

Bentley[®]
Advancing Infrastructure



PLAXIS[®] LE

Essential LEM Slope Stability Analysis

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

Bentley's PLAXIS LE provides you with the capabilities to handle common 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 Slope Stability Methods with Groundwater Analysis

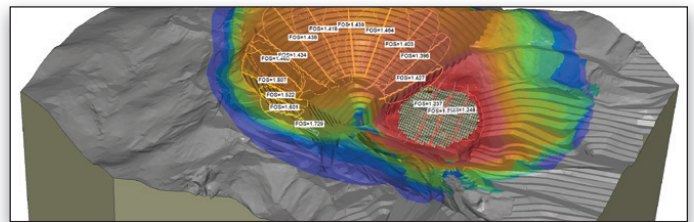
3D analysis gives more rigorous consideration to site geology and increases accuracy when calculating safety factors. This process ensures that you are keeping infrastructure safe and reliable. With PLAXIS LE, you can perform limit equilibrium method (LEM) analysis choosing from over 15 classic method of slices and newer stress-based methods. Extend functionality with analysis that can be performed with popular use cases such as unsaturated groundwater flow, large-strain consolidation, and multiyear climatic effects, either as distinct models or combined with slope stability analysis. Inform your models with strength and hydraulic material parameters estimated from your testing program or by data mining the 40,000+ entries in the SoilVision Soils database.

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 stratigraphy 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 geotextiles.

Rapid and Comprehensive Analysis

PLAXIS LE 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



Complex open pit mine rapidly analyzed at multiple locations.

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, and Fully-Specified for back analysis. 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. PLAXIS LE delivers high-quality digital twin visualizations of designs and integrates with other Bentley design and analysis applications. PLAXIS Designer conceptual model builder allows you to develop geometrically complex digital twin 3D models. You can import data directly from sources, including OpenGround[®] Cloud and glINT[®] borehole data, DXF, OBJ, SHP, Esri, LandXML, and CSV 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.

Visualizing Digital Twins

PLAXIS LE 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, you can have confidence in your 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 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

**Find out about Bentley
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PLAXIS LE At-A-Glance

Calculation Methods

- Use over 15 analysis methods, including classic method of slices like as Bishop, Janbu, Spencer, MP, GLE, and Sarma nonvertical
- Implement stress-based methods, including Kulhawy using Finite-Element input
- Work with groundwater coupling considering unsaturated transient results and climate effects
- Implement rapid draw-down (Duncan and Wright, Effective stress + B-bar)
- Define water pressure as $R_u/B\text{-bar}$ /phreatic correction/piezometric lines/water tables/discrete points/grids
- Implement newmark permanent displacement using seismic finite-element input
- Apply design standards, including Eurocode 7 and BS 8006

Geometry and Design

- Create geometrically complex digital twin 3D models with PLAXIS Designer conceptual model builder
- Create 3D models from triangulated surfaces (TINS)
- Work with multiple 3D model-building methodologies (extrusions, 2D cross-section stitching, 3D layer cake, blocks, or enclosed volume method (MVM))
- Slice 3D models into 2D cross-sections
- Import from boreholes (OpenGround, gINT) and other analysis software
- Import OBJ, 3DS, DEM, DTM, DXF, SHP, ASCII/CSV/XLS, and more
- Export to PLAXIS 2D for finite-element (FEM) analysis

Loading and Supports

- Work water, point, and distributed loads (uniform or variable)
- Implement seismic loads (Pseudo-Static Constant or Spectral Pseudo-Static)
- Implement 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
- Blast disturbance zones for strength reduction

Rapid Modeling and Risk Evaluation

- Implement true 3D multiplane analysis (MPA)
- Use Probability Methods (Monte Carlo, Latin Hypercube, APEM, "Floating" critical slip surface)
- Include sensitivity (one-way and two-way)
- Use a highly optimized computation engine
- Utilize batch analyses and model management tools

Slip Search Methods

- Optimize over 15 comprehensive critical slip surface searching methods in 2D and 3D
- Utilize advanced 3D, non-ellipsoid searching methods
- Include Greco, Cuckoo, moving wedges, blocks, and hybrid ellipsoids
- Use fully specified combinations of wedges, weak planes, ellipsoidal ideal for back analysis
- Optimize critical slip surfaces
- Automatically determine slip direction

More Features

- 2D and 3D analysis with Extrusion and Slicing tools
- Excess pore pressure
- Comprehensive unsaturated analysis
- Tension cracks
- Anisotropic regions (bedding guides)
- Metric or Imperial units

SoilVision Soils database

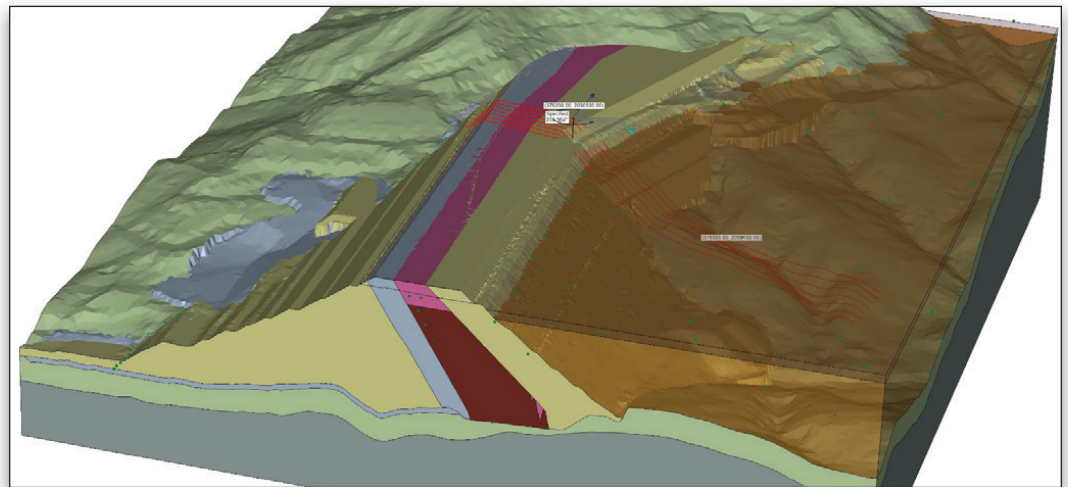
- Determine unsaturated soil parameter (shear, consolidation, SWCC, conductivity, and more)
- Data mine the over 40,000 soils database and import from gINT
- Manage and classify lab and site testing data

Groundwater Flow and Consolidation Analysis

- Model complex open pits, mine tailings, and large earth structures with 3D FEM analysis
- Use a comprehensive set of boundary conditions and unsaturated constitutive relationships

Subscription Entitlement Service Supports

- Provide 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 PLAXIS LE.