SEEQUENT

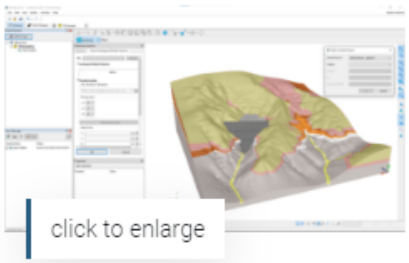
GeoStudio 2023.1 Release Notes

GeoStudio 2023.1 Release Notes

Upgrade your slope stability analysis capabilities with the newly released GeoStudio 2023.1! This release includes the newest product in the GeoStudio portfolio, SLOPE3D, empowering you to conduct enhanced 3D slope stability analysis. SLOPE3D's advanced solving methods, integrated 2D/3D approach, and its unique integration with Seequent products can provide a more efficient and reliable geotechnical design.

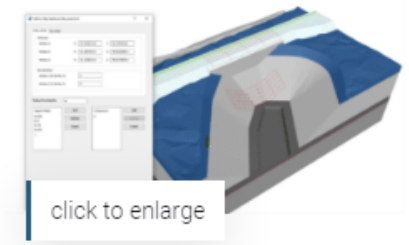
SLOPE3D is available via the Seequent ID license system; and to Bentley enterprise accounts via E365.

Introducing SLOPE3D



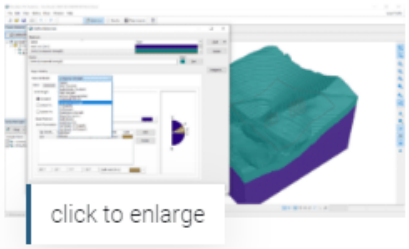
Leapfrog Interoperability for Geometry Definition

Set up the 3D geometry using Leapfrog geological models given the direct interoperability between Leapfrog and GeoStudio. Alternatively, import background meshes from a file, or build the domain using the 3D geometry creation tools available in GeoStudio.



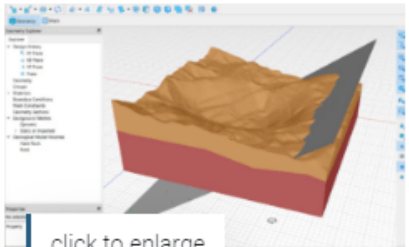
Efficiently Define Slip Surfaces

Analyse potential failure zones with global (Cuckoo) and local (Entry and Exit) slip surface search methods. The Cuckoo slip surface search method provides time-savings when setting up a 3D stability analysis. This automatic search algorithm is useful for identifying areas of concern in large, complex systems. The Entry and Exit slip surface definition provides the same intuitive workflow as 2D, with the ability to collapse the grids to lines or points.



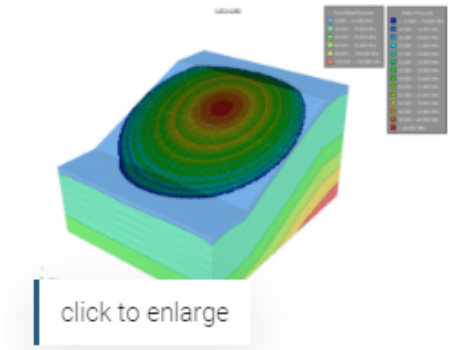
Analyse Soil and Rock Slopes

The comprehensive material model library can be used to capture the shear strength characteristics of rock and soil, including materials with faults, discontinuities, and bedding planes.



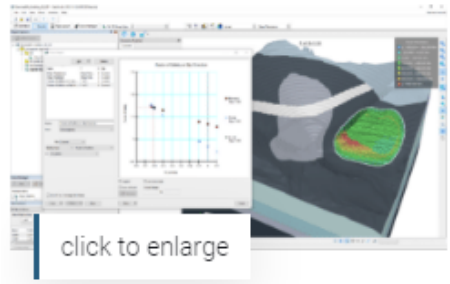
Evaluate the Influence of Weak Layers

Investigate the influence of weak layers and anisotropic material properties on the 3D factor of safety by importing a background mesh to define weak planes in SLOPE3D.



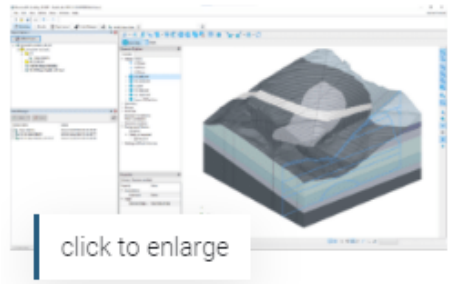
Investigate Pore Water Pressure Effects

Define pore water pressures using Ru, B-bar, or import a background mesh to represent the piezometric surface. When the 3D domain is created using the GeoStudio, pore water pressures from a 3D finite element seepage analysis (SEEP3D) can be used when computing the 3D stability.



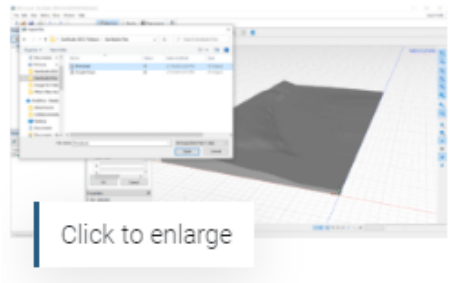
Interrogate Slip Surface Results

Use multiple methods for interpreting the 3D stability results, including plotting graphs (e.g. factor of safety over sliding direction) and contouring sliding mass data such as shear strength, shear mobilized, or effective normal stress. Alternatively, inspect the slip surface search zone and modes of failure using the Colour Map functionality.



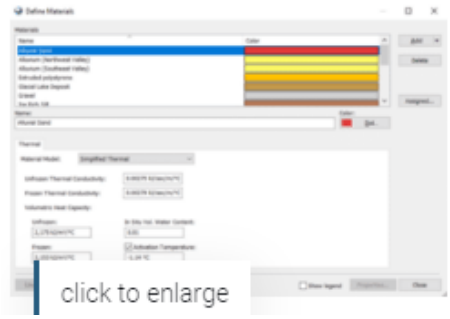
Easily Compare 2D and 3D Stability Results

Include 2D and 3D stability analyses in a single project file for quick results comparison. Alternatively, include multiple 3D geometries in one project to easily compare various scenarios.



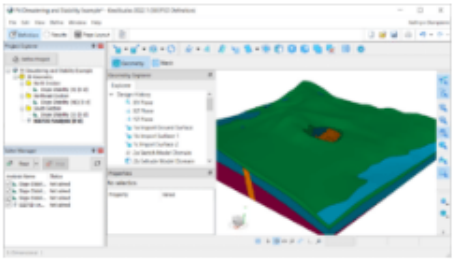
Import OBJ Geological Model Volumes for 3D Geometry Creation

Quickly generate the analysis geometry using external packages, other than Leapfrog, by importing clean, meshed geological model outputs in the OBJ file format.



Updated Material Model for Enhanced Heat Transfer Analysis

The simplified thermal material model implementation in TEMP/W and TEMP3D has been improved to better accommodate the change in properties during freezing/thawing conditions.



ENHANCED 3D WORKFLOW

BUILD3D Embedded in GeoStudio Window

The 3D geometry creation application is now present in the main GeoStudio window, simplifying the 3D workflow. This improvement brings 3D modelling in GeoStudio closer to the 2D experience.

Quick Material Assignment with Geological Model Volumes

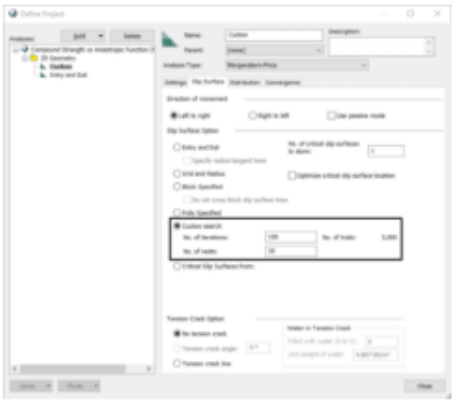
GeoStudio provides the ability to import Leapfrog Geological Model Volumes from Seequent Central into a 3D geometry. These Geological Model Volumes can be used to assign materials to existing 3D parametric geometry objects. This workflow makes it easy to map complex geologies to analysis geometry, removing the need to create complex parametric surfaces to capture stratigraphic boundaries.

Common Commands Added to BUILD3D

The undo and redo commands are now available for creating and modifying 3D geometries.

Import 3D Piezometric Surfaces

Piezometric surfaces can be imported using the Import Background Mesh command in BUILD3D. An imported piezometric surface can be used to define initial pore water pressure conditions in a SEEP3D analysis.



SLOPE/W IMPROVEMENTS

Cuckoo Search Technique Now Available

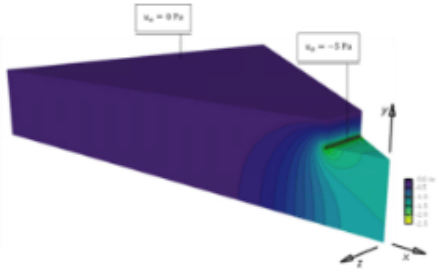
The Cuckoo Search method can be used to search for circular slip surfaces in SLOPE/W. This search method is an unbiased attempt at locating the critical slip surface. It is beneficial for identifying the critical mode of failure in complex geology and/or large domains. This search method can also identify portions of the domain where additional analysis is required.

Improved Compound Strength Material Model

Planar geological features are defined by dip and dip direction. The Compound Strength material model originally required the user to enter a start and end angle which bound the dip of the plane. The improved Compound Strength model now allows for the direct entry of the dip angle and two ranges around the dip, in which the strength is linearly interpolated between the joint and intact material. The other key change is that the intact material is selected from the existing materials list and only the discontinuities must be defined in the joint parameters table.

NEW LICENSE SELECTION WORKFLOW

GeoStudio now supports three licensing types: (1) legacy FlexNet licenses; (2) Seequent ID licenses; and (3) Bentley Connect licenses for E365 customers. A License System selection tool allows GeoStudio users to select the desired License System or to easily move from one License System to another.



ADDITIONAL ONLINE RESOURCES

Free Online BUILD3D Course

A new BUILD3D course is available in the Seequent Learning Portal for those looking to set up 3D geometries and analyses in GeoStudio. The course covers the methods for importing various geometry file types, creating and modifying 3D geometry items, defining the 3D mesh, and interpreting 3D results.

Slope Stability Verification Manual

The Slope Stability Verification Manual comprises dozens of analyses testing various features of stability analysis and compares the simulated results with published studies and analytical solutions.

Additional GeoStudio Example Files

The Compound Strength demonstration project and accompanying document have been updated to reflect changes to the Compound Strength material model. A new 3D FLOW example simulates chemical volatilization of trichloroethylene from a shallow contaminated groundwater table into cracks in the basement of an overlying 3D building.