

# Bentley PLAXIS<sup>®</sup> 2D Product Tiers

*Find the right product level for your needs*

Project teams and their requirements can change. To conquer common or complex geotechnical challenges with confidence, you need to use the appropriate capabilities that meet your current needs.

**PLAXIS** is a user-friendly, finite element package with trusted computation that is used by geotechnical engineers worldwide. We offer three flexible options, each tailored to the different geotechnical analysis needs of any firm.

**PLAXIS 2D** offers all the essential functionalities to perform everyday deformation and safety analysis for soil and rock that do not require the consideration of creep, steady state groundwater or thermal flow, consolidation analysis, or any time-dependent effects.

**PLAXIS 2D Advanced** enhances your geotechnical design capabilities with more advanced features and material models to consider creep, flow-deformation coupling through consolidation analysis and steady state groundwater or heat flow. It also solves your problems faster than PLAXIS 2D with the multicore solver.

**PLAXIS 2D Ultimate** augments the most comprehensive functionality to deal with the most challenging geotechnical projects. Options offered can help you analyze the effects of vibrations in the soil, such as earthquake and traffic loads; simulate complex hydrological ...time-dependent variations of water levels, or flow functions on model or soil boundaries ; and assess the effect of transient heat flow on the hydraulic and mechanical behavior of soil.

Features	PLAXIS 2D	PLAXIS 2D Advanced	PLAXIS 2D Ultimate	Available without GSE*
<b>PROJECT AND MODEL PROPERTIES</b>				
Selection of imperial and SI units for length, force etc.	✓	✓	✓	✓
Select between plane strain and axi-symmetric models	✓	✓	✓	✓
Select between 6-noded and 15-noded element types	✓	✓	✓	✓
Constants tab in Project properties		✓	✓	✓
<b>GEOMETRY CREATION</b>				
Create Borehole Tool	✓	✓	✓	✓
Select, Move and Array Tools	✓	✓	✓	✓
Create Soil Polygon, Soil Rectangle Tools	✓	✓	✓	✓
Create Point & Line Load Tools	✓	✓	✓	✓
Create Point & Line Prescribed Displacement Tools	✓	✓	✓	✓
Create Embedded Beam Row, Plate, Geogrid, Fixed-End Anchor, Node-to-node Anchor, Interface Tools	✓	✓	✓	✓
Create Line Contraction Tool	✓	✓	✓	✓
Create Well, Drain and Groundwater Flow Boundary Conditions Tools		✓	✓	✓
Create Thermal Flow Boundary Condition Tool		✓	✓	✓
Create Added Mass Tool			✓	✓
Tunnel Designer	✓	✓	✓	
Reinforcement (Rockbolts) Definition in Tunnel Designer	✓	✓	✓	

\*GSE – Geotechnical Select Entitlement.

Features	PLAXIS 2D	PLAXIS 2D Advanced	PLAXIS 2D Ultimate	Available without GSE
<b>SOIL MATERIAL MODELS</b>				
Linear elastic	✓	✓	✓	✓
Mohr-Coulomb	✓	✓	✓	✓
Hardening Soil	✓	✓	✓	✓
Hardening Soil Small Strain Stiffness	✓	✓	✓	✓
Modified cam-clay	✓	✓	✓	✓
Jointed Rock model	✓	✓	✓	✓
NGI-ADP	✓	✓	✓	✓
Hoek-Brown, with Parameter guide	✓	✓	✓	✓
Soft soil		✓	✓	✓
Soft Soil creep		✓	✓	✓
Sekiguchi Ohta (Viscid)		✓	✓	✓
Sekiguchi Ohta (Inviscid)		✓	✓	✓
UDCAM-S and Cyclic Accumulation tool		✓	✓	✓
Concrete		✓	✓	✓
User Defined Soil Models		✓	✓	✓
UBC3D-PLM (Liquefaction)			✓	✓
<b>SOIL MATERIAL DRAINAGE TYPES</b>				
Drained	✓	✓	✓	✓
Undrained A	✓	✓	✓	✓
Undrained B	✓	✓	✓	✓
Undrained C	✓	✓	✓	✓
Non-porous	✓	✓	✓	✓
<b>STRUCTURAL ELEMENT MATERIAL TYPES</b>				
Elastic, elastoplastic & elastoplastic (M-Kappa) Plates	✓	✓	✓	✓
Elastic, elastoplastic, elastoplastic (N-Epsilon) & viscoelastic Geogrids	✓	✓	✓	✓
Elastic, elastoplastic & elastoplastic (M-Kappa) Embedded beam rows	✓	✓	✓	✓
Elastic, elastoplastic & elastoplastic with residual strength Fixed-end and Node-to-node Anchors	✓	✓	✓	✓
<b>DYNAMIC, GROUNDWATER AND THERMAL FLOW MATERIAL PROPERTIES</b>				
Groundwater properties, incl. soil classification systems (Hypres, USDA etc) and predefined data sets for (Approximate) Van Genuchten models for soil materials	✓	✓	✓	✓
Thermal properties for soil and structural elements (excl. embedded beam row)		✓	✓	✓
Rayleigh damping for soil and structural elements			✓	✓
<b>INITIAL CALCULATION TYPES</b>				
K <sub>0</sub> procedure	✓	✓	✓	✓
Gravity loading	✓	✓	✓	✓
Field stress	✓	✓	✓	✓
Ground water flow only			✓	✓

Features	PLAXIS 2D	PLAXIS 2D Advanced	PLAXIS 2D Ultimate	Available without GSE
<b>DEFORMATION CALCULATION TYPES</b>				
Plastic	✓	✓	✓	✓
Safety	✓	✓	✓	✓
Consolidation		✓	✓	✓
Dynamic			✓	✓
Dynamic with consolidation			✓	✓
Fully coupled flow-deformation			✓	✓
<b>PORE PRESSURE CALCULATION TYPES</b>				
Phreatic level	✓	✓	✓	✓
Use pore pressures from previous phase	✓	✓	✓	✓
Steady state groundwater flow		✓	✓	✓
Transient groundwater flow			✓	✓
<b>THERMAL CALCULATION TYPES</b>				
Ignore temperature		✓	✓	✓
Earth gradient		✓	✓	✓
Steady state thermal flow		✓	✓	✓
Use temperatures from previous phase		✓	✓	✓
Transient thermal flow			✓	✓
<b>MISCELLANEOUS FEATURES, TOOLS AND INTEROPABILITY</b>				
Spatial variation of preconsolidation	✓	✓	✓	✓
Tunnel deconfinement	✓	✓	✓	✓
Create cluster field stress	✓	✓	✓	✓
Staged construction & automatic regeneration of construction stages	✓	✓	✓	✓
Multicore and parallel calculation		✓	✓	✓
Design Approaches		✓	✓	✓
Pseudostatic analysis		✓	✓	✓
Generate Stratigraphy from imported CPT Logs	✓	✓	✓	
SoilTest and parameter optimization tool	✓	✓	✓	
Sensitivity analysis and Parameter variation	✓	✓	✓	
PLAXIS 2D Classic to PLAXIS 2D CONNECT Edition project converter	✓	✓	✓	
PLAXIS 2D LE model import	✓	✓	✓	
PLAXIS 2D to 3D Converter	✓	✓	✓	
Calculation Manager	✓	✓	✓	
CAD Import and Export	✓	✓	✓	
Command line input (Input, Output & SoilTest)	✓	✓	✓	✓
Command line autocomplete (Input, Output & SoilTest)	✓	✓	✓	
Commands runner (Input, Output & SoilTest)	✓	✓	✓	
Macro library and running macros (Input, Output & SoilTest)	✓	✓	✓	
Remote scripting for Input, Output and SoilTest	✓	✓	✓	
Scripting reference	✓	✓	✓	
1D Site response analysis tool			✓	
Projectwise integration, loading from and saving to ProjectWise server	✓	✓	✓	
Bentley Cloud Services: personal & project portal, project association	✓	✓	✓	

Features	PLAXIS 2D	PLAXIS 2D Advanced	PLAXIS 2D Ultimate	Available without GSE
<b>TIME DEPENDENT FUNCTIONS</b>				
Time dependent groundwater flow components for water levels, groundwater flow boundary conditions and soil clusters			✓	✓
Definition of groundwater flow functions to specify time dependent changes in head or discharge etc.			✓	✓
Time dependent thermal components for thermal flow boundary conditions and soil clusters			✓	✓
Definition of thermal flow functions to specify time dependent changes in temperature or heat flux etc.			✓	✓
Dynamic components in x and y direction for point and line loads or prescribed displacements			✓	✓
Definition of Dynamic multipliers to create vibration and earthquake signals			✓	✓
Scaling tools, Fourier, response spectra & Arias intensity plots and drift correction for input earthquake signals			✓	✓
<b>DYNAMIC BOUNDARY CONDITIONS</b>				
Viscous			✓	✓
Tied degrees of freedom			✓	✓
Compliant base and free field boundaries			✓	✓
All nodes fixity			✓	✓
<b>POSTPROCESSING &amp; RESULTS</b>				
Various ways to display forces, displacements, stresses and strains in contour, vector, and iso-surface plots	✓	✓	✓	✓
Tables of results with copy, sorting and filter options	✓	✓	✓	✓
Curve manager to plot graphs of various results across a selection of calculation phases	✓	✓	✓	✓
Load-Displacement curves	✓	✓	✓	✓
Cross-section tools and cross-section curves	✓	✓	✓	✓
Automatic and manual centerline extraction for structural forces plots of volume plates	✓	✓	✓	✓
Resulting forces view	✓	✓	✓	✓
Plot annotations	✓	✓	✓	✓
Animations	✓	✓	✓	✓
Report generator	✓	✓	✓	✓
Printing and saving plots & curves	✓	✓	✓	✓
Plots & Curves of accelerations, velocities, structural forces envelopes for Dynamic phases			✓	✓
Curve plots of Pseudo Spectral Acceleration, relative displacements and switching between time & frequency representations			✓	✓
Plots and curves of pore pressures for phreatic level calculations	✓	✓	✓	✓
Plots and curves of pore pressures, saturation, suction, and Darcy flux for steady state groundwater flow calculations		✓	✓	✓
Plots and curves of pore pressures, saturation, suction, and Darcy flux for transient groundwater flow or fully coupled flow deformation calculations			✓	✓
Plots and curves of temperature, ice saturation and heat flux for steady state thermal flow calculations		✓	✓	✓
Plots and curves of temperature, ice saturation and heat flux for transient thermal flow or full thermo-hydro-mechanical coupled calculations			✓	✓
Export of results to Paraview	✓	✓	✓	