Bentley®

Product data sheet

PLS-CADD®

Comprehensive overhead power line design software

Bentley PLS-CADD (Power Line Systems – Computer Aided Design and Drafting) is an application used for the design and analysis of overhead power lines. It offers a unified platform that integrates every aspect of transmission, distribution, and communication line design—from terrain modeling and structure spotting to sag-tension analysis and plan/profile drafting. By consolidating these traditionally separate tasks into a single environment, PLS-CADD dramatically improves design accuracy, reduces project timelines, and enhances collaboration across engineering teams.

Advanced 3D engineering model and visualization

At the heart of PLS-CADD is a dynamic 3D engineering model that includes terrain, structures, and conductors. This model supports multiple synchronized views including plan, profile, 3D, and plan and profile sheets, allowing engineers to visualize and interact with their designs in real time. PLS-CADD keeps track of how all parts of the design are connected, and any change to a structure or layout automatically updates all views and calculations. Users can also overlay planimetric maps, contour lines, and draped aerial imagery for enhanced spatial context and route planning.

Flexible survey data integration and terrain modeling

PLS-CADD accommodates a wide range of survey data sources, including total stations, lidar, and photogrammetry. Survey data can be imported electronically, digitized manually, or keyed in directly, and the application supports both geographic (lat/long) and cartesian coordinate systems. Its customizable import routines handle diverse data formats, enabling seamless integration into the design workflow. PLS-CADD can generate detailed terrain models of the ground or above ground objects with contour lines and color renderings to support accurate clearance and structural analysis.

Sophisticated engineering analysis and standards compliance

PLS-CADD offers state-of-the-art engineering tools for sag-tension analysis, structure loading, clearance checks, and insulator swing evaluations. Users can define custom combinations of wind, ice, temperature, and safety factors to meet specific regulatory or internal standards. Sag-tension analysis uses both traditional ruling span methods or advanced multispan finite element analysis with the integrated SAPS finite element analysis engine. PLS-CADD also includes automatic spotting algorithms that optimize structure placement based on user-defined criteria, improving both safety and cost-efficiency.

Efficient design editing and automation

Design modifications in PLS-CADD are intuitive and efficient. Engineers can adjust line routes by dragging points of intersection or adding/removing them with a click. These changes are instantly reflected across all views and recalculated in real time. The application automates many routine tasks, such as generating staking lists, stringing charts, and plan and profile drawings, freeing engineers to focus on higher-level design decisions. PLS-CADD also supports scripting and batch processing for large-scale or repetitive tasks.

Feature-rich platform for end-to-end line design

PLS-CADD includes a wide array of specialized features that support every phase of line design. These include structure family libraries, EMF, circuit impedance and susceptance, vegetation clearance violation detection, and integration with Bentley PLS-POLE® and TOWER for detailed structure modeling. The application also supports thermal rating analysis, line optimization based on cost or performance, and compatibility with GIS and CAD systems. With its modular architecture and extensive customization options, PLS-CADD adapts to the needs of utilities, consultants, and EPC firms alike.

System requirements

Minimum: Windows 10 or 11 (64 bit), 512 MB of RAM and 100 MB of disk drive space
Recommended: 4 GB-96 GB of RAM, Core i7, Ryzen or better processor, 4GHz or better

PLS-CADD at-a-glance

3D engineering model and terrain handling

- Centralized 3D model includes terrain, structures, and all wires
- Supports automatic TIN triangulation and multiple terrain visualization modes (contours, color renderings, aerial overlays)
- Accepts survey data from total stations, lidar, photogrammetry, and manual input
- Supports cartesian and geographic coordinate systems
- Enables interactive line routing and structure placement directly in plan/profile views

Engineering calculations and standards compliance

- Supports user-defined combinations of wind, ice, temperature, and safety factors
- Automates load calculations and strength checks per ASCE, NESC, IEC, CENELEC, and other worldwide standards
- Performs sag-tension analysis for any weather case at initial, creep, and load cable conditions
- Models conductor behavior at high temperatures, including ACSR compression effects
- Calculates clearances to ground, wires, structures and objects near the line, galloping ellipses, thermal ratings (IEEE 738, Cigre 207/601), stringing, and offset clipping charts
- Integrates with SAPS finite element engine for advanced scenarios like broken conductors or unbalanced loads.

Structure modeling and spotting

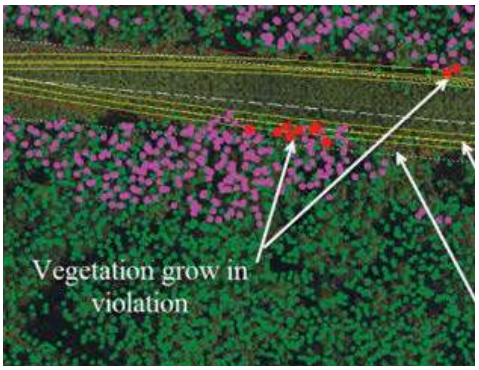
- Offers multiple structure modeling methods, including finite element modeling via TOWER and PLS-POLE
- Visualizes stress distribution with color-coded feedback
- Supports single and multipole guyed or unguyed structures, frames, and lattice towers—ideal for upgrade studies
- Provides both manual and automatic structure spotting, optimizing for cost and constraints
- Allows real-time adjustments to tensions, conductors, and loading agendas

Material management and cost estimation

- Includes a robust material subsystem for estimating costs and generating material lists
- Supports direct entry or database integration (ODBC-compliant systems like Oracle, Access, DB2)
- Enables creation of assemblies from parts and links them to structures
- Generates detailed reports for materials and staking, exportable to spreadsheets or asset management systems

Drafting and visualization

- Fully automates plan and profile sheet generation with real-time updates
- Supports direct plotting or export to CAD and PDF formats
- Integrates planimetric drawings, aerial imagery, custom borders, and logos
- Offers full control over layout parameters including page size, scales, text and annotations, detail views, phasing diagrams, and much more
- Visualizes wire blowout under wind, insulator swing, and clearance envelopes in 3D



Vegetation clearances for grow-in (red points) and falling tree (purple points) calculated to wire positions under wind conditions.

PLS-CADD's TIN surface modeling allows for accurate and realistic structure placement and clearance calculations.

Bentley

Find out more at **Bentley.com**
1.800.BENTLEY (1.800.236.8539)
Outside the U.S.: +1.610.458.5000
Global office listings: bentley.com/contact