



Bentleyuser.dk ÅRSMØDE 2011  
Vejle, 14.+15.11.2011

Bentley Raceway and Cable Management V8i

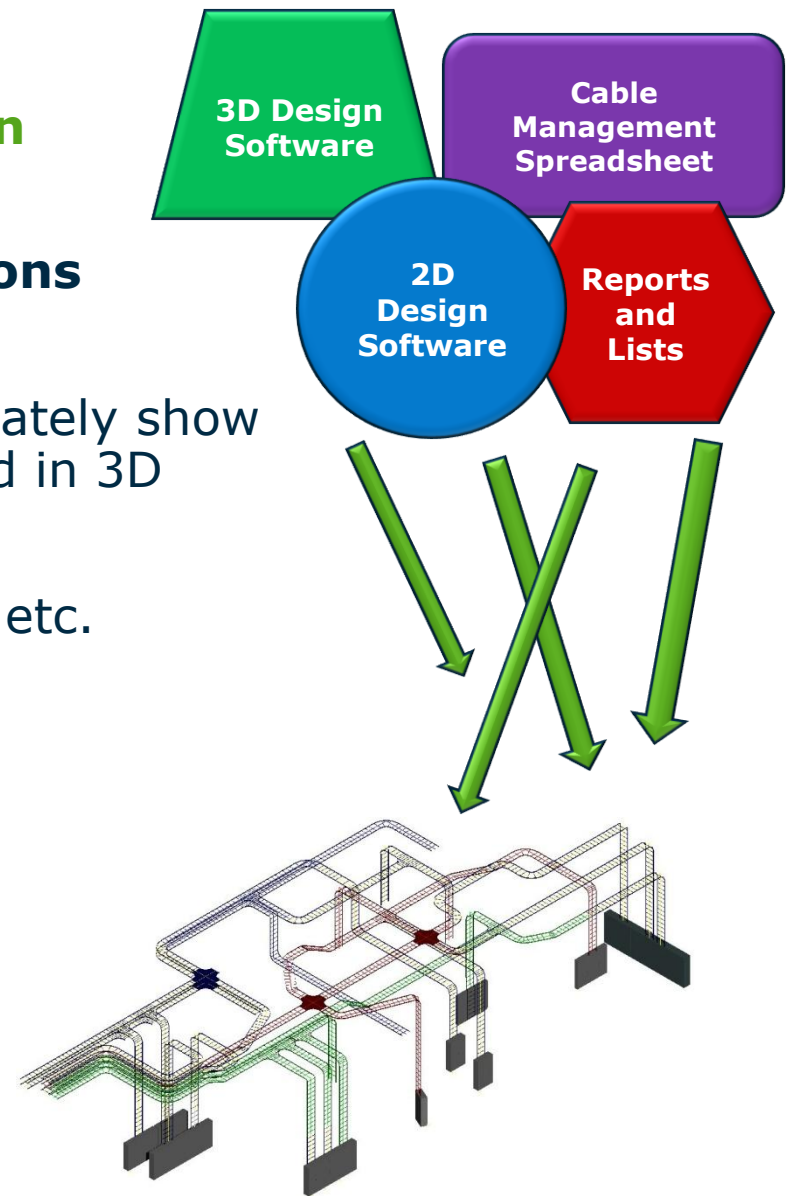
**Carsten Gerke** Senior Sales Director

Bentley Plant EMEA



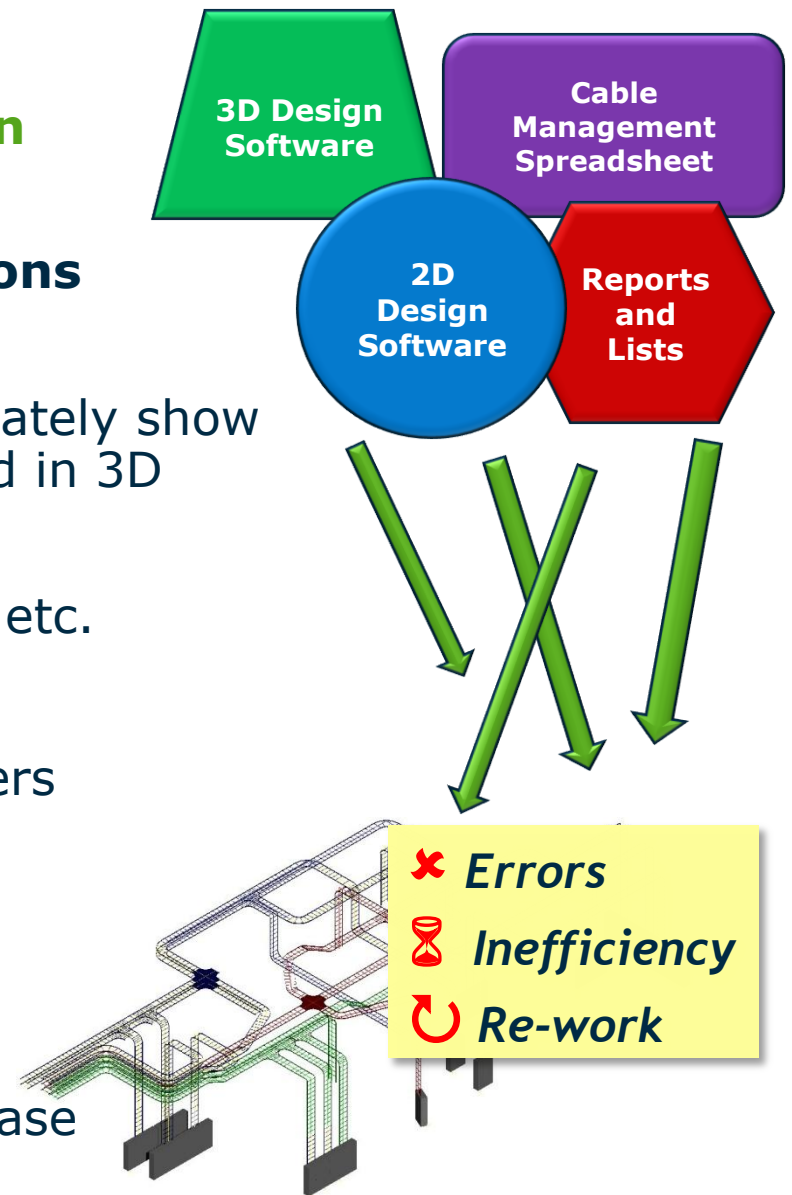
# Challenges of Raceway and Cable System Design

- **Separate, disconnected applications** for raceway design and cable routing
- **Limited, 2D design** does not adequately show spatial relations, has to be re-created in 3D
- **No intelligence in 3D design** for cable routing, material take-offs, etc.

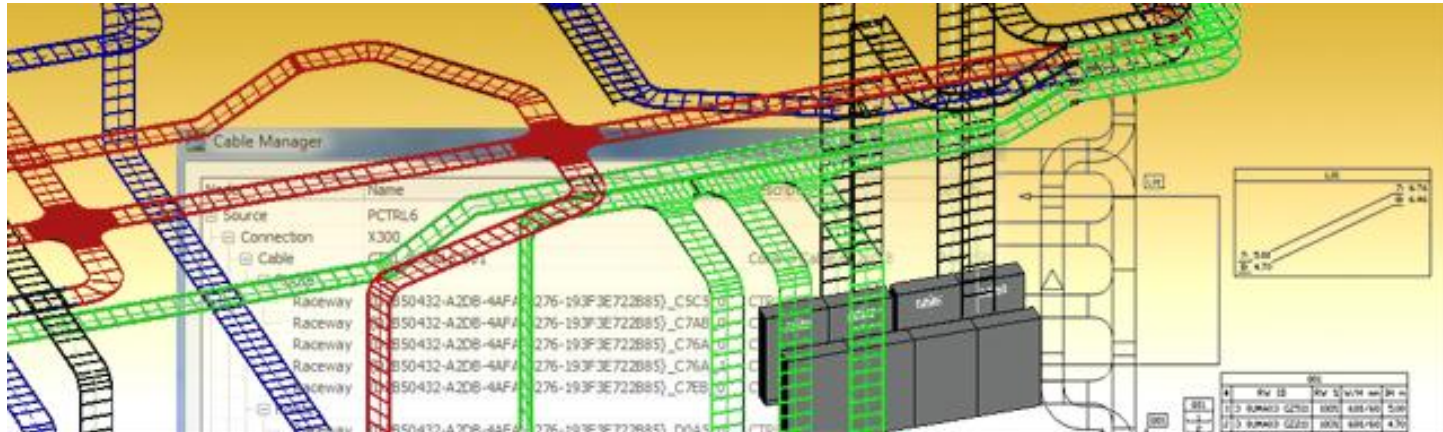


# Challenges of Raceway and Cable System Design

- **Separate, disconnected applications** for raceway design and cable routing
- **Limited, 2D design** does not adequately show spatial relations, has to be re-created in 3D
- **No intelligence in 3D design** for cable routing, material take-offs, etc.
- **Consequences:**
  - Missed schedules due to late orders
  - Longer design time
  - Re-entry of data
  - Poor collaboration
  - Error-prone design process
  - Costly re-work in construction phase



# The solution: Bentley Raceway and Cable Management V8i (BRCM)

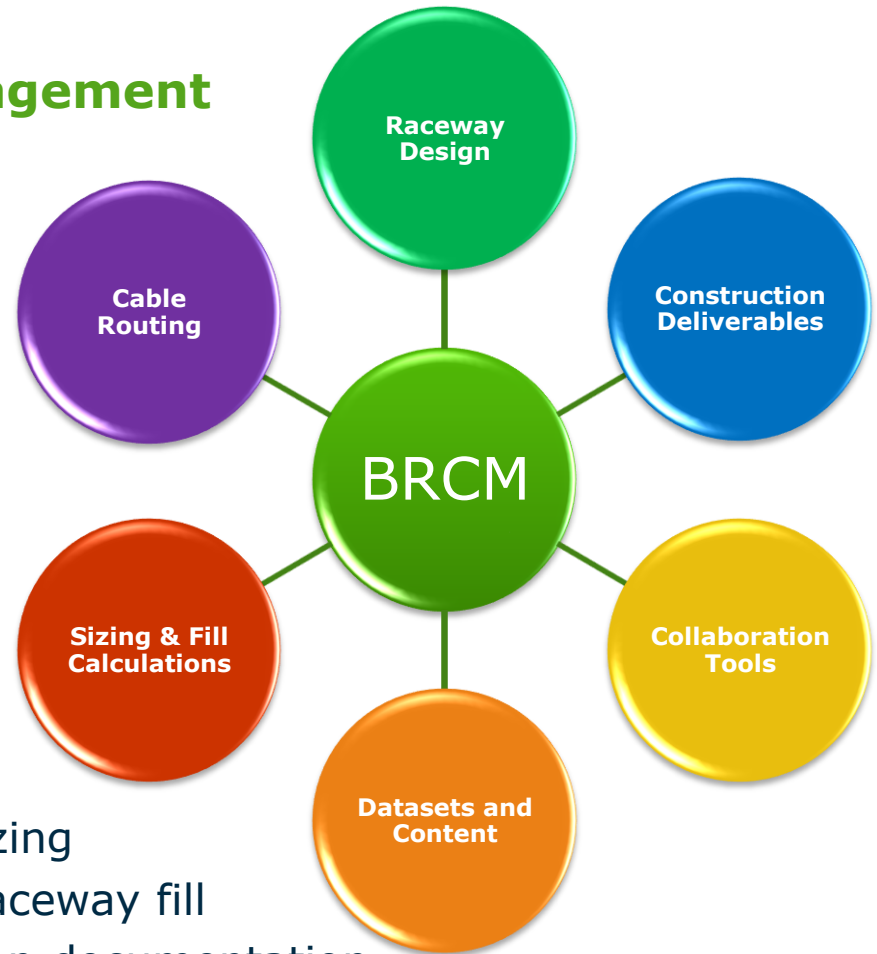


The first and only comprehensive, integrated software system that covers all phases of creating raceway and cable systems

- Start projects early
- Improve design efficiency and collaboration
- Eliminate errors and re-work
- Create accurate deliverables quickly

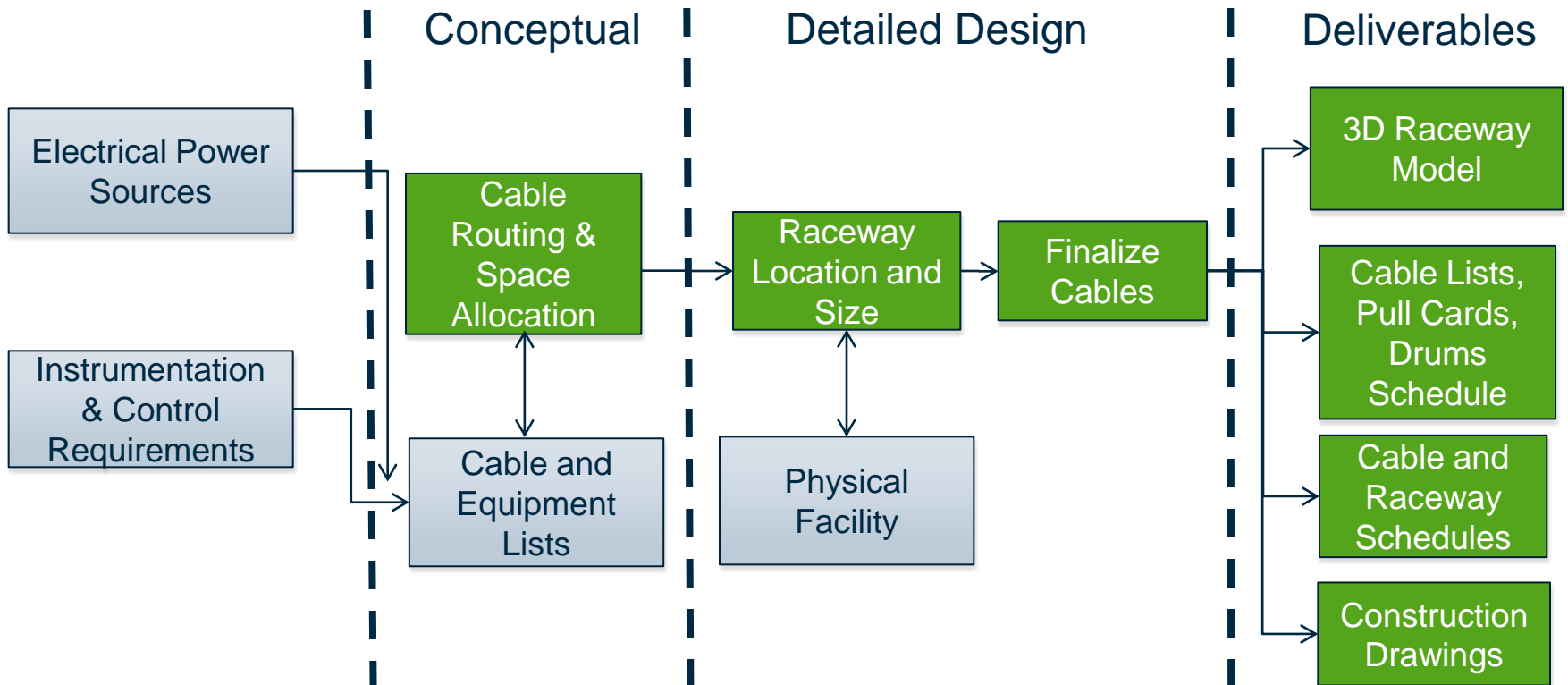
# Bentley Raceway and Cable Management

- Integrated:
  - Raceway and cable design
  - Planning/Design/Analysis/3D modeling
  - Comprehensive construction documentation
- Improved collaboration between work groups
- Eliminate errors through automated:
  - Raceway and cable routing and sizing
  - Calculation of cable lengths and raceway fill
  - Material quantities and construction documentation
- Seamless interoperability with an intelligent infrastructure model



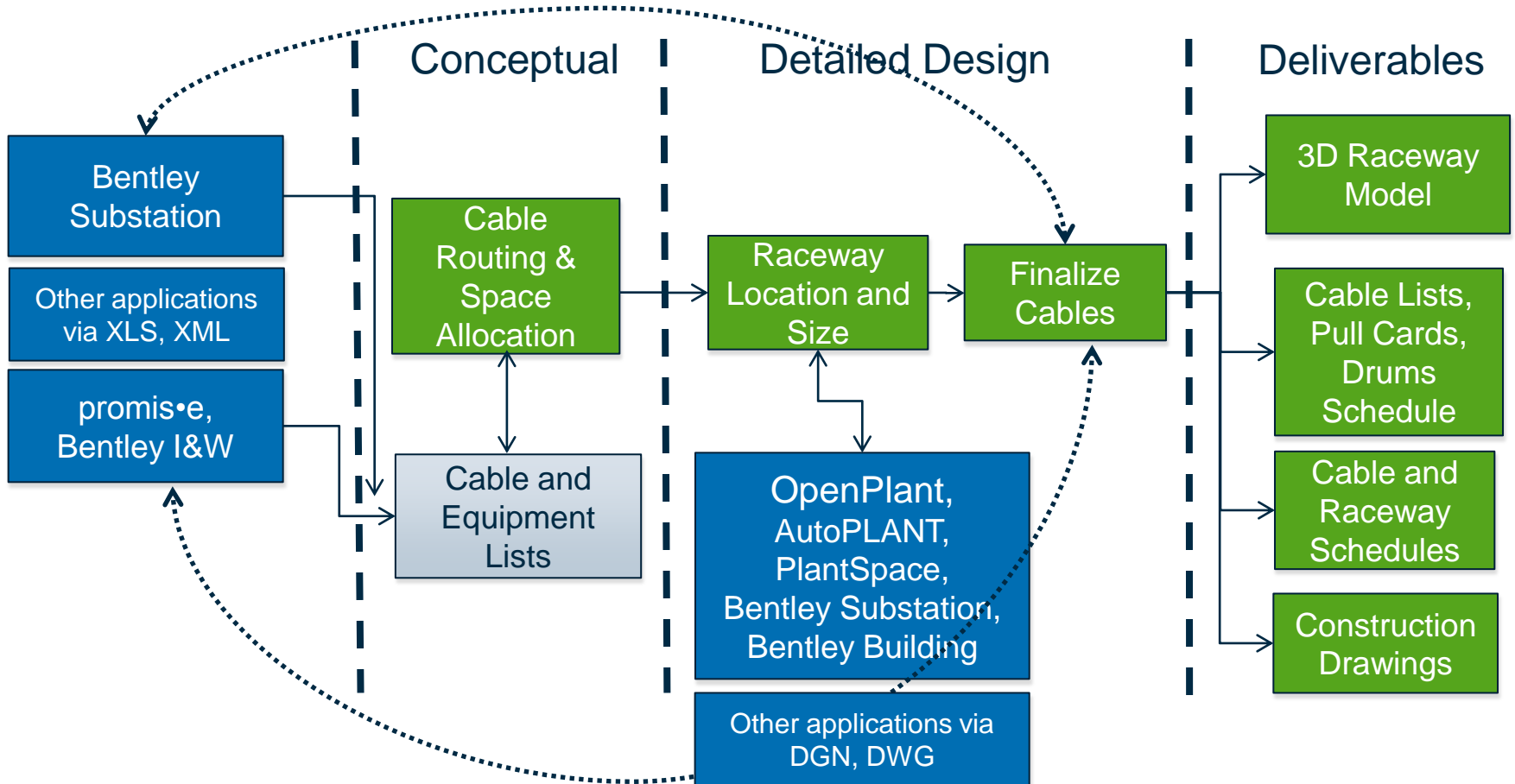
# Understanding the RCM Workflow

## Bentley Raceway and Cable Management



# Collaboration with Other Bentley Applications

## Bentley Raceway and Cable Management



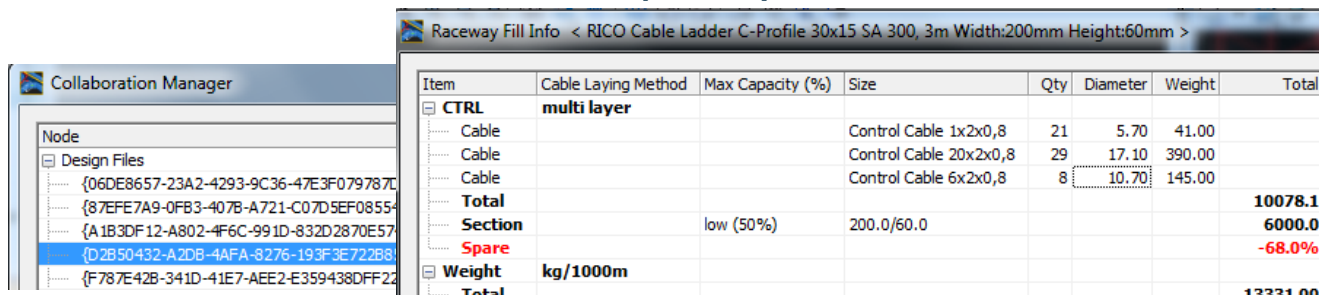
# How Bentley Raceway and Cable Management makes you more productive:

## Workflow

- Conceptual design for early project start
- Integrated project environment enables full collaboration
- Interaction with Bentley Substation, promiscue and I&W to take advantage of existing equipment, node and cable information

## Cable Routing and Management

- Optimized cable routing saves time and eliminates errors
- Cable management filters simplify cable routing and selection
- Fill factors and visual capacity feedback aids decision making



The screenshot displays two overlapping windows from the Bentley software. On the left is the 'Collaboration Manager' window, which shows a tree view of 'Design Files' with several file paths listed. On the right is the 'Raceway Fill Info' dialog box, which is titled '< RICO Cable Ladder C-Profile 30x15 SA 300, 3m Width:200mm Height:60mm >'. This dialog contains a table with the following data:

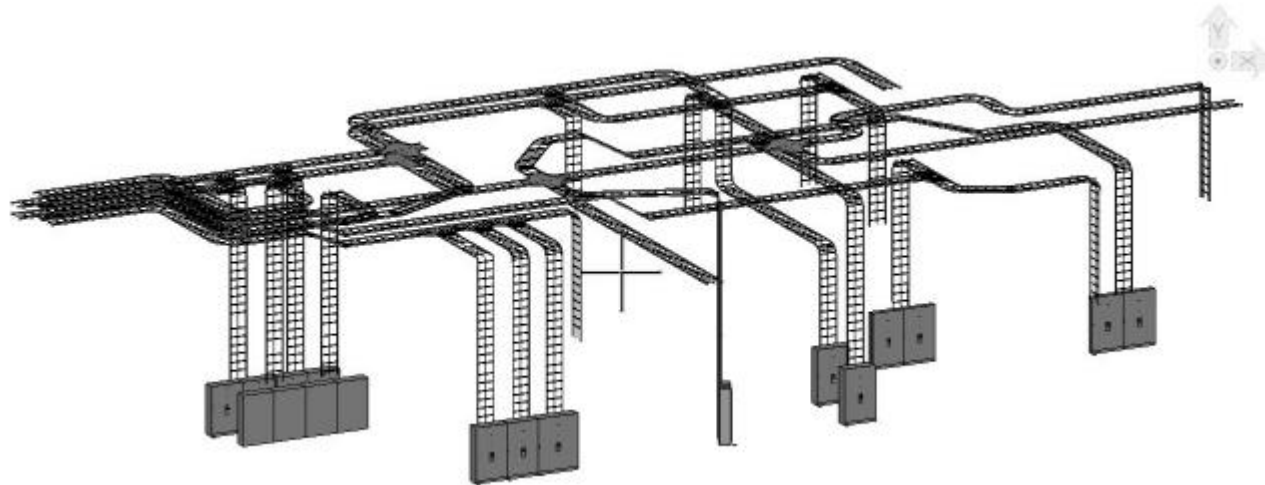
Item	Cable Laying Method	Max Capacity (%)	Size	Qty	Diameter	Weight	Total
<b>CTRL multi layer</b>							
Cable			Control Cable 1x2x0,8	21	5.70	41.00	
Cable			Control Cable 20x2x0,8	29	17.10	390.00	
Cable			Control Cable 6x2x0,8	8	10.70	145.00	
<b>Total</b>							<b>10078.1</b>
<b>Section</b>		low (50%)	200.0/60.0				<b>6000.0</b>
<b>Spare</b>							<b>-68.0%</b>
<b>Weight</b>	<b>kg/1000m</b>						
<b>Total</b>							<b>13331.00</b>



# How Bentley Raceway and Cable Management makes you more productive:

## Raceway Design

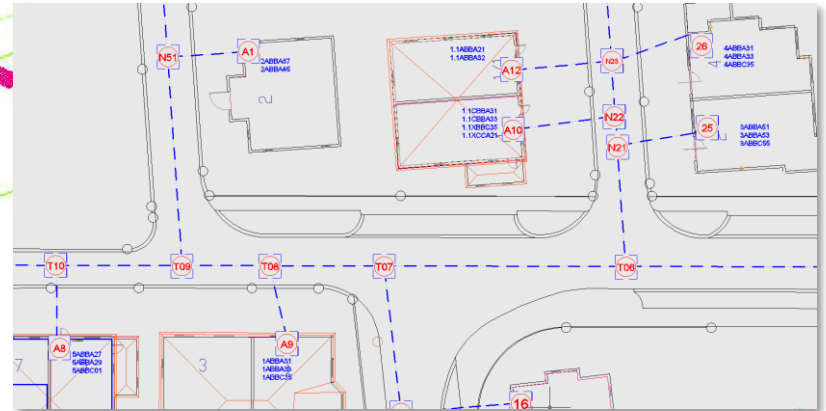
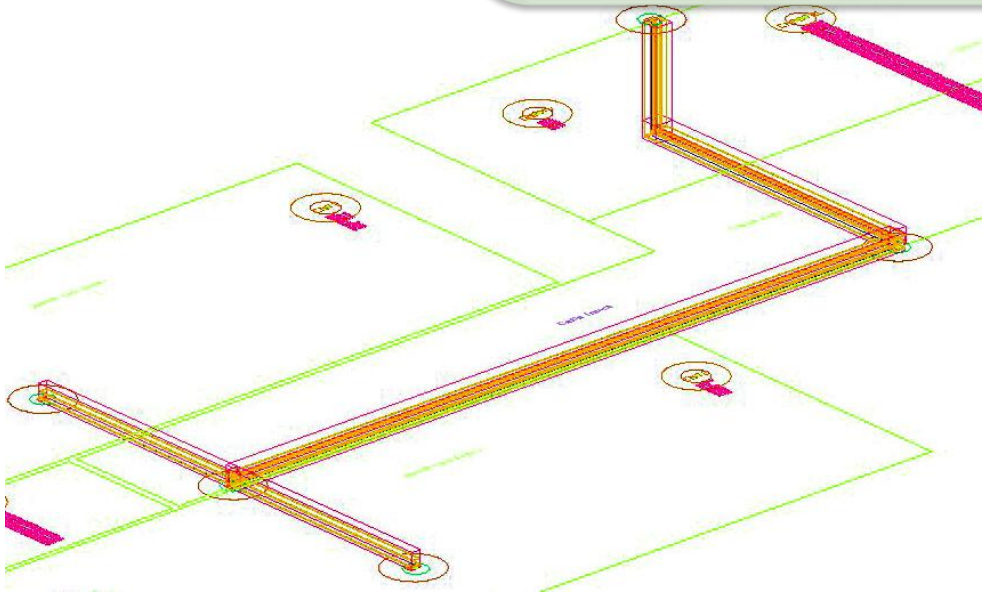
- Powerful raceway tools for accurate and efficient raceway design
- Automated raceway sizing reduces errors
- Unique raceway IDs provide detailed raceway and cable schedules
- Dynamic reporting capability for fast, up-to-date reports



# Bentley Raceway and Cable Management

## Conceptual Design

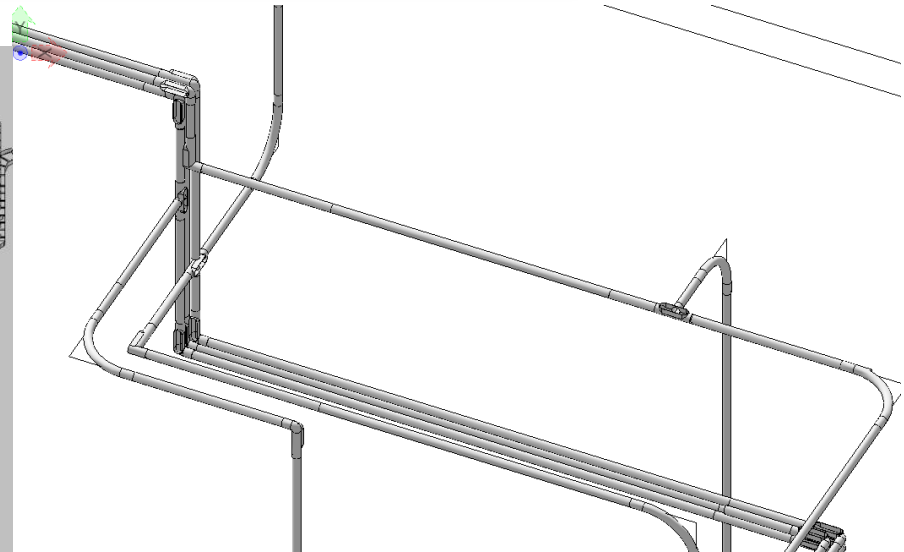
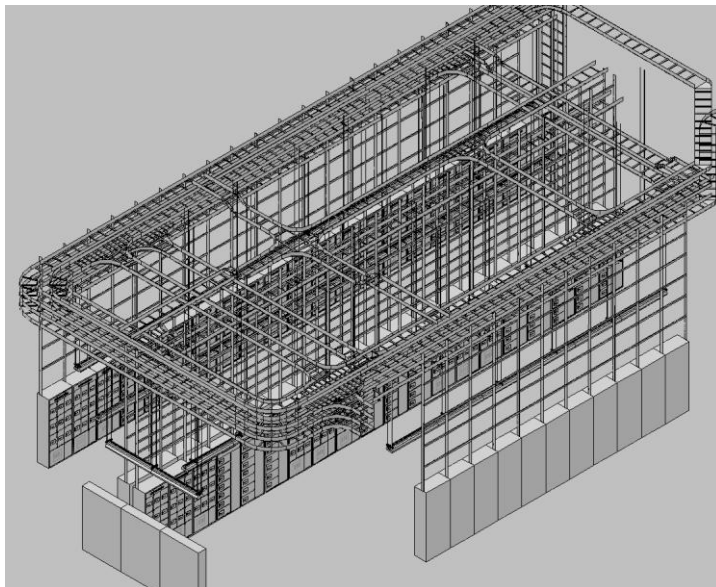
- Create accurate cable and raceway estimates early in the design cycle
- Order materials in advance to meet schedules
- Collaborate with other disciplines to allocate space for electrical systems
- Transfer data to 3D detailed design to eliminate data re-entry



# Bentley Raceway and Cable Management

## Detailed Design

- Raceway modeling
- Equipment modeling
- Cable routing
- 2D extractions



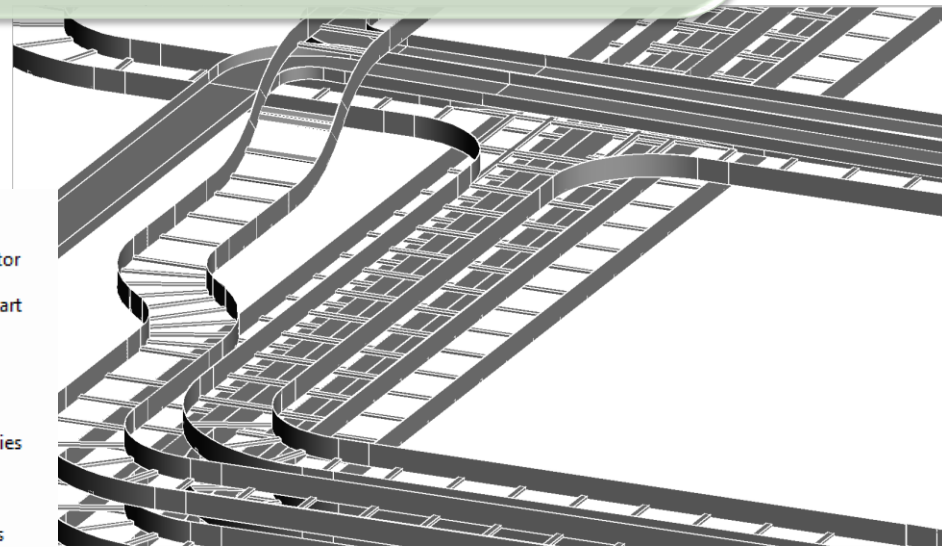
# Detailed Design

## Raceway Modeling

- Intelligent raceway with comprehensive, user-definable properties
- Parametric multi-routing raceway
- Dynamic routing and editing
- Catalogs and generic content included

Alignment	Offset (vert)	Offset (hor)	Properties
Center	0.0000	0.0000	MV
Center	0.0000	0.4000	MV
Center	0.4000	0.0000	MV
Center	0.4000	0.4000	CTRL, LV
Center	0.0000	0.0000	CTRL

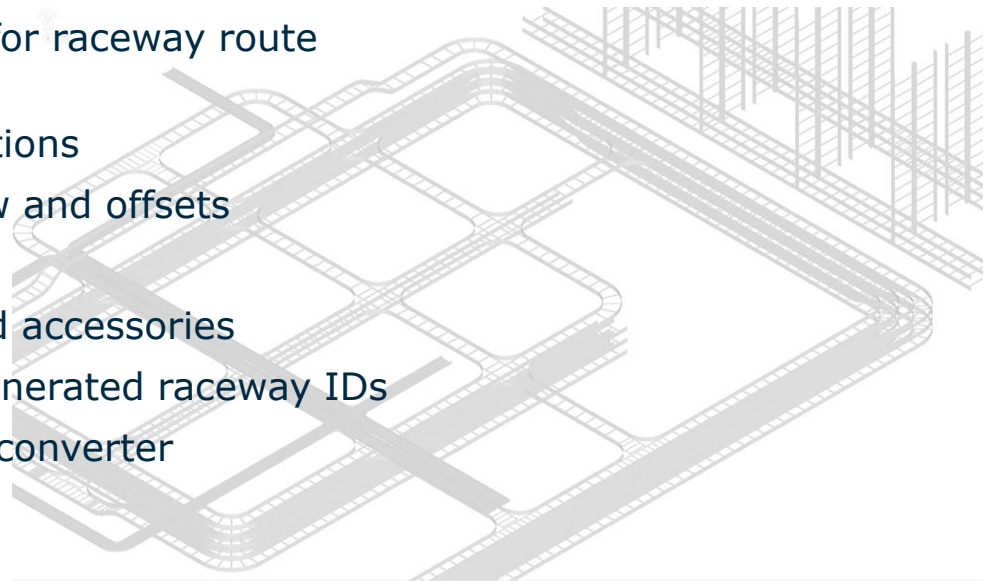
- 1 Raceway Router
- 2 Raceway Generator
- 3 Insert Raceway Part
- 4 Cut Raceway
- 5 Extend Raceway
- 6 Raceway Properties
- 7 Raceway IDs
- 8 Raceway Settings



# Detailed Design

## Raceway Modeling

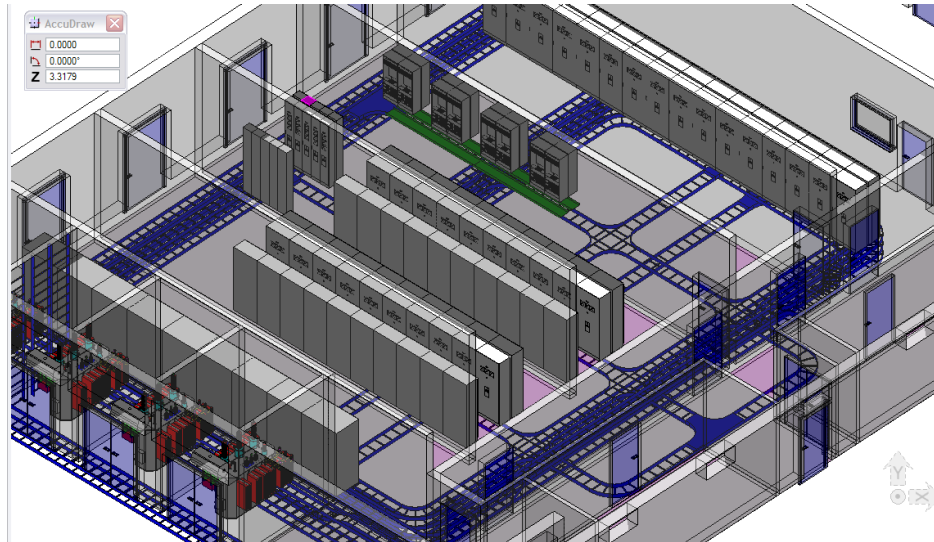
- Supports variety of raceway systems
  - Ladder and solid bottom tray, conduit, wire basket, supports, etc.
  - Underground systems: cable trenches, duct banks
  - Generic content with user-definable sizes
  - Manufacturers catalogs
- Easy-to-use 3D raceway design tools
  - AccuDraw used for raceway route definition
  - Multi-routing options
  - Dynamic preview and offsets
  - Dynamic editing
  - Tray dividers and accessories
  - Automatically generated raceway IDs
  - Line to raceway converter



# Detailed Design

## Equipment Modeling

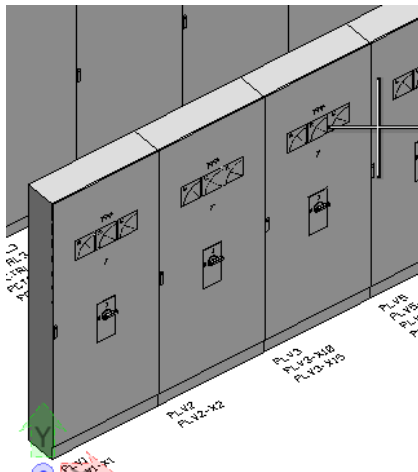
- Parametric modeling for design flexibility
- Dynamic editing for quick change management
- Equipment import from Bentley Substation



# Detailed Design

## Equipment Modeling

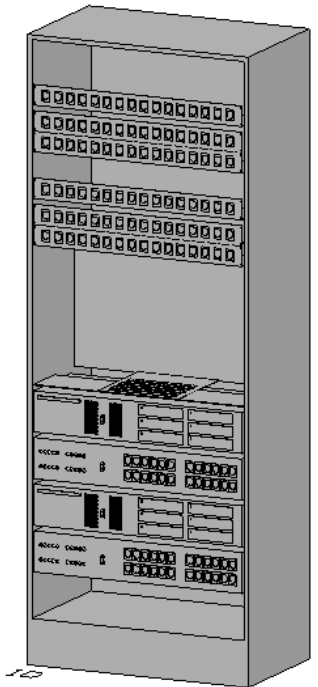
- Predefined parametric templates for electrical components (panels, transformers, motors...)
- Multiple connection points support complex devices
- Incorporate and re-use existing CAD content
- Define clearances for interference prevention and detection
- Generate accurate, detailed BOM



Output Manager

RECNO	CLASS	MANUFACTURER	DESCR	PCODE	QTY_CAD	QTY	UNIT
9	EQ		Cabinet 600x260x1800			2	
10	EQ		Door			2	
5	EQ	Belkin	Patch Panel 16xRJ45	B-PP-RJ4516		1	pcs.
6	EQ	Belkin	Patch Panel 32xRJ45	B-PP-RJ4532		1	pcs.
8	EQ	Cisco	Router			1	pcs.
7	EQ	HP	ProLiant DL 185				pcs.
4	EQ	Rittal	Cabinet				pcs.
1	RW	OBO	Cable Ladder LG45 200				pcs.
2	RW	OBO	Cable Ladder LG45 200				pcs.
3	RW	OBO	Cable Ladder LG45 200				pcs.

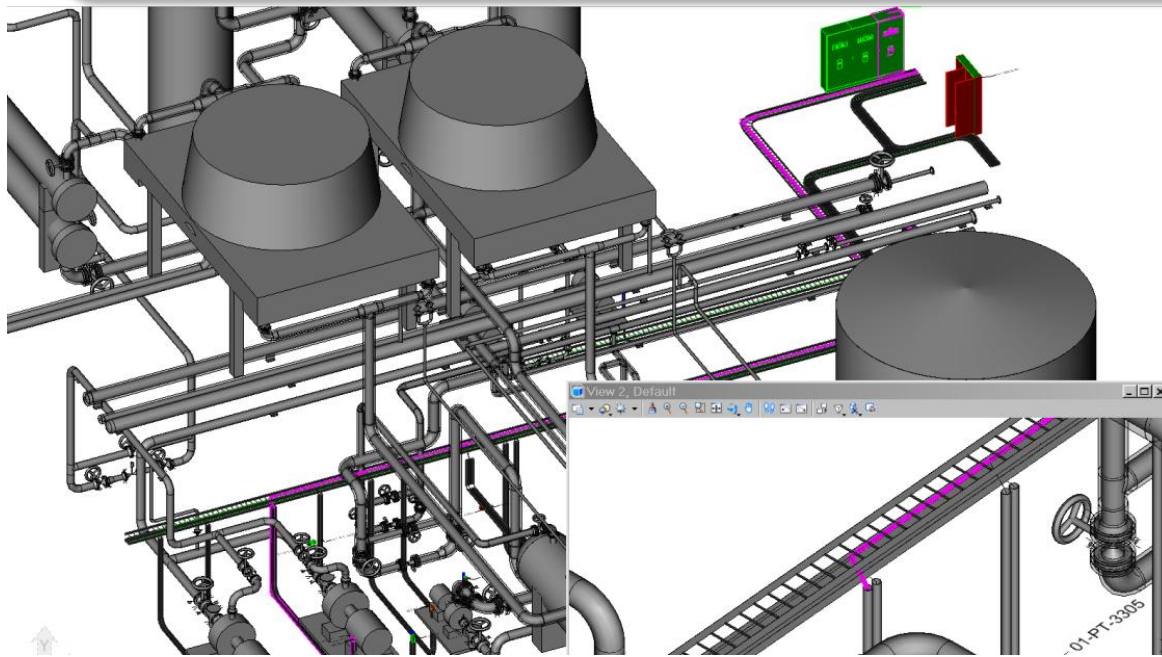
- Add Item: RJ45Connectors16x
- Add Item: RJ45Connectors32x
- Add Item: Terminal
- Add Item: Server
- Add Item: Router



# Detailed Design

## Cable Routing

- Design flexibility with manual and auto routing
- User-definable rules for automatic routing
- Automatic fill calculation and weight analysis

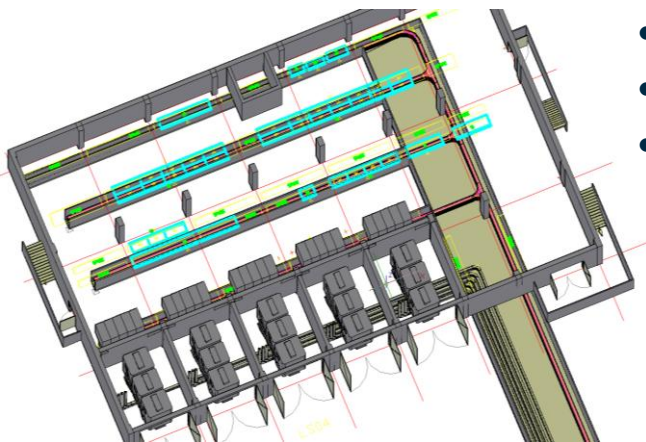




# Detailed Design

## Cable Routing

- Comprehensive rule-based cable routing engine
  - Manual or automatic routing
  - Constraint driven
    - Raceway categories (MV, LV, CTRL...)
    - Raceway fill factor, state and other user-definable constraints
  - Display Manager and filters
    - Model can be viewed per voltage levels
    - User-definable criteria for filters: cable type, source and target ID, length
  - Calculate cable size and length
    - Cables are automatically sized using internal lookup tables
    - Each routing change updates cable length
    - Additional length can be added per cable



# Detailed Design

## Cable Routing

### Auto Router

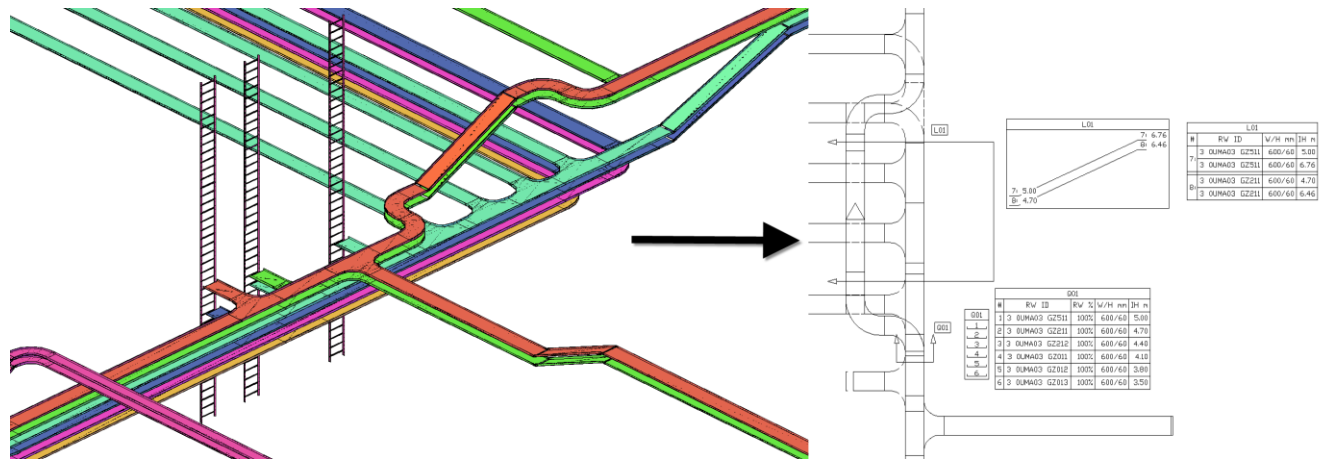
- Use in detailed or conceptual design
- Automatically finds closest applicable entry point through appropriate raceway system
- Auto route based on user-definable routing rules (raceway voltage level, spare capacity, etc.)
- All auto and manual routes can be visualized for immediate quality check
- Route optimization
  - Compare selected route with shortest orthogonal route



# Detailed Design

## 2D Extraction

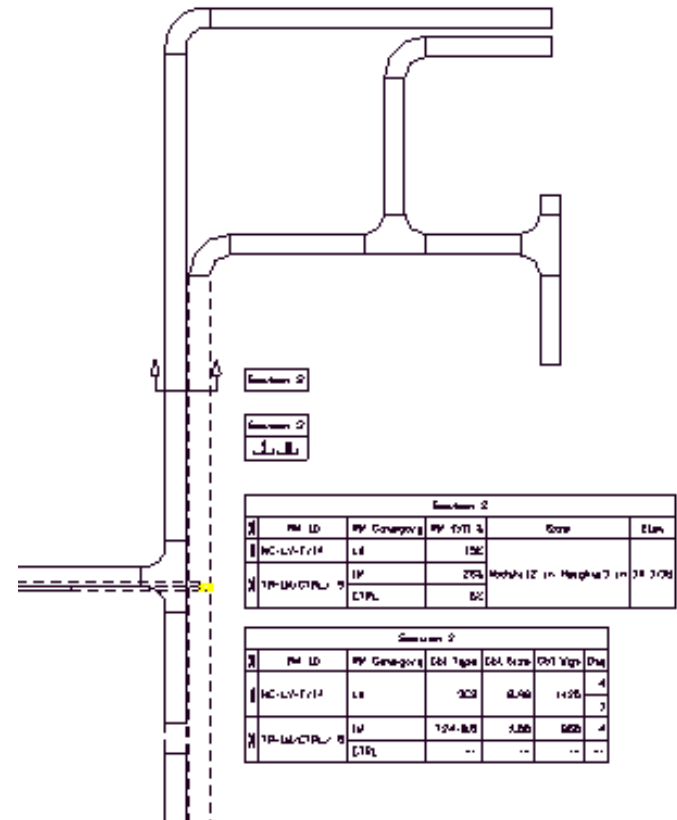
- Update Section tool for easy change management
- Section views are dynamically linked with 3D model to include cable and raceway properties



# Detailed Design

## 2D Extraction

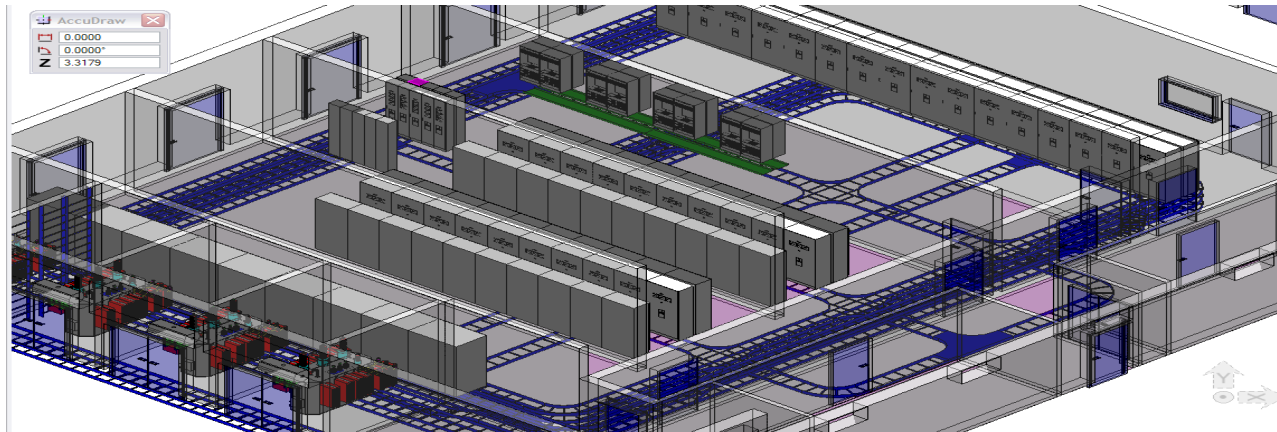
- Automatic 2D representations
  - Multi-layer
  - Vertical / Horizontal
  - Hidden details
- Dynamic sections
  - Schematic details
  - Annotations
  - Schedules
- User-definable
  - Extraction profiles
  - Cable and raceway properties



# Summary – Capabilities


## Bentley Raceway and Cable Management

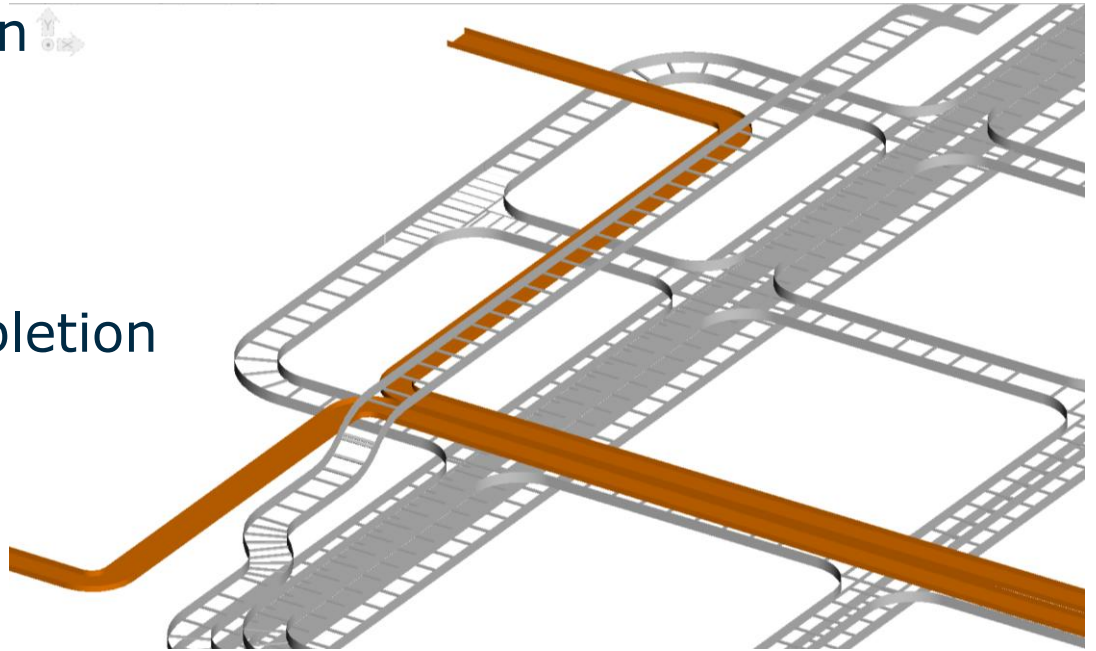
- Integrated raceway design and cable management
- Intelligent 3D raceway models
- Intelligent functions: auto-routing, auto-sizing
- Automatic, error-free report generation and construction deliverables



# Summary - Benefits

## Bentley Raceway and Cable Management

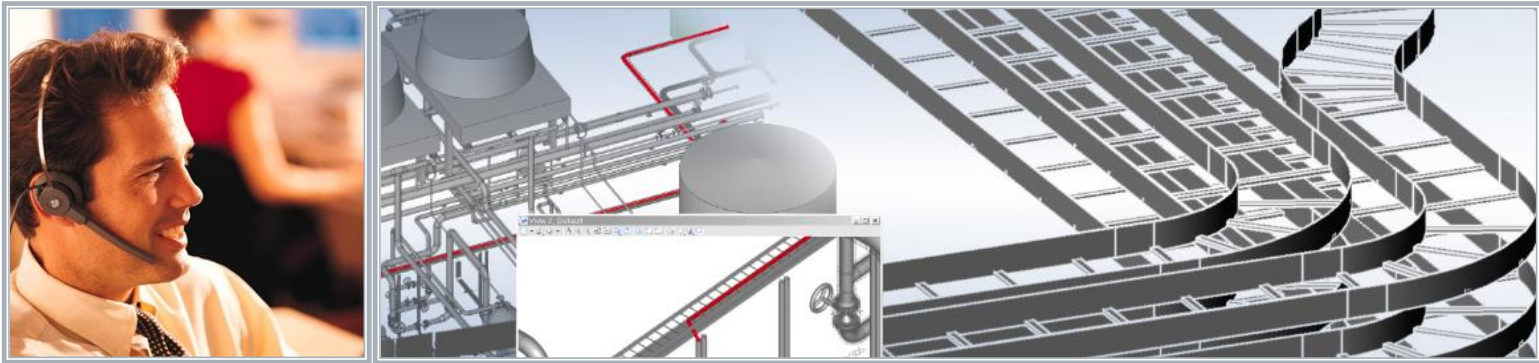
- Early material orders
- Improved efficiency
- Improved collaboration 
- Improved accuracy
- Reduced costs
- Reduced time to completion



# How to get started

## Bentley Raceway and Cable Management

- View an online eSeminar
- Visit Bentley Raceway and Cable Management web page  
[www.bentley.com/en-US/Promo/Raceway+Cable+Management/Overview](http://www.bentley.com/en-US/Promo/Raceway+Cable+Management/Overview)
- Request a detailed (online) demo



# Bentley Raceway and Cable Management

Thank you

