

Bentley[®]
Advancing Infrastructure

 CONNECT Edition



OpenRail ConceptStation CONNECT Edition

From Planning to Performance

OpenRail ConceptStation CONNECT Edition empowers railway engineering professionals to rapidly create conceptual rail designs in a matter of hours – not days. You can create intelligent digital models in context to the real-world environment. OpenRail ConceptStation combines engineering drawing capabilities and associated costs to facilitate better decision making in the preliminary design phase. Engineers and designers can evaluate more options during the planning and pre-bid stage of the project.

The benefits include increasing design productivity, identifying potential high-risk items, and minimizing project development costs. Once the optimal design is identified, you can readily upload the model to OpenRail detailed design applications to streamline rail track, electrification, tunnel, and bridge design. Differentiate your firm in design/build bids by quickly analyzing innovative concepts with optimized designs, lower costs, and less risk.

The CONNECT Edition

The SELECT[®] CONNECT Edition includes SELECT CONNECT *services*, new Azure-based services that provide comprehensive **learning, mobility, and collaboration** benefits to every Bentley application subscriber. *Adaptive Learning Services* helps users master use of Bentley applications through CONNECT Advisor, a new in-application service that provides contextual and personalized learning. *Personal Mobility Services* provides unlimited access to Bentley apps, ensuring users have access to the right project information when and where they need it. *ProjectWise[®] Connection Services* allow users to securely share application and project information, to manage and resolve issues, and to create, send, and receive transmittals, submittals, and RFLs.

Leverage Contextual Information

OpenRail ConceptStation allows you to jump-start the conceptual design process by locating and downloading data-rich contextual information for a given location to model in a real-world setting. You can easily import a wide range of data including terrain models, raster DEMs, images, GIS, reality meshes, and more to create intelligent 3D models in context with minimal effort. The software includes GeoCoordination Services to help find, download, and import geospatial data and transform the data to 3D models to effortlessly view the information. The easy-to-use data assembly capabilities helps your organization reduce the time required to locate existing condition data and decrease the overall design schedule.

Use Civil Engineering Sketching Functionality Capabilities

With OpenRail ConceptStation, you can take advantage of easy-to-use engineering drawing capabilities to sketch track geometry for mainline, yards / sidings / stations, turnouts, crossovers, tunnels, bridges, and more in hours. OpenRail ConceptStation ensures rail specific standards (cant equation, horizontal and vertical curve radiuses, transition curves) are adhered to in the design. The rail vertical alignment can be created with circular vertical curves using best-fit on existing ground or as a straight geometry. Rail superelevation (cant) is determined automatically using cant equation based on the design speed. You can choose from a variety of rail classes high speed, mainline, secondary main line, branch line, and yard. Multi-track alignments can also be designed with using different rail templates and custom offset values. Once the track is created it is easy to edit horizontal and vertical alignments, and edit curve radiuses graphically or precisely using heads-up editing.

Rail overhead line electrification (OLE) can be easily incorporated into the design. OLE structures are placed according to design standards and selected speed. Mast offset, span lengths, and push-pull configuration of cantilevers are calculated using the horizontal curvature. Wire contact height, encumbrance, overlap locations, overlap types (on tangents and curves) are all dictated by OLE libraries and engineering standards. Portals can also be easily modeled using the portal tool, with support for a combination of electrified and nonelectrified tracks. Designs can be easily edited with support of automated healing of the wires.

OpenRail ConceptStation takes conceptual bridge design to the next level. You can use templates to easily place and edit bridges with just a few clicks of the mouse, and determine the number of spans, design speed, classification, and bridge type. You can set girder, support and abutment type. The bridge template defines the typical cross-section to apply to the bridge deck. This includes the number of tracks, the barriers, sidewalks, and other artifacts you need to apply to the top of the bridge. The template also drives the bridge width and ensures that the superstructure adapts to it. You can choose from prestressed concrete girder, cast-in-place slab bridge, or cast-in-place box girder. In addition, you can utilize the bridge library to pick a variety of beams and girders, support types, abutments, and wing walls.

Tunnel tool allows users to place tunnel sections with support for entrance and exit portals. Tunnel section automatically adopts to the track template and allows edits to be made on the location of track superstructure. Entrance and exit portals can also be edited for different buffer widths or slope requirements.

Create Conceptual Designs

OpenRail ConceptStation enables you to create multiple designs with associated costs for better decision making. You can quickly consider different scenarios to

discover the best rail, electrification, bridge, and tunnel designs in context. Make better decisions with interactive discussions with other experts, contractors, and stakeholders early in the design process. The software helps you explore more options to identify high-cost items and potential issues in the preliminary design phase. You can use bridge clearance tool to easily identify clearance problems for existing road or rail crossings. Whole bridge section can be analyzed, and you can change your design accordingly while still early in the design process.

OpenRail ConceptStation provides a cost tab that lets you access estimated costs for the project. As soon as new design elements are added to the concept, the refresh tool can be utilized to provide up-to-date cost estimates for the design. You can easily create detailed quantities and cost report with each design scenario; cut-and-fill values, material volumes (ballast), tunnel length and bridge quantities, OLE quantities, single and double cantilevers, number of masts, portals, and wire lengths. The software helps you become more competitive and win more business by generating better, cost-effective designs.

Render in Real Time with Cinematic Quality

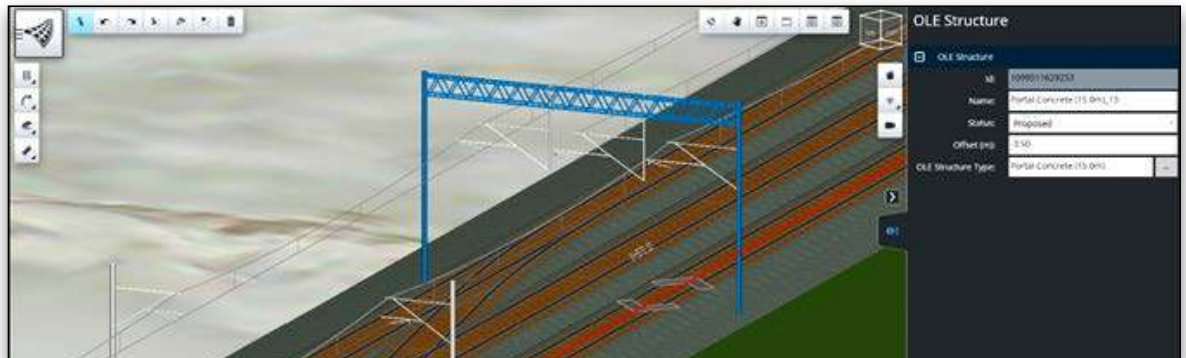
Create stunning photo-realistic visualizations in seconds using the dynamic immersive visualization engine platform. Simply click on the Visualize tab and it will launch the LumenRT mode. Using the embedded LumenRT engine, you can visualize your model into a rich 3D environmental context with vehicles, water, skies, trees, plants, and characters. This platform provides natural-looking light

and shadows, real-time global illumination, IES point and spotlights, lens flares, and luminous materials. Interactively adjust time of day, add lens flares, and apply depth of field while benefiting from highly accurate reflections, anti-aliasing, and motion blur. You can also add a train automatically to selected tracks, that will follow the geometry and articulate at the curve sections.

OpenRail ConceptStation enables you to readily share your concept with colleagues, clients, and stakeholders. You can present alternative civil design concepts in real time and make edits on the fly to meet design needs. Using a photo-like presentation helps your firm present technical information to the public to help explain project impact to the local environment.

Transition Conceptual Design to Detailed Design

Move your optimized conceptual design to the detailed design phase while maintaining geometric integrity. Ensure your digital model is utilized in OpenRail for accelerated project delivery and better design quality. Simply click on the Export tab and you will see a dialog to help you browse for the location and name of the files to be exported into OpenRail. Once you have specified the file name and saved the data, OpenRail ConceptStation will automatically create engineering data types such as .dgn, .tin, .alg, .itl, and .ird files to provide the model, geometry, terrain and templates to export to OpenRail for the detailed design phase. Your designers can move conceptual design to detailed design with a click of the mouse.



Generate conceptual design with associated costs to enhance decision making and ensure optimized rail, electrification, tunnel and bridge designs.

OpenRail ConceptStation CONNECT Edition At-A-Glance

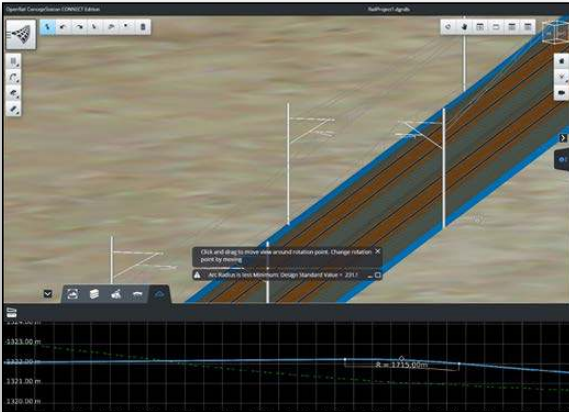
Assemble Context Data

- Import the following file types:
 - » Terrain Models (.DTM, .TIN)
 - » Raster DEM (.IMG, .DEM)
 - » Images (Ingr. TIFF / GEOTIFF (*.tif, *.tiff), Internet TIFF and TIFF64 (*.tiff; *.itiff64), JPEG (*.Jpg; *.jpeg; *.jpe; *.jif), JPEG 2000 (*.jp2; *.j2k; *.jpm), MrSID (*.sid), ERMapper Compressed Wavelets (*.ecw))
 - » GIS (SHP, Esri File Geodatabase, OpenStreetMap) can be mapped to ConceptStation objects and attributes
 - » Filter based on project extent, view, all, fence
 - » DGN as read-only
- Reference Reality Meshes (.3MX) from Bentley's ContextCapture
- Reality Data Services
 - » 3D data (Terrain, Imagery, Roads, Rail, Hydro, Buildings)

Design Track Geometry

- Place tracks
 - » Follows rail standards; class, design speed, default curve radius, transition lengths
 - » Automatic cant application (cant equation)
 - » Best fit existing ground vertically or create a straight vertical alignment
 - » Template (typical cross-section) based approach
 - » Named tracks
- Place multitracks
 - » Select different templates
 - » Input offset between track
 - » Tracks works together, any edit done to main geometry updates the tracks
 - » Track geometries can also be individually modified
- Editing of horizontal alignment

- » Insert PI, delete PI, move PI
- » Edit curve radius graphically or precisely using heads-up text editing
- Editing of vertical alignment
 - » Insert PVI, Delete PVI, Move PVI
 - » Edit vertical curve length and slope graphically or precisely using heads-up text editing
- Template drop editing
 - » Easy editing of template drops and stationing



Draw railway track, electrification equipment, bridges, guardrails, street lights, and more in hours using engineering-friendly drawing applications that adhere to design standards.

Design Yard/Station Areas

- Yard placement tool to create level ground elevations
 - » Select different templates with different widths
- Create offset geometries
 - » User defined offset values, follow vertical geometry
- Precise turnout definitions
 - » Extensive turnout library
 - » Crossing angles and defined turnout geometries
 - » Does not allow creation of arbitrary geometries
 - » Modify turnout locations
- Automatic snapping, horizontally and vertically
 - » Snapping to turnout geometries
 - » Snapping to end of track geometries
- Fit turnouts
 - » Fit turnouts to geometry intersections
 - » Creates precise turnouts, does not allow creation of arbitrary geometries
- Create crossovers
 - » Automatic placement of turnouts
 - » Separate start and end turnout definitions

Design Overhead Line Systems

- Place masts
 - » Mast placement based on design standards
 - » User-selected offset values
 - » Span lengths are based on horizontal curvature and design tables
- Place portals
 - » Portal placement based on design standards
 - » Tracks that will be electrified can be selected
 - » Automatic placement of cantilevers based on track geometries
- Create cantilevers
 - » Single and double cantilevers
 - » Automatic selection of push-pull configuration based on geometry and offset

- Create Wires
 - » Automatic wire creation
 - » Catenary, contact, and dropper wires
 - » Library-based encumbrance and stagger values
- Overlaps
 - » Maximum wire length input, automatic creation of wire overlaps
 - » Different overlap definitions for straight and curved sections
 - » Library based overlap definitions
 - » Manual overlap placement and removal
- Edit overhead line items
 - » Change offset and station of the masts and portals
 - » Change the selected mast and cantilever definition, push-pull configuration
 - » Automatic update of structures upon geometry modifications

Place Rail Signals

- Place railway signals using provided library

Design Bridges

- Place bridges
 - » Simple two clicks bridge placement
 - » Number of supports automatically determined from the bridge length
 - » Can set girder type, support type, abutment type, wing walls
 - » Can set bridge deck template
- Edit bridges
 - » Simple editing of Horizontal and Vertical
 - » Change girder type, support type, abutment type, wing walls
 - » Change number of spans/supports, number of girder
 - » Rotate supports, move/skew abutment



Create stunning photo-realistic visualizations in seconds using dynamic immersive visualization capabilities.

Design Tunnels

- Place tunnels
 - » Simple two-clicks tunnel placement, using 3D or profile view
 - » Tunnel template automatically determined from the track template
 - » Creates entrance and exit portals
- Edit tunnels
 - » Simple editing of horizontal and vertical
 - » Buffer lengths
 - » Portal grading and offset

Railway Template

- Create new template
 - » Easy component-based creation
 - » Ballast and rail components
 - » Component material determines quantities and cost
- Manage template
 - » Duplicate, delete, copy/paste, rename

System Requirements

Processor

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

Operating System

Windows 10 (64-bit) – Home, Pro, Enterprise, and Education; Windows 8 (64-bit) – Standard, Pro, and Enterprise; Windows 8.1 (64-bit) – Standard, Pro, and Enterprise; Windows 7 SP1 (64-bit) – Home Basic, Home Premium, Professional, Enterprise, and Ultimate

Memory

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

2 GB GPU graphic cards for optimal performance in the real-time rendering engine

Disk Space

5.5 GB minimum free disk space

Find out about Bentley at: www.bentley.com

Contact Bentley

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Global Office Listings

www.bentley.com/contact

- Modify template
 - » Save change as copy
 - » Modify the entire design

Estimate Cost and Quantities

- Project cost overview
 - » High level overall design cost
 - » Includes allowance by default
- Detailed quantities/cost, listing cost items, and associated quantities for rail track and overhead line equipment
 - » Cut, fill, and ballast quantities
 - » Tunnel length, volume, and bridge
 - » Masts, portals based on types
 - » Single and double cantilevers
 - » Wire quantities

Interoperability with Detailed Civil Design

- Export to OpenRail
 - » Export ALG, IRD, ITL, TIN
 - » Supports geometry, template, template drop transition
- Export CAD model
 - » 3D DGN model

Place City Furniture

- Place and edit guardrails
 - » Ability to choose what symbol to use
 - » Ability to set offset from alignment
 - » Ability to set angle from alignment
- Place and edit street lights and other city furniture
 - » Ability to choose what symbol to use
 - » Ability to set offset from alignment
 - » Ability to set angle from alignment

Aerial Imageries

- Bing Map as images provider

Visualization

- Real-time rendering
- Automatic train animation
- Adding cars, people, trees
- Changing atmospheric conditions, time (day, night), seasons
- Output high-end images, videos, and Live Cube (LumenRT)

