

SEEQUENT

PRODUCT DATA SHEET

PLAXIS® 2D

Trusted Geotechnical Finite Element Analysis Software

PLAXIS 2D is a powerful and user-friendly finite-element (FE) package for 2D analysis of deformation and stability in geotechnical engineering and rock mechanics, used worldwide by top engineering firms and institutions in the civil and geotechnical engineering industry. With a broad range of advanced features in a single integrated software package, PLAXIS 2D is used in geotechnical challenges ranging from excavations, embankments, onshore or offshore foundations to tunneling, mining, and reservoir geomechanics.

FAST AND EFFICIENT FE MODEL CREATION

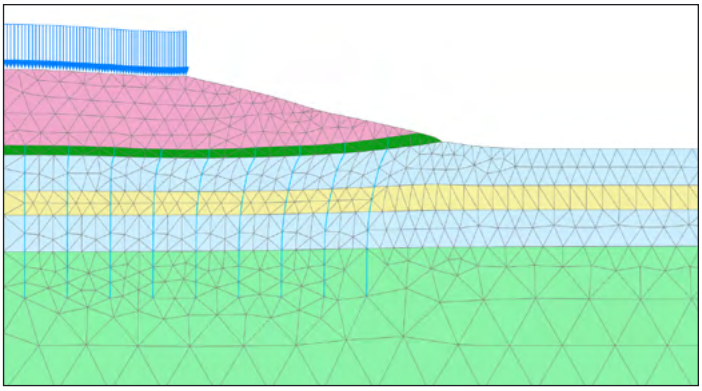
The user-friendly PLAXIS interface guides users across several modes to efficiently create models with a logical geotechnical workflow. Benefit from fast and efficient finite-element model creation via CAD-like geotechnical drawing applications. Utilize multiple boreholes in Soil mode to quickly create ground profiles or geological cross-sections. In Structures mode, add structural elements like plates, discontinuities, piles, and prescribed loads or displacements etc. For tunnel solutions, a designer wizard offers quick creation of tunnel cross-sections, reinforcements, tunnel lining, and loading conditions. Mesh mode features automatic and manual mesh refinements, automatic generation of irregular and regular meshes, and capabilities to inspect the mesh quality. It is also possible to import geometry from CAD files, or fully automate model generation by using Python-based scripting.

REALISTIC ASSESSMENT OF STRESSES AND DISPLACEMENTS

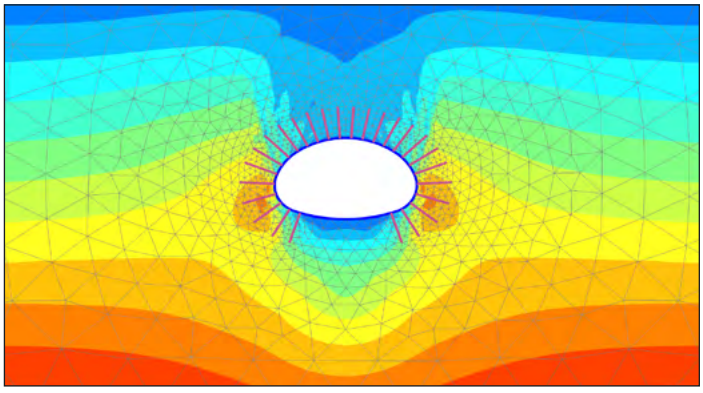
Accurately model the construction process by (de)activating soil/rock clusters and structural elements in each calculation phase in Staged construction mode. Perform the relevant geotechnical analysis by selecting between plastic, safety, and consolidation analysis as well as dynamic or fully coupled flow-deformation analysis. Employ various constitutive models ranging from simple linear to advanced highly nonlinear models that allow accurate simulation of most soil and rock types. Well-proven and robust calculation procedures ensure that calculations converge and provide accurate results for the most common or complex models, excelling in settlement, thermal, groundwater flow or dynamic analysis.

POWERFUL AND VERSATILE POST PROCESSING

The versatile Output program offers various ways to display forces, displacements, stresses, velocities, accelerations, temperature, and flow data shown in contour, vector, and iso-surface plots. Cross-section capabilities allow areas of interest to be inspected in more detail, and data can be copied from tables for further postprocessing in other software. The curve manager enables the creation of graphs that can plot various results across a selection of calculation phases. Python scripting allows Output results to be used in connected external applications or automated modeling workflows in the PLAXIS ecosystem.



Stability of embankment on soft soil reinforced by rigid inclusions.



NATM tunnel with rockbolts.

SEEQUENT

SYSTEM REQUIREMENTS

MINIMUM: Dual core CPU, Windows 10 Pro 64-bit, or Windows 11 Pro, 4 GB RAM, 2 GB hard disk, GPU with 256 MB OpenGL 1.3, display 1280 px by 800 px or better
RECOMMENDED: Quad core CPU, 8 GB RAM, discrete GPU from Nvidia GeForce or Quadro range with at least 128-bit bus and 1 GB of RAM, or equivalent ATI/AMD solution, display 1920 px by 1080 px

PLAXIS 2D At-A-Glance

MODELING

- Tunnel deconfinement
- CAD Import and Export*
- Nonlinear geogrids: Elastoplastic (N-ε) and Viscoelastic (time-dependent)
- Discontinuity element to model fractured or jointed rocks
- Polar and rectangular array
- Nonlinear embedded beam (M-κ diagrams)
- Connections
- Tunnel Designer with easy definition of rockbolts*
- Automate processes with full command line support and remote scripting API*

MATERIAL MODELS

- Industry standard soil models: Hardening Soil, HSsmall, Soft Soil and Soft Soil Creep
- Rock models: Jointed rock, Hoek-Brown with parameter guide, N2PC rock creep model with MC failure criterion
- Concrete
- UDCAM-S with cyclic accumulation and optimization tool
- NGI-ADP
- User-defined soil models*
- Static and dynamic liquefaction models: NorSand, UBCSand, PM4Sand, PM4Silt

CALCULATIONS

- Well-proven and robust calculation procedures
- Multicore computing
- K_0, Gravity loading and Field stress for initial stress calculations
- Distinguish between a plastic calculation, safety, or consolidation analysis
- Facilities for steady-state and transient groundwater or thermal flow calculations, including flow-related material parameters, boundary conditions, drains, and wells
- Pseudo-static and dynamic analysis, including dynamics with consolidation and free field and compliant base boundary conditions
- Specify load, acceleration, head or temperature variations through time with linear, harmonic, or table functions
- Fully coupled flow-deformation analysis
- Convenient and intuitive Phase explorer
- Automatic regeneration of construction stages for geometric changes

*Some features are dependent on product level or SELECT® entitlement.

RESULTS

- Realistic assessment of stresses and displacements
- Vector, contour, and iso-surfaces plots of displacement, stress, pore pressure, temperature, or acceleration
- Use the Output command line to display plots, generate cross-sections or save plots with user-defined resolution
- Curves Manager to create load vs. displacement,
- Pseudospectral acceleration plots, or cross-section curves
- Automatic centerline extraction for structural forces plots
- Structural forces in volume plates (tunnel lining, retaining wall)
- Resulting Force View
- Plot annotations
- Extensive report and movie generator
- PLAXIS 2D Viewer

USAGE

- Surface settlements and mechanical response of intact, fractured or jointed rock masses due to tunneling, mining, or reservoir depletion
- Slope stability and seepage analysis for large earth dams, tailing dams, embankments, and pit mines
- Predicting differential settlements of buildings adjacent to excavation pits
- Stability of and seepage into excavation pits and lateral displacements of diaphragm walls
- Calculate necessary consolidation time for pore pressure dissipation in undrained loading problems
- Bearing capacity and foundation settlement analysis for high-rise buildings, LNG tanks, and other structures (for example, offshore suction anchors)
- Liquefaction analysis to predict the safety of critical infrastructure such as levees or large dams under earthquake loading
- Seismic design of jetties, quays, walls, and building foundations
- Stability of dams or levees under rapid drawdown during seasonal variations of water level or during precipitation or flooding
- Ice wall formation during ground freezing in tunnel construction
- Temperature distribution and propagation into surrounding soils of nuclear waste disposal facilities

SUBSCRIPTION ENTITLEMENT SERVICE SUPPORTS

- Provides 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

Ready to buy? PLAXIS can be purchased on Bentley's eStore – **virtuosity.com/software/geotechnical-engineering-seequent**

To request a follow-up for more information,
please contact us at **seequent.com/contact-us/**

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PLAXIS® 3D

3D Geotechnical Engineering Software

As infrastructure assets are crucially linked to subsurface environments, they are vulnerable to geotechnical risk. Risk in complex geotechnical engineering and rock mechanics projects can be mitigated by performing 3D analysis of deformation and stability. Make safe, cost-efficient decisions and reduce risk by employing PLAXIS 3D, the comprehensive solution for design and analysis of soils, rocks, and associated structures, developed by geotechnical leaders with over 50 years of experience.

FAST AND EFFICIENT FINITE ELEMENT MODEL CREATION

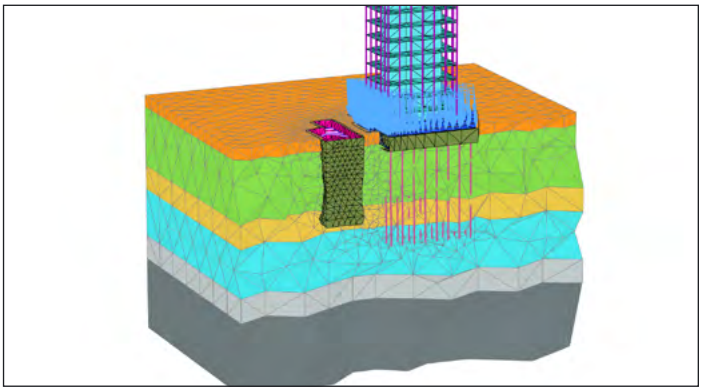
Finite element modeling in full 3D is easy with drawing tools such as extrude, intersect, combine, and array operations. Utilize multiple boreholes to quickly create the subsurface model then add structural elements like plates, discontinuities, piles, and prescribed loads or displacements. For tunnel solutions, a designer wizard offers quick creation of tunnel cross-sections, reinforcements, tunnel lining, and loading conditions. Meshing features automatic and manual mesh refinements, automatic generation of irregular, regular or swept meshes, and capabilities to inspect the mesh quality. It is also possible to import geometry from CAD files, or fully automate model generation by using Python-based scripting.

REALISTIC ASSESSMENT OF STRESSES AND DISPLACEMENTS

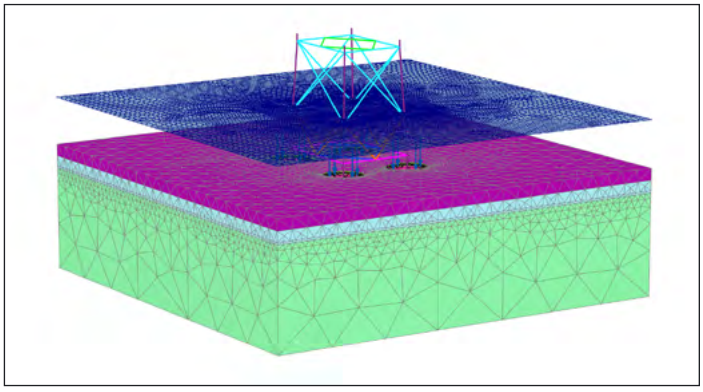
Accurately model the construction process by (de)activating soil/rock clusters and structural elements in each calculation phase in Staged construction mode. Perform the relevant geotechnical analysis by selecting between plastic, safety, and consolidation analysis as well as dynamic or fully coupled flow-deformation analysis. Employ various constitutive models ranging from simple linear to advanced highly nonlinear models that allow accurate simulation of most soil and rock types. Well-proven and robust calculation procedures ensure that calculations converge and provide accurate results for the most common or complex models, excelling in settlement, groundwater flow or dynamic analysis.

POWERFUL AND VERSATILE POST PROCESSING

The versatile Output program offers various ways to display forces, displacements, stresses, velocities, accelerations, temperature, and flow data shown in contour, vector, and iso-surface plots. Cross-section capabilities allow areas of interest to be inspected in more detail, and data can be copied from tables for further postprocessing in other software. The curve manager enables the creation of graphs that can plot various results across a selection of calculation phases. Python scripting allows Output results to be used in connected external applications or automated modeling workflows in the PLAXIS ecosystem.



Excavation next to a building on a pile raft foundation.



Offshore platform with suction bucket.

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SYSTEM REQUIREMENTS

MINIMUM: Dual core CPU, Windows 10 Pro 64-bit, or Windows 11 Pro, 4 GB RAM, 2 GB hard disk, GPU with 256 MB OpenGL 1.3, display 1280 px by 800 px or better
RECOMMENDED: Quad core CPU, 8 GB RAM, discrete GPU from Nvidia GeForce or Quadro range with at least 128-bit bus and 1 GB of RAM, or equivalent ATI/AMD solution, display 1920 px by 1080 px

PLAXIS 3D At-A-Glance

MODELING

- Automatic Swept Meshing for more efficient meshes
- Elastoplasticity for beams and plates
- Connections
- Design arbitrary geometries using Combine, Intersect, Extrude,
- Loft, Blendsurfaces and Revolve around axis tools
- CAD Import and Export*
- Nonlinear geogrids: Elastoplastic (N-ε) and Viscoelastic (time-dependent)
- Discontinuity element to model fractured or jointed rocks
- Polar and rectangular array
- Tunnel Designer with easy definition of rock bolts, umbrella arches and girders*
- Define excavation sequence in the Tunnel Designer*
- Automatic generation of staged construction phases for tunnels*
- Automate processes with full command line support and remote scripting API*

MATERIAL MODELS

- Industry standard soil models: Hardening Soil, HSSmall, Soft Soil and Soft Soil Creep
- Rock models: Jointed rock, Hoek-Brown with parameter guide, N2PC rock creep model with MC failure criterion
- Concrete
- UDCAM-S with cyclic accumulation and optimization tool
- NGI-ADP
- User-defined soil models*
- Static and dynamic liquefaction models: NorSand, UBCSand

CALCULATIONS

- Well-proven and robust calculation procedures
- Multicore computing and 64 bit
- K0, gravity loading and field stress for initial stress calculations
- Distinguish between a plastic calculation, safety or consolidation analysis
- Facilities for steady-state or transient groundwater flow calculations, including flow-related material parameters, boundary conditions, drains, and wells
- Pseudo-static and dynamic analysis, including dynamics with consolidation and free field and compliant base boundary conditions, and moving point or line loads
- Specify load, acceleration or head variations through time with linear, harmonic, or table functions
- Fully coupled flow-deformation analysis
- Convenient and intuitive phase explorer
- Automatic regeneration of construction stages for geometric changes

RESULTS

- Realistic assessment of stresses and displacements
- Vector, contour, and iso-surfaces plots of displacement, stress, pore pressure, or acceleration
- Structural forces from cylindrical and square volume piles
- Curves Manager to create loads vs. displacement, Pseudospectral acceleration plots or cross-section curves
- Advanced data slicing
- Movable cross-sections
- Extensive report and movie generator
- PLAXIS 3D Viewer

USAGE

- Surface settlements and mechanical response of intact, fractured or jointed rock masses due to tunneling, mining, or reservoir depletion
- Slope stability and seepage analysis for earth and tailing dams, embankments, and open pit mines
- Predicting differential settlements of buildings adjacent to excavation pits
- Stability of and seepage into excavation pits, and lateral displacements of diaphragm walls
- Calculate consolidation time for pore pressure dissipation in undrained loading problems
- Bearing capacity and foundation settlement analysis for high-rise buildings, LNG tanks, and other structures (for example offshore suction anchors)
- Liquefaction analysis to predict the safety of critical infrastructure like levees or large dams under earthquake
- Stability of embankments for high-speed railways
- Seismic design of jetties, quays, walls, building foundations
- Stability of dams or levees under rapid drawdown, during seasonal variations of water level or during precipitation or flooding

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