PRODUCT DATA SHEET

Bentley Subsurface Utility Engineering

Intelligent 3D Feature-based Modeling of the Buried Construction Zone

Bentley Subsurface Utility Engineering (SUE) extends the power of OpenRoads technology by including a robust tool-set for building intelligent 3D feature-based models of the buried construction zone. These models help mitigate the risk of building in a utility-congested underground environment and ensure better coordination among team members during design and construction.

Automatically Creates 3D Models

SUE enables transportation, utilities, engineering firms, GIS departments, and other design and engineering professionals to analyze information about existing systems and assign reliability values to use as the basis for future project planning. The software automatically creates 3D models from survey information, CAD artifacts, GIS data, Excel spreadsheets, Oracle databases, and other industry-standard sources of information. SUE also maintains a relationship between CAD and GIS data sources while working on the project. For example, the user can modify civil design features and post updates back to the GIS data source so that data is always current.

Powered by OpenRoads Technology

OpenRoads, the underlying technology for Bentley's civil engineering design products (GEOPAK, InRoads, MXROAD, and PowerCivil), expands design boundaries by providing 3D modeling, design-time visualization, design intent, information mobility, and construction-driven engineering in a single application. OpenRoads technology preserves user equity in standards, deliverables, and legacy data while providing information modeling to drive intelligent infrastructure projects.

Intelligent 3D Feature-based Models

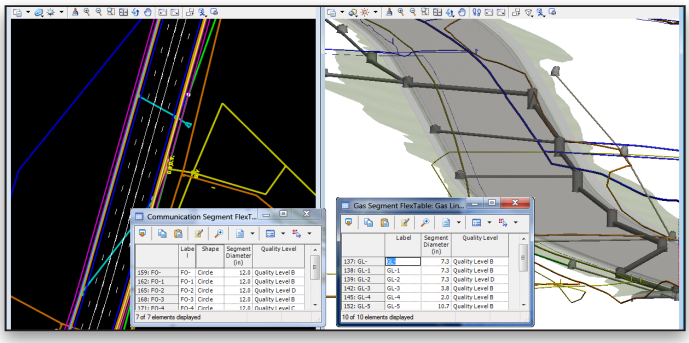
Because SUE is built on OpenRoads technology, users have the same immersive modeling with parametric design included in Bentley's civil design applications. SUE enables users to readily create intelligent 3D models of utilities infrastructure, including drainage and wastewater features, and incorporate rules, relationships, and constraints for incomparable modeling capabilities.

Enhanced User Experience

The user experience is enhanced with context-sensitive, dialog-free editing. Users can edit on the fly by hovering over a line to see a set of grips and key input fields. The software knows what object was selected and offers design options via a context-sensitive toolbar.

Design Intent Ensures Design Quality

Design intent builds associations and relationships between civil elements. Object information (how, where, and by what method it was created) is stored with the object to ensure the original intent is retained and honored in the design. If an element is modified, any related elements will recreate themselves based on these stored relationships. Design intent assures the project is engineered and design quality is enhanced with element relationships and links in the project.



SUE enables the capture of Quality Level that quantifies the level of risk associated with the 3D utility model component's location in the buried construction zone. Quality Level A-D represents increasing levels of risk. Refer to ASCE standard 38-02 for more detail.

Two-way Information Exchange

SUE makes it easy for users to synchronize civil and GIS data with a two-way information exchange between the design and geospatial database. The software creates a two-way information link for extracting and posting data. Remove, update, and create new utilities based on project criteria. This link ensures that as-built project data is exported to the database to continually grow and improve available data.

Design-time Visualization

Readily view the design in progress with Bentley's powerful, dynamic 3D modeler that results in a design-time rendering. SUE enables users to visualize existing utilities in a 3D composite model and readily interact with the underlying data and edit the model as needed.

Informed Decisions Make Better Designs

Bentley's SUE conforms to the Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data (38-02). This standard assists engineers, project and utility owners, and constructors in developing strategies to reduce risk by improving the reliability of information on existing subsurface utilities in a defined manner. In addition to standards adherence, SUE also enables users to readily perform conflict analysis of proposed project changes to save time, eliminate building errors, and reduce product costs by truly experiencing the design.

System Requirements

Processor
Intel Pentium-based or AMD Athlon-based processor 2.0 GHz or greater

Operating System
Microsoft Windows 8, Windows 8 x64, Windows 7, Windows 7 x64, Windows Vista, Windows Vista x64, Windows XP Professional (SP3 or later), Window XP x64

Memory
1 GB minimum, 2 GB recommended, (more memory typically results in better performance)

Disk Space
1.25 GB minimum free disk space

Input Device
Mouse or digitizing tablet (Digitizing tablet requires vendor-supplied WINTAB driver or Bentley's Digitizer Tablet Interface, the latter included with Power InRoads installation.)

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Bentley Subsurface Utilities At-A-Glance

Automated 3D Model Production

- Consumption of linear artifacts created from a range of sources to automatically build 3D models
- 3D models for pipes, conduits, ducts, cables, and structures (manholes, inlets, valves, wetwells, and more)
- 3D models ruled to linear elements for automatic updating
- Topology of network automatically created and maintained
- Connectors (tees, wyes, etc.) automatically modeled between adjacent utility lines
- Elevations determined from terrain model or surveyed elevation
- Structure libraries customized or pre-packaged by agencies and/or vendors
- Standard design libraries describing the component details for a variety of storm, sanitary, water, gas, and communications can be created, shared, and expanded

Design Intent

- Builds associations and relationships between civil elements
- Information about the object (how it was created, from where it was created, by what method it was created) is stored with object to ensure designer's intent
- Stored relationships between elements ensure that relationships are maintained

Two-way Link to Geospatial Data

- Two-way connection allows extraction from database as well as editing and augmenting of data in the database
- 3D models are automatically created and featurized
- Connections map source, target schemas, and unitized feature attributes

3D Models Streamline Clash Detection

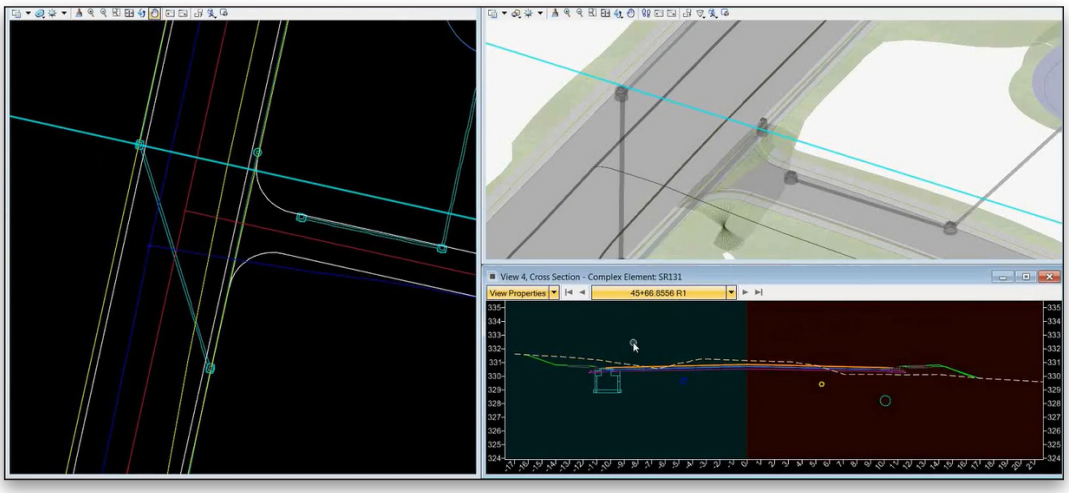
- Clash detection among utility elements
- Clash detection among utility elements and any other 3D elements
- Found clashes are modeled as first-class conflict features, which are reportable, queryable, and editable
- Clash features can be visualized to appropriate detail using feature definition
- Using recognized data schemas, all utilities can be designated to reflect confidence levels. Accepted standards terminology is used. For example, ASCE 38-02 standard for locating existing utilities.
- Adapt and extend physical and information model to conform to specific agency needs

Feature Definition-based Models

- Tools to import into Subsurface Utilities project from GEOPAK Drainage, InRoads Storm and Sanitary, and MX Drainage
- Node feature definitions use 3D models
- Conduit (pipe) feature definitions support all utility shapes plus user-defined, custom-shape option
- Conduit thickness is modeled
- Materials libraries can be used to provide realistic rendering
- Structure catalogs can span all levels of detail
- Generic catalogs are supplied
- Agency- and vendor-specific catalogs can be easily integrated into projects
- Layout in plan and profile allows the engineer to work in familiar ways while 3D is managed automatically
- OpenRoads platform conceptually organizes the 3D design world into corresponding plan, profile, and section modeling views
- Heads-up display and task-based menus streamline model development
- Automated tools for extracting from a variety of data sources targeting design features and finished grades to render corresponding 3D utility models
- Utility nodes and conduits are ruled to surfaces, terrain models, and other 3D elements so that surface elevation changes are automatically reflected in utilities

Design-time Visualization

- Constraint-driven utility trench templates with a new context sensitive, intuitive interface
- Powerful, dynamic 3D modeler with built-in visualization tools
- Plan, profile, section, and 3D views



Working in plan and profile allows the engineer to work without interruption while the 3D model is automatically created.

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