CADWorx Raceway

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What is CADWorx Raceway?

CADWorx Raceway is the 3D CAD design module of CADWorx Electrical & Instrumentation Design Suite used for the creation of plant raceway models. CADWorx software performs cable routing, cable filling and cable length calculations, as well as interference analysis and materials reporting.

CADWorx Raceway is a powerful software tool for the design of plant and substation raceway systems. It is a 3D CAD application that contains parametric construction, design and analysis tools which accelerates the design process and increases efficiency and accuracy.

CADWorx Raceway is also the world's first fully functional PC based cable and wire routing software.

For 3D modeling CADWorx Raceway provides fast, easy to use tools for creating cable tray, conduit runs and duct bank, including polyline trace and links to supplier parts libraries. The designer can also extract/select components (motors, instruments, electrical enclosures) from a Bill of Materials list generated in a CADWorx Electrical or CADWorx Instrumentation. This 3D raceway system provides the model used to route the project's cables.

After completion of the raceway design, new cables can be automatically (or manually), routed through the raceway network, based on the termination information generated in CADWorx Electrical / CADWorx Instrumentation and the raceway system topology in the CADWorx model. Querying of components and routes in the 3D model within the CAD session with data displayed via list boxes and graphics is possible.

When optimising cable routes, CADWorx Raceway considers raceway fill, power compatibility, cable pulling schedules and bend radius. Where there are potential bottlenecks, CADWorx Raceway will also provide diagnostics information to assist in finding the best route solution and can easily provide alternative routes.

CADWorx Raceway produces cross section reports and drawings and will also create drumming reports informing the user on where to cut and splice cables, optimally reducing cable wastage.

CADWorx Raceway software can produce significant cost savings, particularly in the design of large projects where spreadsheet data becomes unmanageable. Historically, without CADWorx Raceway, cabling project costs can be over or underestimated by up to 30% because of the inaccuracy of manual routing methods (including spreadsheet use). Historically raceway filling has been governed by guesswork and approximation.

With smart electrical design automation and enhanced accuracy, CADWorx Raceway can help achieve significant savings on design, installation, and material costs. It is common for trained CADWorx Raceway users to recover the cost of the software and training on their first project.

CADWorx Raceway page

CADWorx Raceway integrates with CADWorx Instrumentation and CADWorx Electrical, which are providers of upstream cable schedule data for routing. CADWorx Raceway also integrates with the EDS Cable Scheduler module which provides a "database centric" cable management interface for all CADWorx Raceway cabling processes.

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Overview	Benefits	Capabilities	Key Features	Customer Success	System Requirements	Related Products

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Overview

Why Use CADWorx Raceway?

CADWorx Raceway, adds the 3rd dimension to electrical layout, allowing accurate interference checking and visual arrangement of models, and accurate cable length reporting. Working in 2D only results in approximation, hence costing and material errors occur.

Who Uses CADWorx Raceway?

CADWorx Raceway is for construction engineers with electro-mechanical design and cable management requirements, such as those designing plant cable raceway, duct bank, cable tray and cable ladder layout, and cable routing.

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Benefits of CADWorx Raceway

Integrated Design Environment:

- **Seamless Integration:** Works within the CADWorx environment, allowing for seamless integration with other design elements such as piping and structural components.

- **Unified Platform:** Allows for the design of electrical panels, wiring, and raceways within a single platform, reducing the need to switch between different software tools.

- **Consistent Data:** Ensures that raceway designs are consistently aligned with other design elements, reducing the risk of conflicts and design errors.

Enhanced Design Efficiency:

- **Intelligent Design Features:** Includes intelligent design features that assist in the creation of accurate and efficient raceway layouts, minimizing design time.

- **Automated Design Tools:** Provides automated tools for layout, routing, and placement of raceway systems, which can significantly speed up the design process

- **Predefined Templates and Standards:** Includes predefined templates and standards that help streamline the design process and ensure compliance with industry standards.

Accurate Documentation and Reporting:

- **Automated Documentation:** Generates accurate documentation and reports automatically, including bills of material (BOMs), raceway schedules, and wiring diagrams, which helps in maintaining consistency and reducing manual errors.

- **Documentation Updates:** Ensures that all documentation is updated as changes are made to the design, providing up-to-date information throughout the project.

Improved Visualization:

- **3D Visualization:** Provides 3D modeling capabilities to visualize raceway systems in the context of the entire project, aiding in the detection of potential clashes and design issues.

- **Enhanced Clarity:** Improves design clarity and understanding by allowing users to see how raceways interact with other components.

Cost and Time Savings:

- **Reduced Design Time:** The automation of design and documentation processes can significantly reduce the time required to complete raceway designs.

- **Minimized Errors:** Automated tools and error-checking features help reduce the likelihood of design errors, which can lead to cost savings by minimizing rework and correction efforts.

Compliance and Standards:

- **Adherence to Standards:** Supports compliance with industry standards and regulations, ensuring that designs meet necessary codes and requirements.

- **Customizable Standards:** Allows for customization of design standards to fit specific project needs or company policies, providing flexibility in meeting various requirements.

Enhanced Collaboration:

- **Centralized Data:** Facilitates better collaboration by providing a centralized platform where team members can access and work with the same design data.

- **Integration with Other Tools:** Can integrate with other CADWorx design tools – CADWorx P&ID Professional and CADWorx Instrumentation - improving coordination and communication among other disciplines and project stakeholders.

Scalability and Flexibility:

- **Adaptable Solutions:** Suitable for a range of project sizes and complexities, from small-scale installations to large industrial systems.

- **Scalable Design:** The software can scale to accommodate different project scopes and requirements, making it a versatile choice for various applications.

Training and Support:

- **Technical Support:** Hexagon provides comprehensive technical support to assist users with troubleshooting, software updates, and best practices, ensuring that teams can fully leverage the software's capabilities.

- **Training Resources:** Users have access to a variety of training resources, including webinars, tutorials, and documentation, to help them maximize the benefits of CADWorx Raceway. Free eLearning available via Hexagon University.

CADWorx Raceway offers significant advantages in terms of design efficiency, accuracy, and documentation. Its integrated approach, automation features, and compliance capabilities make it a valuable tool for electrical and instrumentation design projects.

Capabilities
- Works on AutoCAD and BricsCAD   - Easy to use, automated, design tools   - Catalogue based component selection   - Detailed realistic 3D model   - Project-wide editing and block changes   - Automated cable routing   - Automated cable length and drumming   - Automated raceway filling incl. National Electrical Code   - Automated transit management and filling   - Integrated SQL database for cable management   - Automated power and room segregation   - User defined blocks and libraries   - Clash detection tools

Automated cable routing:

- Cable route calculated by CADWorx Raceway software, shown in a raceway network.
- Software algorithm for automated cable route optimisation, and calculation of cable length and fill.
- Filling optionally compliant with National Electrical Code.
- Override auto-routes by manually specifying an entire route or set "waypoints" through which the conductor must pass.

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- Override auto-routes by manually locking routes.
- User defined levels of cable power segregation and mixing.
- Project milestone-based cable route issues are handled and managed. Design/routing and installation can be overlapped for fast turnaround projects with the "ROUTED/ISSUED/PULLED" system. This system provides milestone based "partial cable/route/fill schedules" which do not conflict as the installation progresses.
- Cable tray and conduit "Snug Fit" system optimises cable routing linearity and speed by intelligently and statistically optimising cable raceway intersections.
- Automated 3D cable route diagram with integral labelling and fill intelligence.
- Raceway network consistency checker. This highlights potential problems in an electrical raceway network.

Cable raceway, cable tray, and cable ladder design:

- Cable raceway that can be designed using Paneldes Panel software
- Parametric shapes for Areas, Enclosures, Devices, Instruments, Cable Tray, Cable Ladder, Trench, Conduit, Duct bank, Fittings, Accessories with Automated 3D SNAP.
- User defined 3D and 2D block options for visual accuracy.
- Automated model creation / device / instrument insertion from a database of components with their 3D locations.
- Automated "Ductbank Editor" is a tool to create and edit parallel arrays of conduit in concrete filled trenches.
- Automated "incremental" tag name defaulting - with user programmable tag names.
- Automated selection of components from preliminary one lines and block diagrams and final circuit diagrams.
- Database driven component sizing/block selection via CADWorx Electrical catalogue databases [ODBC].
- Automated bill of materials and quantity summary.
- Component placement cross checks.
- Tag name duplication cross checks.
- Database driven global editor for changing tags, specs, and sizes of multiple components in a single operation.
- "Query" function provides fill and other details about the cable and the raceway segments.
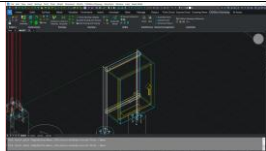
CAD software integration:

- Integration with AutoCAD 2018 – 2025.
- Integration with BricsCAD Pro v21 – v24.
- Adds electrical CAD toolbars, menus, ribbon tabs, and commands to your CAD software user interface.

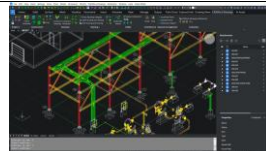**Commented [MP13]:** Link to BricsCAD Pro product page.

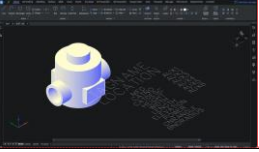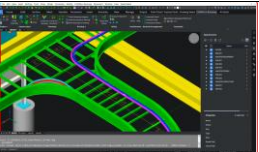| Key Features		
Panel Modeling	**Raceway Modeling**	**Ductbank and Trench Modeling**
Junction Boxes, Motor Control Centers, Distribution Boards,	Once panels are created, you design the raceways that	Modeling duct banks and trenches involves defining the

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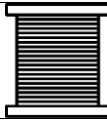
etc. all essential components in an electrical network, can be easily defined and placed using CADWorx Raceway. Panels can be created using the built-in panel modeling tools. They can be customized to suit the specific requirements of the project, including size, type, and mounting details, etc. Each panel is defined with several attributes and properties, such as material, dimensions, and manufacturer details.	connect them. Raceway design involves laying out conduits, cable trays, or ducts in a 3D environment. CADWorx Raceway provides tools for routing raceways efficiently within the physical constraints of the building or plant layout. The software has advanced tools for automatic and manual routing of raceways.	pathways, placing ducts or conduits, adding necessary fittings and accessories, and routing cables through the created pathways. The software's 3D environment, clash detection, and detailed documentation capabilities make it a comprehensive tool for designing complex underground electrical raceway systems.
Conduit Modeling	**Placing Instrumentation**	**Creating Assemblies**
Modeling conduits involves defining conduit specifications, placing conduits in a 3D model, adding necessary fittings and bends, checking for interferences, and integrating conduits with other raceway elements. The software provides powerful tools for both automated and manual routing, detailed documentation, and report generation, ensuring accurate and efficient design and installation of electrical systems.	Various instrumentation devices – such as sensors, and junction boxes - can be placed within the 3D raceway design environment. Instrumentation placement involves defining and placing instrumentation components, connecting them to junction boxes and control panels, routing cables, and ensuring that everything complies with design standards and safety requirements and are properly connected within the overall electrical and control system.	Creating assemblies involves grouping multiple components, such as raceways, fittings, conduits, junction boxes, supports, and other related elements, into a single reusable unit. Assemblies streamline the design process by allowing users to create, save, and reuse complex configurations in various parts of a project or across different projects. This is especially useful in large-scale projects where repetitive components or setups are common.
Automated Cable Routing	**Adding a New Cable**	**Materials Reporting and Quantity Summary**
Automated cable routing involves using intelligent algorithms to automatically determine the optimal path for cables within a 3D raceway model. This process considers several factors such as cable	Adding a cable involves defining the cable properties, specifying its source and destination, and manually routing it through the 3D raceway network. This process allows for precise control over the cable path,	Producing reports in CADWorx Raceway is a critical part of the design and project management process. The software provides powerful tools for generating a wide range of reports, from cable schedules and BOMs to

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| types, segregation rules, fill capacities, bend radii, voltage drop, and environmental constraints. Automated cable routing enhances design efficiency, reduces errors, and ensures compliance with project standards. | which is especially useful for unique routing scenarios or when the automated cable routing tool does not meet specific design requirements or produce acceptable results. | voltage drop analyses and clash detection summaries. These reports are highly customizable, can be exported in various formats, and integrate seamlessly with other project systems, ensuring comprehensive and accurate documentation for all project stakeholders. |

Customer Success

LMG (UK)	RML (Australia)	GEC (UK)
"We have calculated that the use of CADWorx Electrical and CADWorx Raceway has saved our company up to 80% in man-hours to turn a project around. The software reduces human errors and is more precise."	*"Our power business utilised the capabilities of CADWorx Electrical and CADWorx Raceway in the generation of all loop and termination diagrams, 3D cable tray design, auto cable routing and cable scheduling for the Pinjarra Unit 1 Gas Turbine Power Station."*	*"CADWorx Raceway automation of wire pre-fabrication is estimated to have saved 40-50% in the production costs of our modular K-series protection systems."*
CAD Documentation Manager	*Chief Engineer*	*Engineering Manager*

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CADWorx Instrumentation
CADWorx Plant Professional
BricsCAD

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