

FLAC3D™ VERSION 6.0

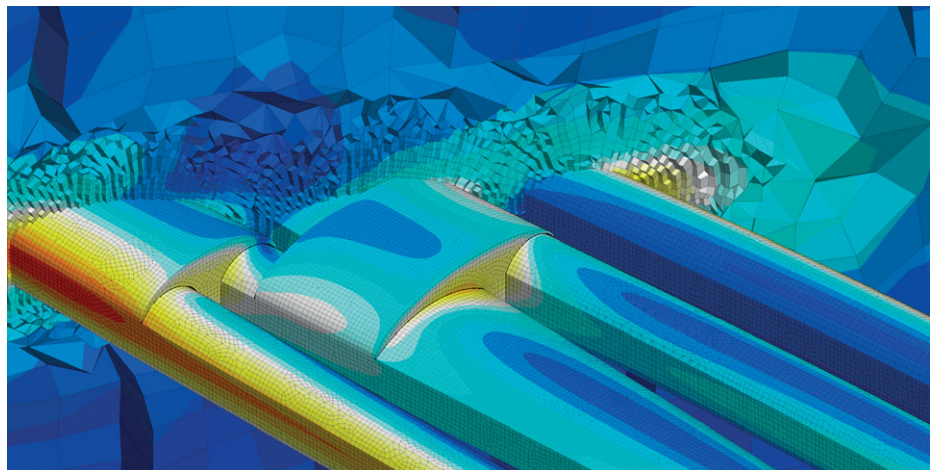
Explicit Continuum Modeling of Non-linear Material Behavior in 3D

ABOUT FLAC3D

FLAC3D is numerical modeling software for geotechnical analyses of soil, rock, groundwater, constructs, and ground support. Such analyses include engineering design, factor of safety prediction, research and testing, and back-analysis of failure. Continuum analysis can be applied to engineering design of civil, mining, and geotechnical excavations and constructs in soil, intact rock, and rock masses. Using interfaces, *FLAC3D* can also simulate discontinuities such as faults, joints, bedding planes, and engineered boundaries along constructs.

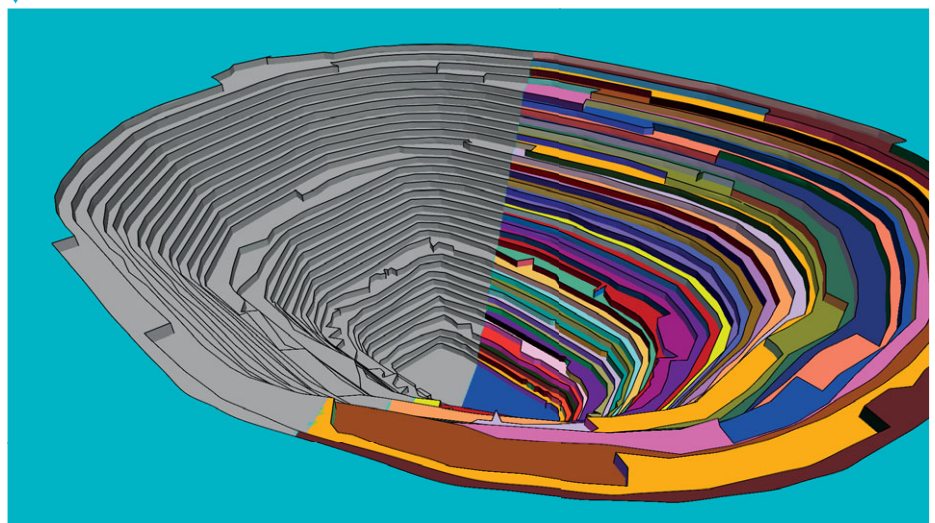
FEATURES

- Small- and large-strain simulations
- Multi-physics modeling
- Multi-threaded, 64-bit solutions with no CPU locks or additional fees
- Built-in project management tools, text editor, automatic movie-frame generation, and extensive plotting tools
- Includes null, three elastic, and 15 plastic constitutive models for soil, clay, and rock (Mohr-Coulomb, Hoek-Brown, Plastic Hardening, Strain Softening, CYSoil)
- Commands are intuitive, easy to learn, and easy to apply **UPDATED**
- Groundwater analyses are included at no additional cost:
 - Water table (i.e., effective stress)
 - Steady-state fluid flow
 - Transient fluid flow
 - Couple fluid flow analysis to mechanical model (two-way coupling) as well as to (optional) dynamic and thermal analyses
- Six forms of ground support (beam, cable, pile, shell, geogrid, and liner)
- *FISH* scripting provides powerful functionality to parameterize, analyze, review, and modify nearly every aspect of the simulation, even during cycling
- Built-in, automatic factor of safety analysis using the shear strength reduction (SSR) method
- Safety map contouring function **NEW**
- Assign zones, gridpoints, faces, structural elements, and more to groups and slots
- Define groups interactively using visual and property-based ranges **NEW**
- Track histories of model properties and results in order to compare to actual monitoring and instrumentation data
- Bundle project files into a single file for easy distribution and archiving
- Seismic wizard for pre-processing ground waves for optional dynamic analysis **NEW**



FLAC3D model of a complex civil transportation tunnel system showing displacement contours along the tunnel roof and within the surrounding rock. The mesh was created using *Rhinoceros 5.0* 3D CAD and *Griddle 1.0* software.

FLAC3D can automatically identify the model skin based on face break angles (colored faces). Easily assign faces to new groups (gray faces), making it a snap to apply boundary conditions for simple and complex geometries.



- All events (via the user interface, commands, or *FISH* scripting) modifying the model are recorded to permit undo and archiving functionality **NEW**
- Custom "extra" variables can be assigned to and read from zones, faces, gridpoints, interfaces, structural elements, and more
- Results files store a user-selected subset of model data, *FISH*, geometry, or structural elements for more compact files for archiving, distribution, and post-processing purposes **NEW**

MESHING AND GEOMETRY

- Create models from primitive shapes using parametric commands
- Automatic octree mesh generation using geometric surfaces and volumes
- Extrude zones from a topography
- Create structured meshes interactively from the *Building Blocks* pane using primitives, CAD data, draping, basic *KUBRIX* Geo tools, and predefined library sets **NEW**
- Built-in 2D extruder is integrated seamlessly with both *Building Blocks* (for further 3D manipulation) and the *Model* pane (for direct use) **UPDATED**
- Import ABAQUS/ANSYS meshes **NEW**
- Includes the BlockRanger plug-in* **NEW**
- Built-in tools to generate Discrete Fracture Networks (DFN) and assign properties to interfaces and/or intersecting zones **NEW**
- Interactively define shells, geogrids, and liners using the *Model* pane **NEW**
- Beam, cable, and pile geometry can be imported from CAD data **NEW**

MODEL PANE

- Can interactively view, select, and operate on model objects **NEW**
- Quickly assign zones and faces to groups and slots for easy application of subsequent commands and *FISH* functions **NEW**
- Hide/show, delete, and recolor group zones and faces **NEW**
- Interactive zone densification **NEW**
- Use a plane defined by a break angle to make zone face selection easy on even complex surfaces **NEW**
- Automatic tool to name internal and external boundaries via a break-angle setting **NEW**
- Easily select and group zone faces to assign boundary conditions **NEW**

BOUNDARIES/CONDITIONS

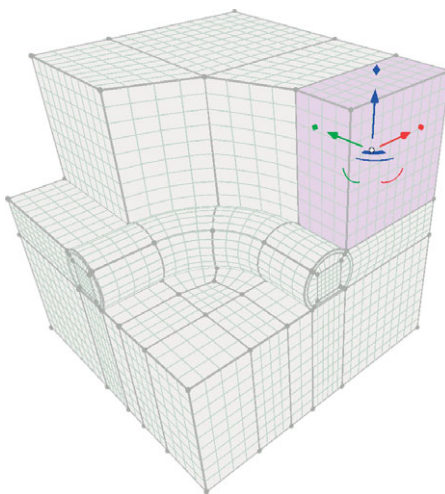
- Displacement, stress, and artificial boundaries
- Interfaces allow inclusion of faults, joints, and boundaries that permit slip, separation, and closure
- Zone relaxation (excavation sequencing)
- Westergaard method (dynamic option)
- Apply logic improved (better automation and plotting) **UPDATED**

FISH SCRIPTING

- Built-in text editor provides command syntax error checking and context-sensitive help for simpler, faster model generation
- Text editor includes a built-in, automatic conversion tool to translate *FLAC3D* 5.0 data files to the updated syntax **NEW**
- Inline *FISH* (add *FISH* fragments within a command)
- *FISH* management control set displays the current values of *FISH* variables and functions, even during cycling

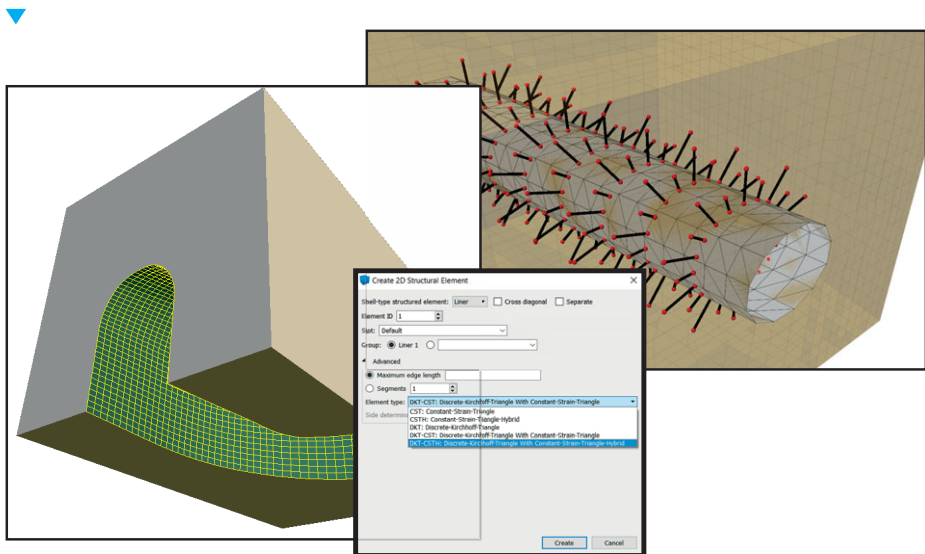
HELP

- Manuals now an Interactive Help file **NEW**
- Access Instant Help at the command prompt or within a data file [F1]
- Access Keyword Help [?] + Enter] at the command prompt to list the possible commands/keywords given the preceding command input
- Access Inline Help [Ctrl + Spacebar] to auto-complete commands **NEW**



▲ Example Building Blocks library set of a lined, flat curved tunnel. Blocks can be copied, deleted, deformed, transformed, and built upon interactively.

FLAC3D has new ground support tools that make adding shells, geogrids, and liners easy using the *Model* pane and adding beams, cables, and piles from imported CAD geometry using simple commands.



AVAILABLE OPTIONS

DYNAMIC

- Permits 3D, fully dynamic analysis
- May be coupled to structural elements, ground water flow, and thermal (optional) models

CREEP

- Used to simulate materials that exhibit time-dependent material behavior

THERMAL

- Includes both a conduction (material thermal stresses and displacements) and an advection (fluid density) model
- Included a thermal hydration model

C++ PLUG-IN

- Permits users to create their own *FLAC3D* C++ constitutive model and functions

The exchange of user-defined *FLAC3D* constitutive models can be found at:

www.itascacg.com/udms

TRY THE DEMO

Itasca is pleased to offer free demo versions of all software for download. There is no restriction to the length of time you can use the demos, but some model size restrictions apply. For more information, visit:

www.itascacg.com/demos

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