# Bentley Substation
Integrated Electrical and Physical Design for Intelligent Substation Infrastructure

Designing or upgrading an electric substation is a complex task that combines the placement of physical objects and the distribution and control of electrical power. Bentley Substation addresses this challenge by providing a comprehensive, integrated set of capabilities that make the design process faster, easier, and more efficient. Bentley Substation is a valuable productivity application for utilities, engineering firms (EPCs), and rail owner-operators who design and operate substation infrastructure.
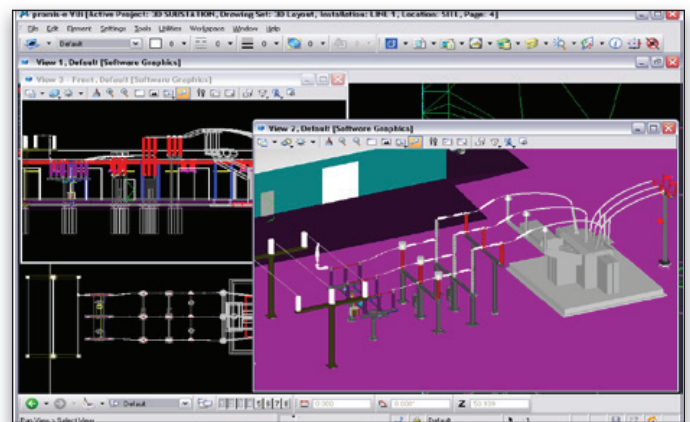
### Intelligent Information Model
Using an intelligent information model, Bentley Substation combines intuitive 3D modeling, powerful electrical design functionality, and automatic bills of material and report generation in an integrated, stand-alone application to get your project completed, approved and online in the shortest possible time. The product operates in conjunction with ProjectWise®, a powerful engineering content management system, to facilitate the design workflow.

### 3D Physical Design
A 3D model makes it much easier to visualize and document substation plans, create accurate bills of material and execute clash detection and clearance checking. In the past, 3D models were often omitted from substation designs due to the complexity of the required software, but Bentley Substation offers new, easy-to-use 3D modeling tools. Each object in the model is linked to the parts database, providing component data and the contents of any accessory kits associated with the part. Hook points connect related objects, so they automatically snap together and move as one unit when repositioned. Dynamic Views show 2D and 3D edits simultaneously. There are also tools to design or analyze the grounding grid, lightning protection and cable sag, as well as enhanced capabilities for visualizing and confirming existing stations. Bentley Substation supports workflows for brownfield expansion and retrofit projects, using a combination of 2D existing designs, 3D models and point clouds.

### Electrical Design
Bentley Substation incorporates an established electrical design engine (Promis.e®) which provides many time-saving functions. Wires break and heal automatically as symbols are placed or removed. Wire numbers can be assigned automatically and connections are recognized by the software. Unique IDs are prompted by the software, and related symbols are cross-referenced automatically. In this way, you can generate single line drawings and protection and control schematics quickly without errors. As with the 3D model, the integrated parts database allows you to associate components in your design with specific parts information to generate an accurate bill of material and other documentation.



3D modeling – visualize your design for clash detection, clearance checking, and presentations.

Work is organized into projects, allowing many drawings to be linked for cross referencing, error checking and list generation. Changes made in one part of the project are immediately reflected in the rest of the project, drastically reducing editing time and ensuring accuracy. Project-wide default settings ensure adherence to standards.

### Error Checking
As you create drawings, Bentley Substation alerts you to possible errors. This significantly reduces manual checking, improves the overall accuracy of the drawing and prevents costly corrections later on. Error conditions include short circuits, duplicate device identifiers, over-assignment of contacts, and more.

### Automatic Generation of Documentation
Superior documentation is provided by a project database linked to the schematic, allowing bills of material, purchase order lists, job cost estimates, panel layouts, terminal plans, wire lists and wiring diagrams to be generated automatically. This automatic creation of documentation minimizes errors and ensures that any design revisions are quickly reflected in the reports.

### Distributed Engineering
As the design work for a substation typically involves people working at different locations, there is a need to coordinate this activity to avoid errors and delays. The i-model support built into Bentley Substation facilitates data exchange. In addition, ProjectWise software provides robust enterprise-level engineering content management and team collaboration capabilities to support the substation design workflow.

# Bentley Substation At-A-Glance

## General/System Features
- Stand-alone product – no additional CAD software required
- Command protection
- One-click navigation
- Search tool
- Fully open API
- Bentley SELECT® licensing
- Project-wide data editor
- i-model support
- Import legacy DGN files into active project
- Can operate in Citrix environment (XenApp 5.0 or 6.0)
- Supports Bentley Descartes software for integrating point-cloud data of existing designs and editing existing 2D raster drawings

## 3D Modeling Features
- Intelligent objects linked to parts database
- Hook points automatically align and join related objects
- Grounding grid layout tool
- Wire sag algorithm (spline and catenary, hook-point enabled)
- Lightning protection (rolling sphere method)
- Dynamic views – 2D and 3D views both update dynamically when either is edited
- Dynamic section views

## Electrical Drawing / Design Features
- Project-based design organization
- ANSI/IEEE or IEC electrical symbol catalog included
- Ladder builder
- Wire sizing tool (NEC, 600V max.)
- Manufacturers parts databases and symbol catalogs
- Global find/replace wire property
- User-definable device tag formats
- User-definable wire layering
- User-definable wire tag formats
- Cable termination diagrams
- Automated balloon callouts
- Panel layout mode
- BOM explorer
- Dynamic symbol text
- Automatic component align
- Global find/replace symbols & symbol properties
- Automatic wire numbering
- Automatic page numbering
- Automatic page save
- Automatic project copy
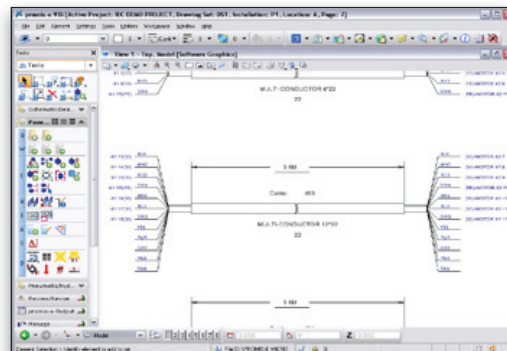- Page copy, rename, move
- Global title block replace

- Automatic device tagging
- Custom symbol creation
- User-definable circuit macros & symbols
- Symbol migration tool
- AutoCAD block migration tool
- Intelligent off-page wire references
- Automatic wire/line break & heal
- Automated circuit copy
- Wire crossing / connection preferences
- User-definable wire property display
- Catalog manager
- Cable manager
- Cable export to Bentley Raceway and Cable Management
- PLC schematic generator
- Automatic PLC addressing
- PLC I/O import
- Automated symbol rotation
- Real-time cross-referencing across multiple pages
- Multi-user/discipline collaboration
- Multiple undo/redo capabilities
- Instantaneous real-time error checking
- Forced wire routing
- Dynamic wire diagrams
- Terminal/pin-plug manager
- Graphical terminal/pin-plug plans
- Spare parts utility
- Multi-language drawing text
- Drawing mode manager
- Shortest distance wire routing
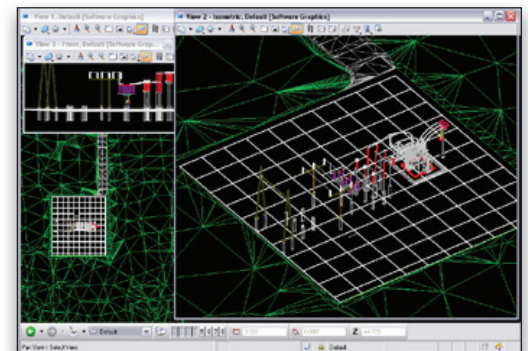
## Reports and Documentation
- Automatic report generation
- Bills of material
- Wire list
- Wire labels
- Wire length calculation reports
- Cable list
- Terminal-plug list
- PLC list
- Job costing report
- Field wire list
- Revision history reports
- Custom report designer
- Output reports to TXT, CSV, HTML, RTF, PDF, XLS, MHT files
- Project publisher

## Special Utilities
- Project builder
- Panduit selection tool



*Cable diagrams – display connection information automatically.*



*Grounding grid layout function – configure the grid as part of the 3D model.*

**Bentley®**
*Advancing* Infrastructure