FLAC2D™ VERSION 9.0
Continuum Modeling for Geomechanics in 2D
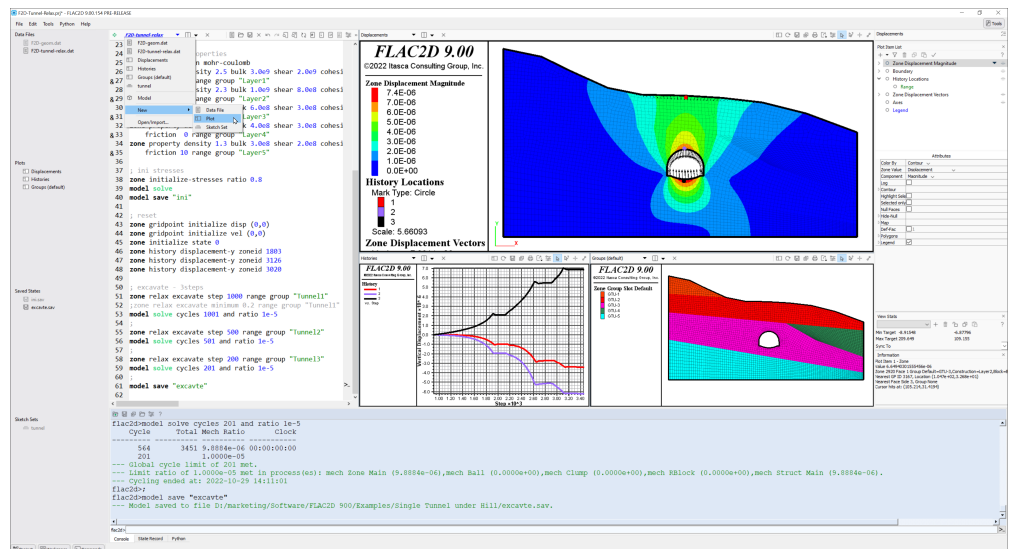
JUST RELEASED
NEW PRODUCT
JUST RELEASED

SOLVE YOUR MOST COMPLEX GEOTECHNICAL PROBLEMS

FLAC2D is a 2D version of Itasca's *FLAC3D* numerical modeling software[1]. With a completely new user interface (UI) and new interactive tools to construct models and interpret result, *FLAC2D* is our easiest-to-use software. *FLAC2D* is the best solution to solve complex geotechnical problems for two-dimensional analyses of soil, rock, concrete, structural ground support, and groundwater flow. Options can be added to expand analyses (dynamic, creep, and thermal) and to create user-defined constitutive models (UDMs). *FLAC2D* provides an incredibly accurate simulation of real-world geotechnical conditions for engineering applications, such as slope stability, underground excavation behavior, and earthquake simulations[2]. Flexible commands and scripting allow for model parameterization, flexibility, customization, and automation. With *FLAC2D*, the only modeling limitation is your imagination.

EASE-OF-USE

- Interactively create models from CAD files (DXF, STL), geometry sketching, or images
- Automatic structured and unstructured mesh generation
- Skinning to automatically identify model boundaries to set boundary conditions
- Interactively assign groups, constitutive models, and properties/distributions
- Built-in database to save/import/export material properties
- Automatic stress initialization
- Intuitive commands are easy to learn
- Most UI interactions are automatically translated into commands, which can be saved to a datafile and re-used
- Built-in help / command auto-complete
- Advanced built-in text editor makes creating and running models simple
- With Version 9's common UI, seamlessly move between programs or easily couple to other Itasca software[3]

FASTER

- Multi-threaded to utilize the full power of your computer for faster solutions
- Multi-threaded *FISH* Lists and Operators to query or modify the model incredibly quickly, even while cycling
- New Maxwell damping for 10-200x faster performance for dynamic[2] models
- *FLAC2D* plane-strain or axisymmetric models run up to 2-5x faster than equivalent *FLAC3D* models
- New, faster implicit solvers for fluid flow and thermal calculations

FLAC2D 9 features a new user interface (UI) where you can tile plots, data files, and panes. It shares this with other Version 9 Itasca software, making it easy to switch between them or seamlessly work with them all in the same UI[3].
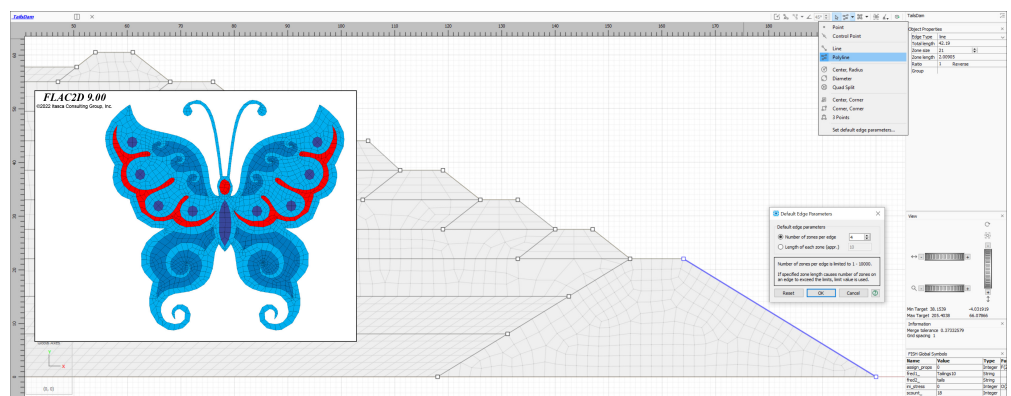
Through sketch sets, *FLAC2D* 9 provides interactive model creation tools for model construction, meshing, and specifying groups. Specify edge vend zone size targets and automatically create unstructured or structured meshes. Easily import CAD files, convert them to edges and automatically mesh, as with the butterfly shown in the insert.

ITASCA Consulting Group, Inc.

www.itascacg.com/flac2d

POWERFUL

- Large-strain simulations to capture the full extent of model deformation
- Mixed and Nodal Mixed Discretization (NMD) for accurate plasticity calculations
- Includes over 20 built-in constitutive models for soil, rock, and concrete
- Built-in liquefaction models P2P-Sand and NorSand with PM4Sand, PM4Silt, and UBCSAND liquefaction models coming
- Advanced plotting tools to understand model results and for working with hundreds of plots on real projects
- *FISH*, Itasca's scripting language, provides you with unparalleled control over, and customization of, the model
- Built-in Python 3.10 scripting includes SciPy for plotting, NumPy for computing, and Pyside for UI customization
- Statistical generation tools for Discrete Fracture Networks (DFNs)

FLEXIBLE

- Highly customizable UI and modeling
- All licenses permit two instances of *FLAC2D* to be run on the same computer
- Access and modify almost all variables (including "EXTRA" variables for zones, piles, gridpoints, etc.) via *FISH*/Python
- Import and export any ASCII data format
- Optional user-defined constitutive models (UDM) can be written in C++ using Visual Studio template

ANALYSES

- Plane-strain
- Axisymmetric
- Static stability
- Dynamic[2] stability
- Automatic factor of safety analysis (shear strength reduction method)
- Back-analyze failure and calibrate forward-prediction
- Service limit state (SLS) and ultimate limit states (ULS) based on displacements
- Zone relaxation simulates gradual excavation for construction sequencing, including out-of-plane excavation
- Simulate material damage and failure
- Effective stress using conventional or complex pore pressure distributions
- Fluid flow (single-phase)
- Seepage and consolidation
- Model ground support correctly with coupled ground-structure interaction (beams, cables, piles/rockbolts, and liners are available)
- Simulate discontinuities (faults, joints, bedding planes, and construction boundaries) using interfaces; capture yielding or failure, shear displacements, opening, and closure along them
- Static liquefaction
- Dynamic[2] liquefaction

AVAILABLE OPTIONS

DYNAMIC

- Permits 2D, fully dynamic analysis
- May be coupled to structural elements, ground water flow, and thermal models[2]
- Free-field and quiet boundaries
- Five hysteretic models, including Ramberg-Osgood
- Finn, P2PSand and other UDM material models for dynamic liquefaction analysis
- Rayleigh damping
- Maxwell damping for 10-200x faster performance
- Seismic wizard for pre-processing ground waves

CREEP

- Used to simulate materials that exhibit time-dependent material behavior
- Includes 10 creep constitutive models

THERMAL

- Includes both a conduction (material thermal stresses and displacements) and an advection (fluid density) model
- Includes a thermal hydration model
- New, faster implicit solvers for thermal calculations

USER DEFINED CONSTITUTIVE MODELS

- Allows users to create their own *FLAC2D* C++ UDMs and functions

LICENSES

- **TERM:** available as a monthly or annual lease and as a perpetual license
- **TYPE:** desktop and network licenses, via USB security keys, and web licenses are available (plus node locked upon request)
- Use network and web licenses with one or more seats across organizations
- Share desktop USB security keys between computers in the same office or remotely
- Without a license, the software may be run in demonstration mode (some modeling restrictions apply)
- Trial licenses are available upon request

ONLINE RESOURCES

Demonstration Software
www.itascacg.com/demos

Itasca's Software Forum
forum.itascainternational.com

Itasca Software Academy
academy.itascainternational.com

Technical Support
www.itascacg.com/help

UDM Library
www.itascacg.com/udms

Software Price Quote
www.itascacg.com/sales

The most successful global engineering companies, leading universities, and critical government agencies *trust* the *reliable* results of Itasca software to solve the most difficult geotechnical problems.
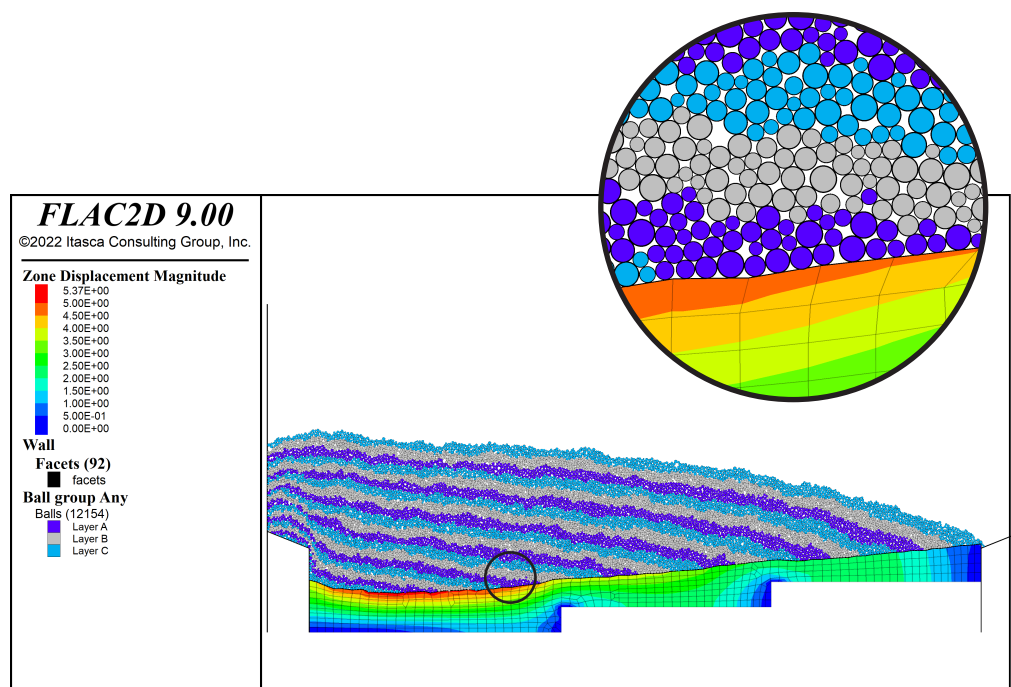
FLAC2D 9 and PFC2D 9[4] can be coupled to leverage the power of both discrete element method (DEM) and continuum modeling. In this project PFC2D balls are deposited onto a soft elastic material under large strain conditions.