FLAC/Slope™ VERSION 8.1

Explicit Continuum Factor-of-Safety Analysis of Slope Stability in 2D

NEW ★ NOW FREEWARE ★ NEW

ABOUT *FLAC/SLOPE*

FLAC/Slope is a special, streamlined version of *FLAC* for evaluating the factor of safety (FoS) of soil and rock slopes in two dimensions with simple and fast model setup, execution, and analysis. *FLAC/Slope* can simulate stability problems under a wide variety of slope conditions, including: arbitrary slope geometries, multiple layers, pore pressure conditions, heterogeneous soil properties, surface loading, and structural reinforcement.

FEATURES

GENERAL

- Provided free and with no time or size restrictions
- Simple user interface and workflow
- Specifically designed to perform multiple analyses and parametric studies for slope stability projects
- Failure mode develops naturally – no need to specify a slip surface or failure mechanism
- Predict multiple, interacting failure mechanisms (failures can propagate)
- Extensive solution controls and options
- Multi-threaded mechanical calculations
- Built-in PDF manual and examples

GRIDS and GEOMETRY

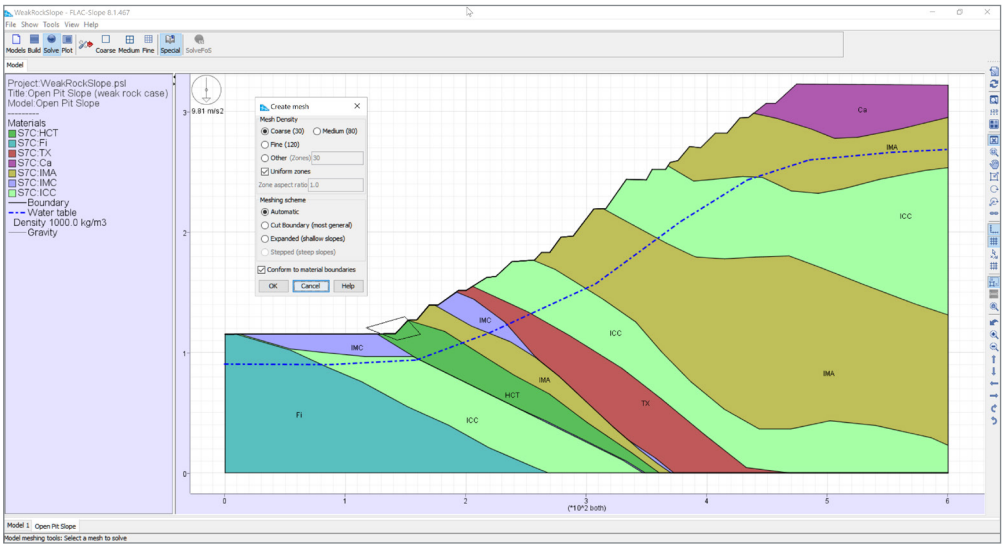
- Wizards for generating slope, bench, dam, and general surface grids
- Automatic/customizable meshing tools

MATERIALS and MODELS

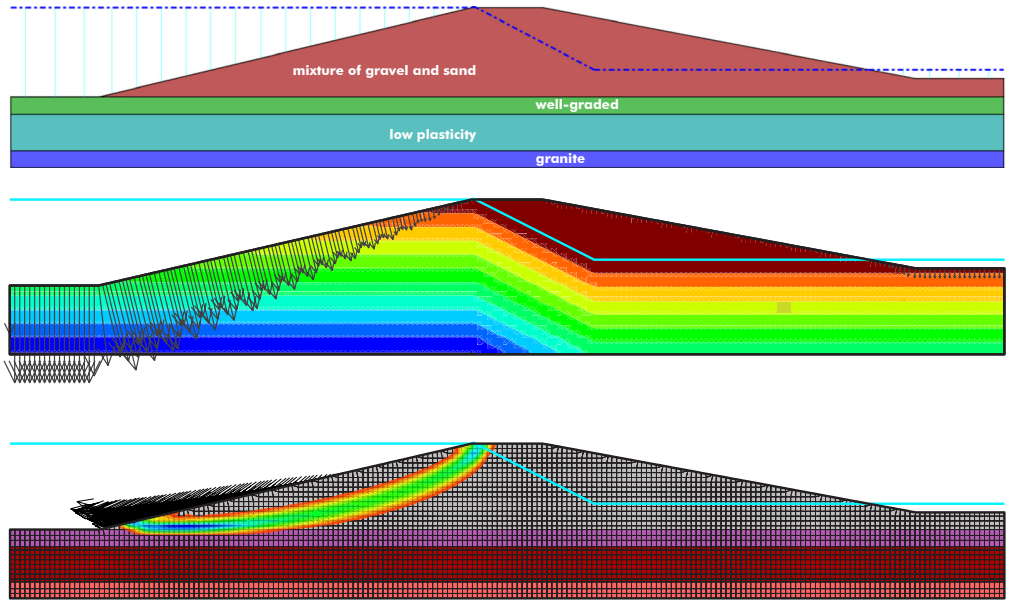
- Mohr-Coulomb, Hoek-Brown, and Ubiquitous Joint materials are available
- Built-in materials library includes gravel, sand, silt, clay, and rock properties
- Add, save, edit, and import/export your own material properties with the library
- Easily define geotechnical layers

BOUNDARIES and CONDITIONS

- Automatic boundary conditions
- Apply stresses (Sxx, Sxy, Syy, normal, shear, and pressure) and forces (Fx, Fy)
- Cable structural support elements can be added as geosynthetic sheets or spaced (out-of-plane) ground reinforcement to simulate ground-structure interaction.
- Easily add a water table to include pore pressures for effective stress calculations
- Add a Mohr-Coulomb interface to represent a weak plane for faults, joints, or artificial boundaries
- User-defined gravity settings



FLAC/Slope user interface showing the model pane with the *Create mesh* dialog open. Geotechnical unit materials, the water table, and an excluded region (the polygon near the slope toe) can also be seen.



FLAC/Slope model of a dam showing the model view (top); water table, pore pressures, and applied forces to represent the water head above the dam (middle); and the resulting maximum shear strain rates and velocity vectors (bottom). The calculated FoS is 2.45 for this model.

SOLUTIONS

- Plane strain or axisymmetric analysis
- Automatic FoS calculations using the shear strength reduction (SSR) method
- Structural support elements, materials, and interface properties can be included or excluded as part of the FoS calculation
- Exclude model regions from the FoS calculation to capture the global failure
- Pseudostatic analysis with constant horizontal and/or vertical accelerations to represent an earthquake
- *FLAC/Slope* model records can be saved and imported into *FLAC* for additional analysis

POST PROCESSING

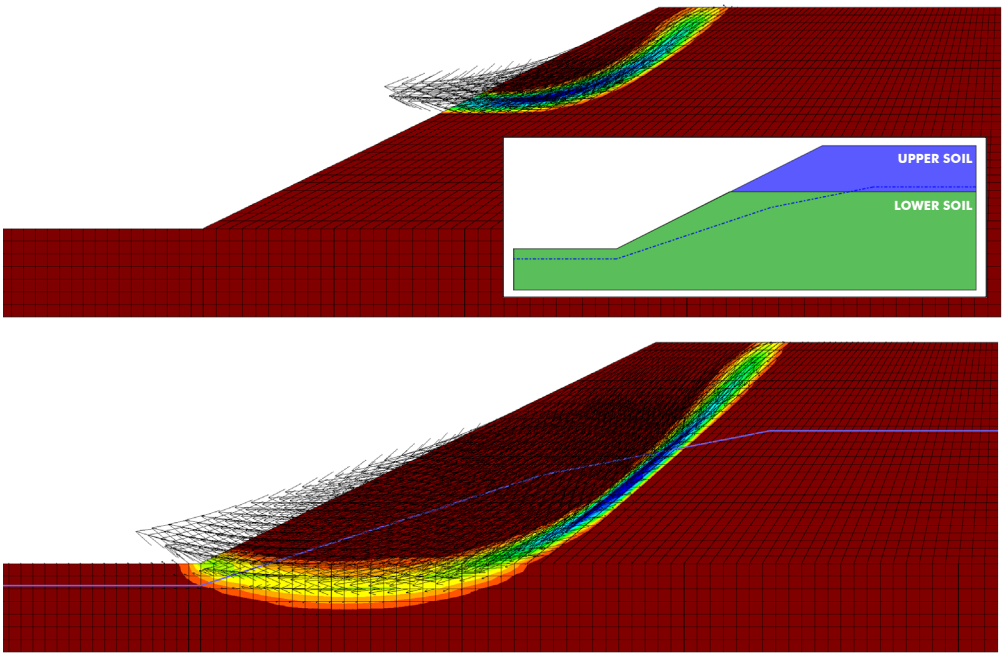
- Plotting of:
  - materials
  - shear strain rate contouring (failure surface location)
  - velocity vectors (failure mode)
  - pore pressure contouring
  - model boundary or mesh
  - water table
  - applied conditions
  - plasticity indicators (yielding/failure)
  - ubiquitous joint angles
  - ground reinforcement elements and axial forces
  - calculated FoS (in legend)
- Export model plots as bitmap, postscript, and DXF formats
- Generate an HTML report with material, interface, and structural element property tables and solution table
- Optionally show resources to:
  - view all of the background *FLAC* commands generated as you create and run models
  - query the model using *FLAC* commands
- Compare runs using different parameters, and even compare results from different projects

A FREE DOWNLOAD

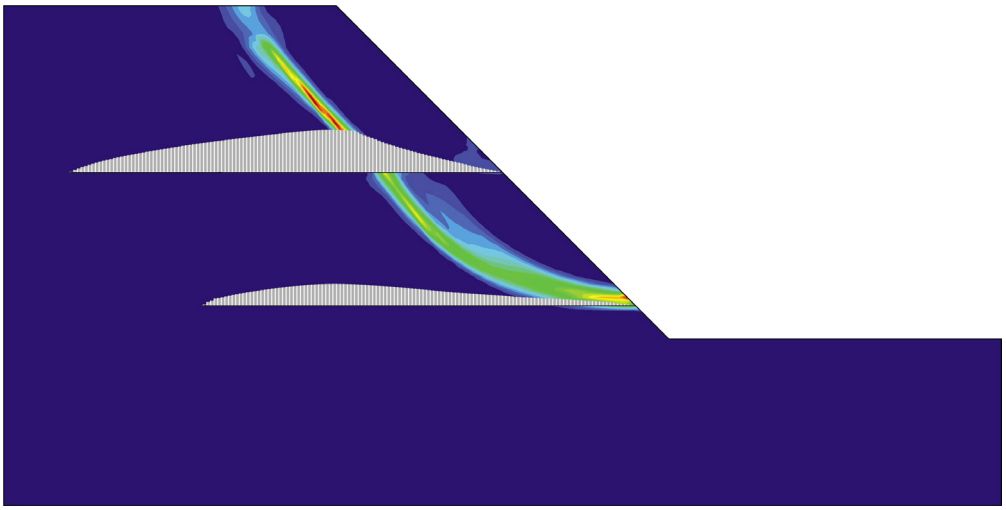
Itasca is pleased to offer *FLAC/Slope* for free. There is no restriction to the length of time you can use the software and there are no model size restrictions.

Free technical support is not provided but paid technical support is available. Any software bugs reported will be fixed and software updates released on our website.

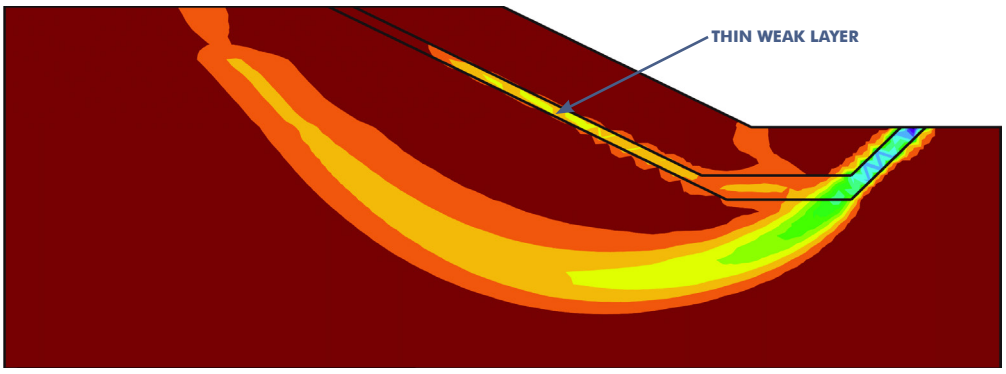
www.itascacg.com/freeflacslope



FLAC/slope models of a simple slope consisting of two soil types without (top) and with a water table (below). The predicted FoS without and with pore pressures are 1.62 and 1.45, respectively. The presence of water drives possible slope failure mechanisms much deeper through the lower soil towards the slope toe.



Cable structural elements can be used to represent soil nails and rock bolts (by specifying an out-of-plane spacing) or, as shown above, geosynthetic sheets (no out-of-plane spacing). Axial forces that develop along the geogrid are shown as bar charts, with maximum axial forces for the top and bottom geogrids of -99.6 kN and -51.0 kN, respectively. Maximum shear strain rate contours are also shown that indicate the surface failure location. The slope's FoS is only 0.92 without reinforcement. Geogrids with bond cohesions of 1 kN/m and 10 kN/m result in a slope FoS of 1.12 and 1.23, respectively.



FLAC/Slope model of a slope with a thin weak layer. Where the ratio of cohesive strength is 0.6 between the thin weak layer and the surrounding clay, a FoS of 1.37 is predicted. Additional modeling where the ratio of cohesive strength between the weak layer and the surrounding clay of 1.0 and 0.2 results in different failure mechanisms and a calculated FoS of 1.45 and 0.54, respectively. In the latter case failure was confined within the thin weak layer only.