PRODUCT DATA SHEET

Bentley
Advancing Infrastructure

PLAXIS® Dynamics

Geotechnical Dynamic Modeling Software

Soil and structures are often subjected to dynamic loads due to traffic or earthquakes. In cases of severe loading, such as earthquakes, dynamic loads can cause severe damages. In urban areas, structures can be subject to man-made vibrations due to pile driving, vehicle movement, heavy machinery, or train travel. With PLAXIS Dynamics, geotechnical engineers can consider the vibration effect on structures and designs to build safer infrastructure.

Reliable Data-Geotechnical Expertise-Digital Workflows

PLAXIS Dynamics analyzes the effects of man-made or natural seismic vibrations in soil. Geotechnical engineers can perform dynamic analyses in a user-friendly, efficient, and accurate way regardless of the vibration source or scale. They can accurately calculate the effects of vibrations with dynamics analysis when the frequency of the dynamic load is higher than the natural frequency of the medium.

PLAXIS Dynamics is an add-on module to PLAXIS 2D and PLAXIS 3D and is frequently used for site response analysis, seismic design of structures, earthquake simulation, stability under dynamic loading, and wave propagation to adjacent structures.

Powerful Capabilities

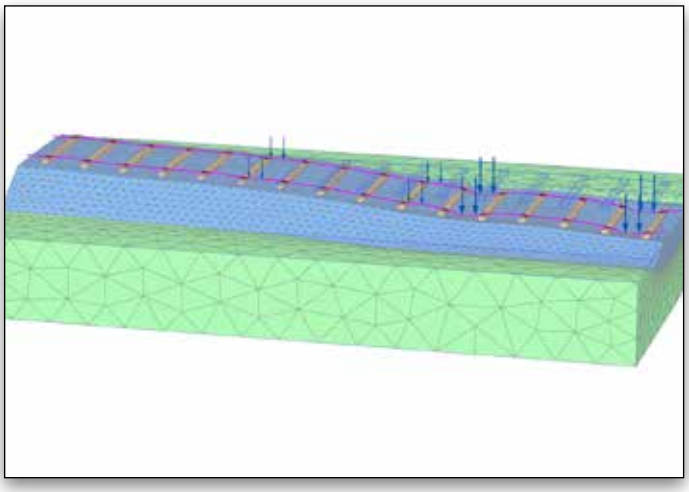
The application allows you to apply advanced model boundary conditions when required. In addition to viscous boundaries, free-field and compliant-base boundaries can be selected to reduce spurious reflections of waves reaching the model boundaries.

Apply Simple and Advanced Constitutive Models

PLAXIS uses an effective-stress modeling approach for almost all of its constitutive soil models, enabling the calculation of excess pore pressure build-up during dynamic excitation, which is especially relevant for liquefiable soil. Cyclic-loading specific constitutive models are offered together with PM4SAND and UBC-SAND model for liquefiable materials. For soils other than liquefaction-susceptible sand, choose the (Generalized) Hardening soil model with small strain stiffness. All material models contain extra parameters, which consider material damping.

Perform Dynamic Loading with Earthquake Data

When modeling the dynamic response of an embedded structure, the inertia of the subsoil and the time dependency of the load are considered. The time dependent behavior of the load can be assigned through harmonic, linear, or table multipliers. Using the table input, you can import real earthquakes signals to perform meaningful seismic design of jetties or foundations. Dynamic multipliers can be assigned independently in the X and Y directions in PLAXIS 2D Dynamics and X, Y, and Z directions in PLAXIS 3D Dynamics.



Train moving across a railway embankment, modeled with moving loads.

Advanced and Customizable Features

- Point, line and surface loads and prescribed displacements are extended with a dynamic component to model traffic vibrations and earthquakes.
- Dynamics and dynamic with consolidation calculation types.
- Automatic determination of the minimum mesh element size, ensuring the smallest wavelengths can be captured in the model.
- Plots of accelerations, velocities, structural forces envelopes and much more.
- Curve plots of Pseudo Spectral Acceleration, relative displacements, switch between time or frequency representations.

User-friendly Technology

PLAXIS Dynamics is fully integrated and interoperable with the PLAXIS suite of geotechnical software solutions, to seamlessly manage your project.

PLAXIS Dynamics is user-friendly software built around intuitive geotechnical digital workflows for efficient project management. The flexible interface allows for easy geotechnical process management and inputs while the output program allows for powerful reporting and analysis through animation, graphs as well as numeric results.

With Subscription Entitlement Service, you have the best applications to support your sustainable solutions.

System Requirements

Operating System
Windows 8 Professional 64-bit, Windows 10 Pro 64-bit

Graphics Card
Required: GPU with 256 MB OpenGL 1.3. Bentley recommends avoiding simple onboard graphics chips in favor of a discrete GPU from the Nvidia GeForce or Quadro range with at least 128-bit bus and 1 GB of RAM, or equivalent solution from ATI/AMD

Processor
Required: Dual Core CPU
Recommended: Quad Core CPU

Memory
Recommended for 2D: minimum 4 GB. Large projects may require more.
Recommended for 3D: minimum 8 GB. Large projects may require more.

Hard Disk
Minimum 2 GB free space on the partition where the Windows TEMP directory resides, and 2 GB free space on the partition where projects are saved. Large projects may require significantly more space on both partitions. For best performance, ensure that the TEMP directory and the project directory reside on the same partition.

Video
Required: 1024 x 768 pixels, 32-bit color palette
Recommended: 1920 x 1080 pixels, 32-bit color palette

Internet connection
Required for SES licensing

Find out about Bentley at: www.bentley.com

Contact Bentley
1-800-BENTLEY (1-800-236-8539)
Outside the US +1 610-458-5000

Global Office Listings
www.bentley.com/contact

Bentley®
Advancing Infrastructure

PLAXIS Dynamics At-A-Glance

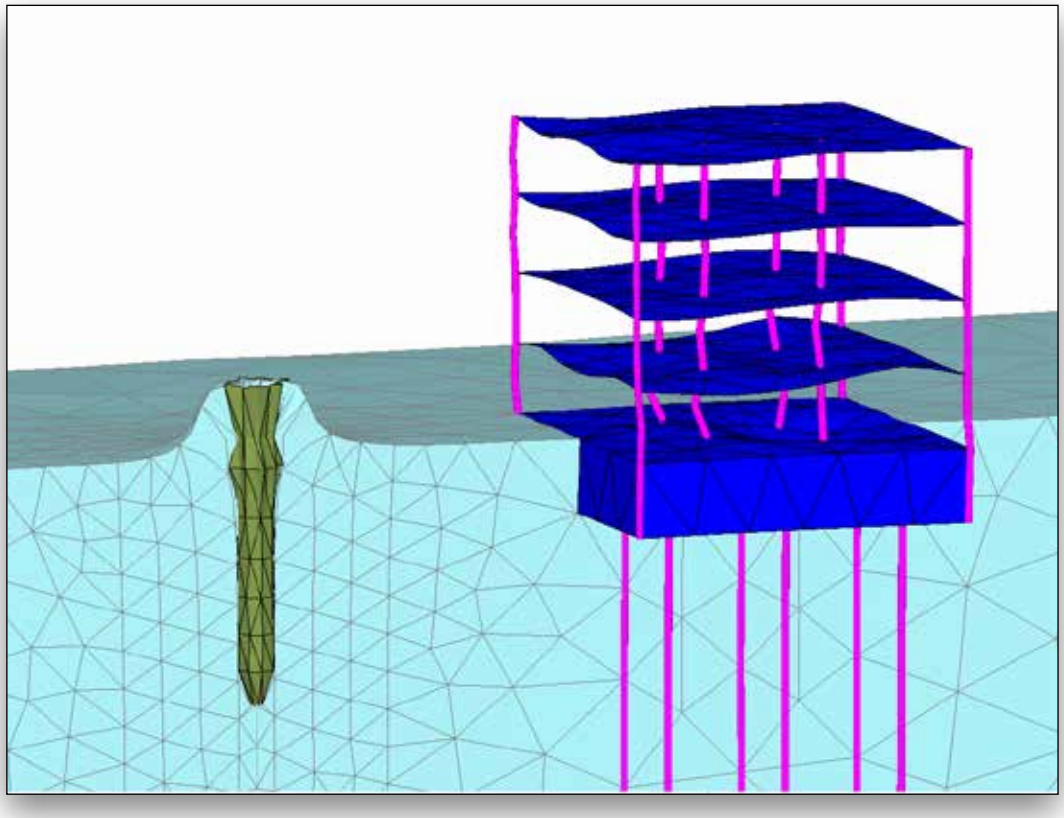
Modeling
- Free vibration analysis
- Earthquake analysis
- Site response analysis
- Stress and strain diagrams
- Acceleration-time or force-time curves
- Inspect structural forces in volume plates due to dynamic loading
- Resulting forces in plates, anchors, geogrids, embedded beams rows from dynamic loading
- Dynamic with consolidation

Material Models
- UBC3D-PLM model

Dynamic Calculations of Realistic Geotechnical Problems
- Dynamic with consolidation calculations
- Import real earthquake signals
- Moving loads

Results
- Deformations, velocities, and accelerations in each stage
- History of forces, accelerations, or displacement in selected points
- Spectrum of frequency representation
- Acceleration in time
- Actual loading in time
- Vertical displacement, velocities or accelerations of the surface in time with or without damping in every phase
- Pile settlement in time
- Maximum shear stresses in the interface

Usage
- Site response analysis
- Seismic design of jetties, quays, walls, building foundations
- Earthquake simulation
- Embankment stability under dynamic loading due to high-speed trains or vehicular traffic
- Pile driving and wave propagation to adjacent structures
- Liquefaction analysis to predict the safety of critical infrastructure like levees or large dams under earthquake loading
- Racking of tunnel lining



Effects of pile driving near an existing building.