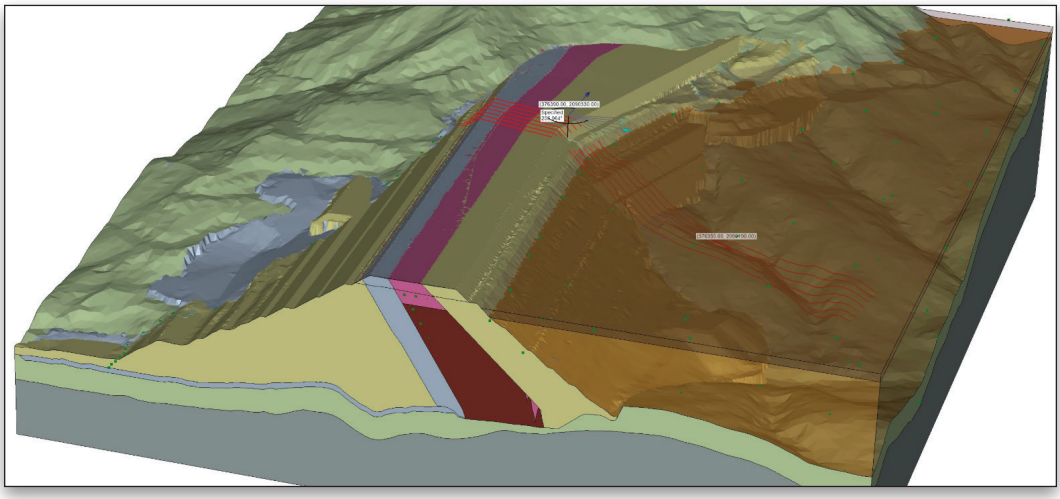
Material Strength Models
- Support for over 20 different soil strength models including Mohr-Coulomb, Hoek-Brown, Undrained, Anisotropic methods, and Unsaturated shear strength models. Strong support for both rock and soil constitutive models

Rapid Modeling and Risk Evaluation
- True 3D multiplane analysis (MPA)
- Probability Methods (Monte Carlo, Latin Hypercube, APEM, "Floating" critical slip surface)
- Sensitivity (one-way and two-way)
- Highly optimized computation engine
- Rapid 64-bit parallel processing
- Batch analyses

Slip Search Methods
- Over 15 comprehensive critical slip surface searching methods in 2D and 3D
- Advanced 3D, non-ellipsoid searching methods
- Including Greco, Cuckoo, moving wedges, blocks, and hybrid ellipsoids
- Fully specified combinations of wedges, weak planes, ellipsoidal ideal for back analysis
- Optimization of critical slip surfaces
- Automatic determination of slip direction

More Features
- Includes 2D and 3D analysis
- Export 3D slips to SVSOLID for SSR analysis
- Excess pore pressure
- Comprehensive unsaturated analysis
- Tension cracks
- Anisotropic regions (bedding guides)
- Metric or Imperial units
- Peer-reviewed and heavily benchmarked
- Developed based on research started in 1993

Subscription Entitlement Service Supports
- Provides a universal ID to link together all activity within Bentley applications
- Manage license entitlements at a user level, without requiring activation keys or hardware dongles
- Access personal learn material, paths and history, timely product related news, automatic product updates, and notifications



Safety and efficiency of a mine tailings facility is improved by using SVSLOPE.

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