

# Electrical Tutorial

## Integration with SmartPlant Electrical (SPEL)



Version 2014



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## SESSION 8

# Integration with SmartPlant Electrical (SPEL)

### Objective

By the end of this session, you will be able to:

- Describe the process to retrieve cable data from SPEL into Smart 3D.

### Before Starting this Procedure

- Smart 3D Overview
- Smart 3D Common Sessions
- Electrical Overview

### Overview:

To design or create a plant in Smart 3D, you might need to reuse data from other design or authoring tools. The SmartPlant integrated environment allows you to retrieve design data from and communicate the data with different design and authoring tools, such as the tools in the SmartPlant Enterprise suite and AutoCAD. For example, you can retrieve and reuse equipment, nozzles, and piping specifications from SmartPlant P&ID. Similarly, you can retrieve cable data from SmartPlant Electrical (SPEL) to route cables along cableways, trays, and conduits in your model.

SPEL is a schematic design application that stores cable schedules. A cable schedule is a list of cables with connectivity information, such as cables connecting two types of equipment like a junction box and an electric motor and the type of cable used to make this connection.

Revision: 1  
By: RH  
Date: 11/1/97



Cable Schedule

Cable Tag	Cable Category	Cable Specification	Cable Formation	Reference Cable	Rated Voltage	Segregation Level	From Item Tag	From Subclass	From Description	From Process Equipment Item	To Item Tag	To Subclass	To Description	To Process Equipment
CP-T0	Power	Power - NEC	3 x 10 AWG + 2 x 10 AWG	3+2/C-10AWG (Power / NEC)			G-3	Generator			PDB-2	PDB		
CP-T1	Power	Power - NEC	3 x 10 AWG + 2 x 10 AWG	3+2/C-10AWG (Power / NEC)			PDB-2	PDB			T-3	Transformer		
CP-T2	Power	Power - NEC	3 x 10 AWG + 2 x 10 AWG	3+2/C-10AWG (Power / NEC)			T-3	Transformer			MP-162A	Motor		

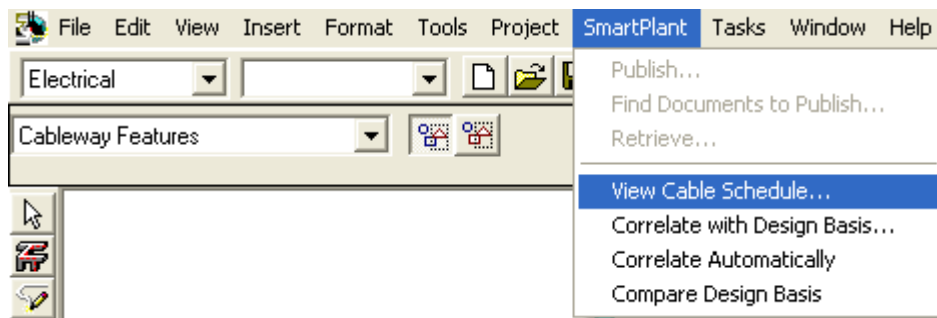
You can retrieve cable schedules from SPEL into Smart 3D to route cables. The information retrieved from SPEL is considered the design basis or design data in Smart 3D. The design basis is a collection of objects that represent pieces of data from different design and authoring tools. Smart 3D just adds graphical meaning to the design data.

After routing cables in a 3D model, the length of the cable is calculated in Smart 3D. Smart 3D then publishes the updated cable information back to SPEL where the cable will be resized or redesigned based on the length information. The process of publishing SPEL data back to Smart 3D repeats, and then updates the cable in the Smart 3D model when these cables are retrieved again.

### Retrieving Data from SPEL

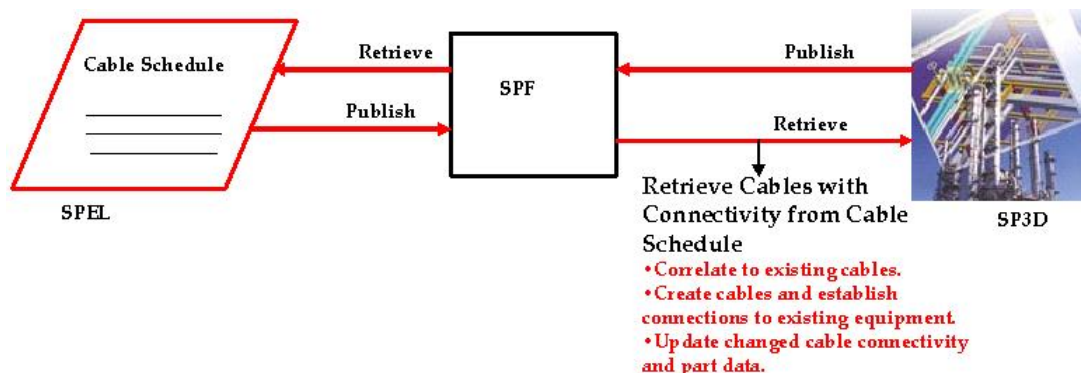
All design tools publish and retrieve data through SmartPlant Foundation (SPF). SPF acts as the central repository for data and a medium through which information is shared among other tools, such as SmartPlant Instrumentation, SmartPlant P&ID, and Smart 3D. In the integrated environment, data is published to and retrieved from a central repository. SPF enables the publishing and retrieval of the following types of data:

- **Piping and Instrumentation Diagrams (P&IDs)** - You can retrieve piping, instrumentation, and equipment data from a P&ID in an integrated environment.
- **SPEL Cable Schedules** - You can view the retrieved data, update cables, and import cables by selecting **SmartPlant > View Cable Schedule...** in the **Electrical** task in Smart 3D.

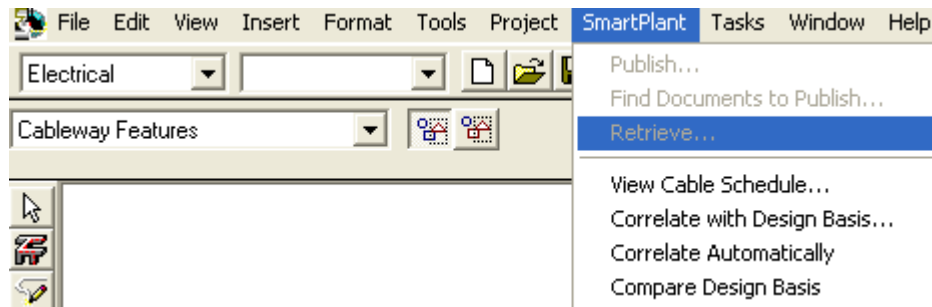


- **SmartPlant Instrumentation Dimensional Datasheets (DDPs)** - You can retrieve SmartPlant Instrumentation dimensional data for piping. Smart 3D retrieves instruments defined in SmartPlant Instrumentation and maps the instruments to a parametric symbol.
- **Plant Breakdown Structure (PBS)** - You can retrieve PBS and project documents to provide information about the models, areas, units, and projects that need to be created in Smart 3D. The PBS document published by SPF contains information about the physical model whose structure consists of plants, areas, and units.

When you retrieve cable data from SPEL, SPEL publishes the data to SPF, and Smart 3D retrieves the data from SPF. Similarly, when SPEL retrieves the updated cable data from Smart 3D, Smart 3D publishes the data to SPF. SPEL then retrieves the data from SPF.



You can select **SmartPlant > Retrieve** to retrieve data in Smart 3D. This command is enabled when you work in an integrated environment.



## Comparing Model and Design Data

The retrieved data and the Smart 3D design that is derived from the retrieved data are dynamic. They keep changing during the design of the model. It is often necessary to obtain the updated versions of the retrieved data while the 3D design is evolving. Whenever a new version of the data is retrieved into Smart 3D, you need to compare the new data with the data that exists in the model. During this comparison, you want to review the impact of changes on the model.

In Smart 3D, you can compare the differences in the property and topology values in the model and design data. The purpose of this comparison is to:

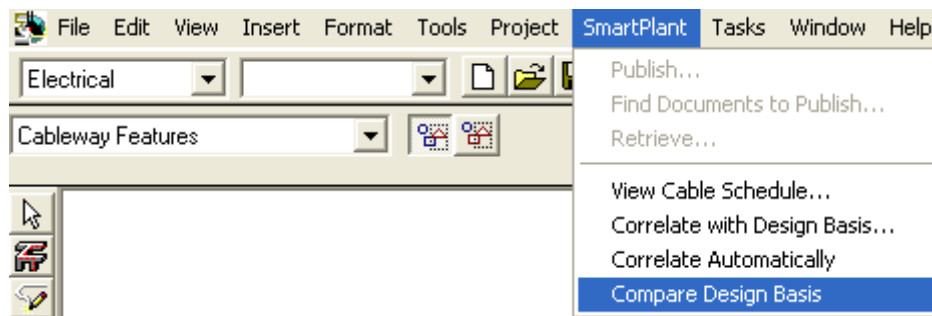
- Update the values of the mapped properties of the design and model data on the correlated objects in Smart 3D.
- Process deleted objects.

Upon comparison, you might find that the Smart 3D or model data and the design basis object or design data are in different states:

- Uncorrelated, when the model data is not related to the design data.
- Correlated, but the data does not agree. For example, a pump may be black in the model, but white in the pump design basis.
- Correlated, and the data agrees or matches.

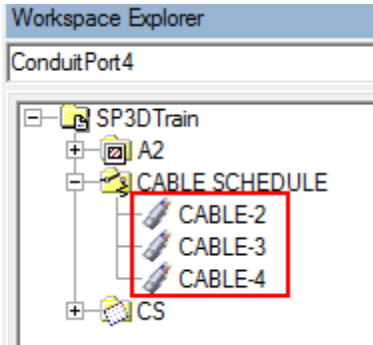
Comparing the data allows you to manage changes to 3D model objects to match the design basis objects without having to remodel. For example, you can change the pump coating requirement or the type of pump after comparing the data.

**SmartPlant > Compare Design Basis** allows you to compare the model and design data in Smart 3D. It also resolves discrepancies between the model and design data.




### Retrieve Cables from SPEL

Place new cables on the 3D model by using the cable schedule sheet supplied by SmartPlant Electrical. After retrieving the cables, they will appear in the **Workspace Explorer** as shown.

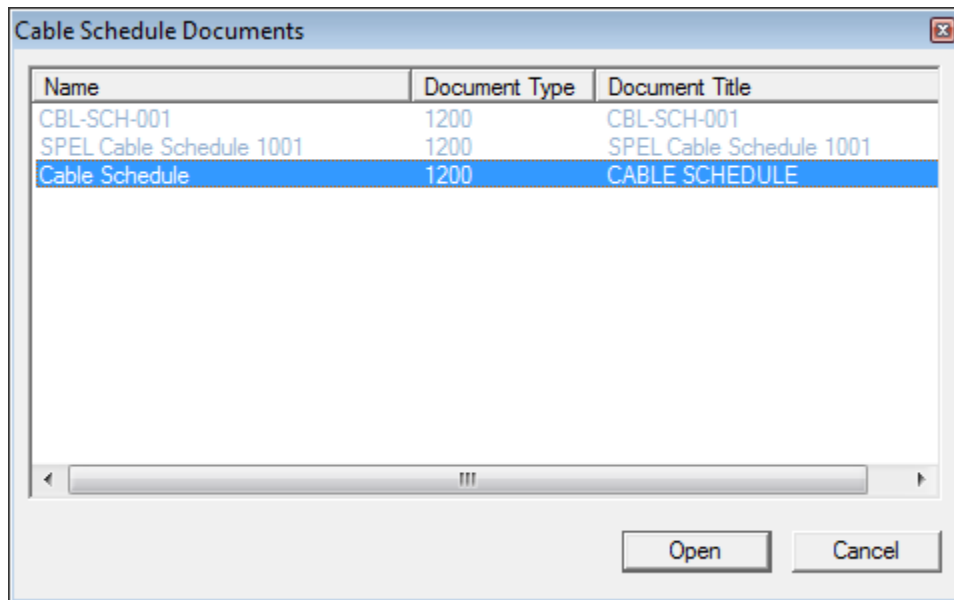


**NOTE** In an integrated environment, the Electrical task and SmartPlant Electrical can share a cable schedule, along with several cable properties.

1. Define your workspace to include all objects located in **Unit U01** and the coordinate system **U01 CS**. In your training plant, select **Plant Filters > Training Filters > U01** in the **Select Filter** dialog box.
2. On the **PinPoint** ribbon, set the active coordinate system to **U01 CS**, and click **Set Target to Origin** .
3. Select **Tasks > Electrical** to enable the **Electrical** task.
4. Set the **Active Permission Group** to **Electrical** and assign the objects that you place in the model to the Active Permission Group.
5. Select **SmartPlant > View Cable Schedule....**

*The **Cable Schedule Documents** dialog box displays.*

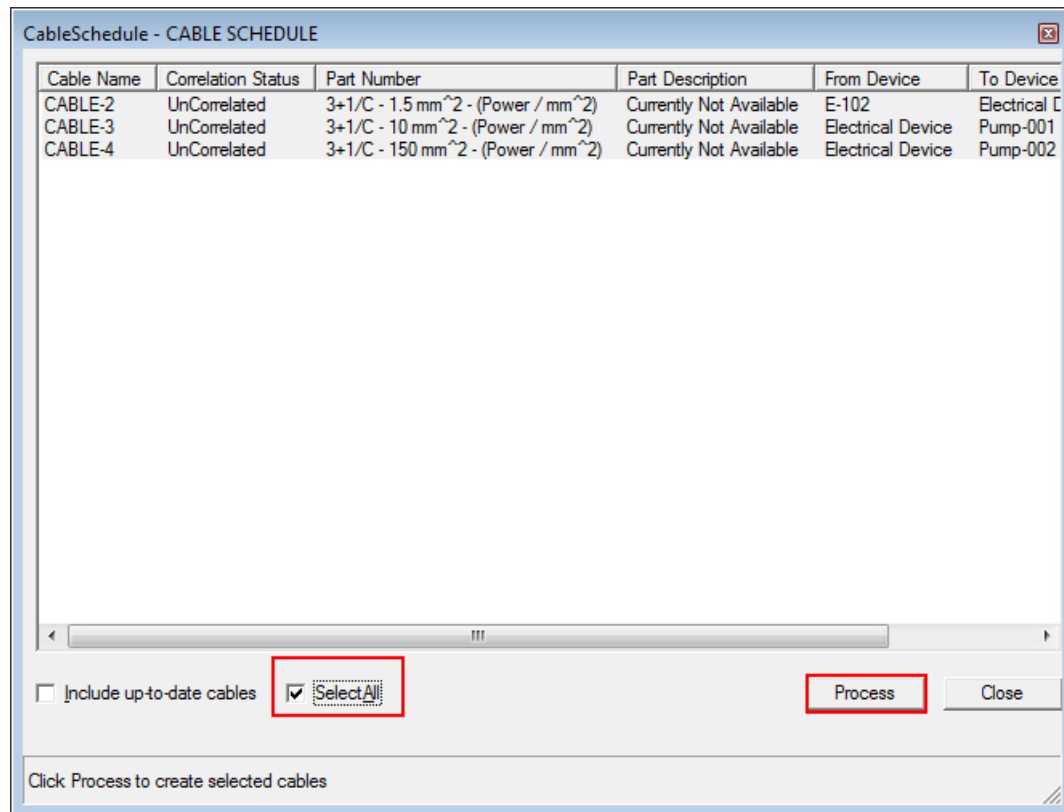
6. Select a cable schedule document and click **Open**.



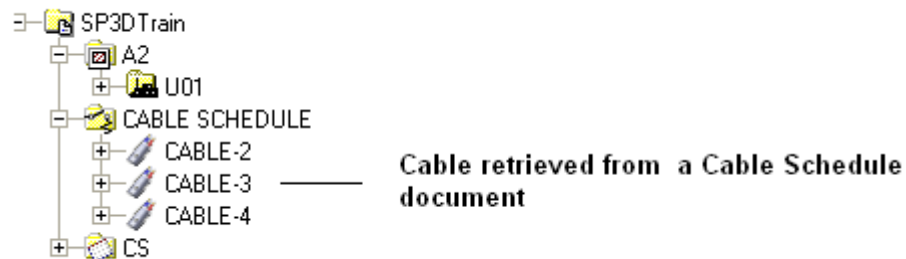
The **Cable Schedule** dialog box displays a list of retrieved cable schedules and their associated specifications.

7. Check **Select All** at the bottom of the dialog box and click **Process**.

**NOTE** To display available cables, you must have SmartPlant Client installed on your machine.



The retrieved cables display on the **Workspace Explorer** under **SP3DTrain\CABLE SCHEDULE**.



Smart 3D creates relationships between the 3D cable objects and their corresponding design basis objects.

- Click **Close**.

A new electrical system displays in the **Workspace Explorer** with the new cables.

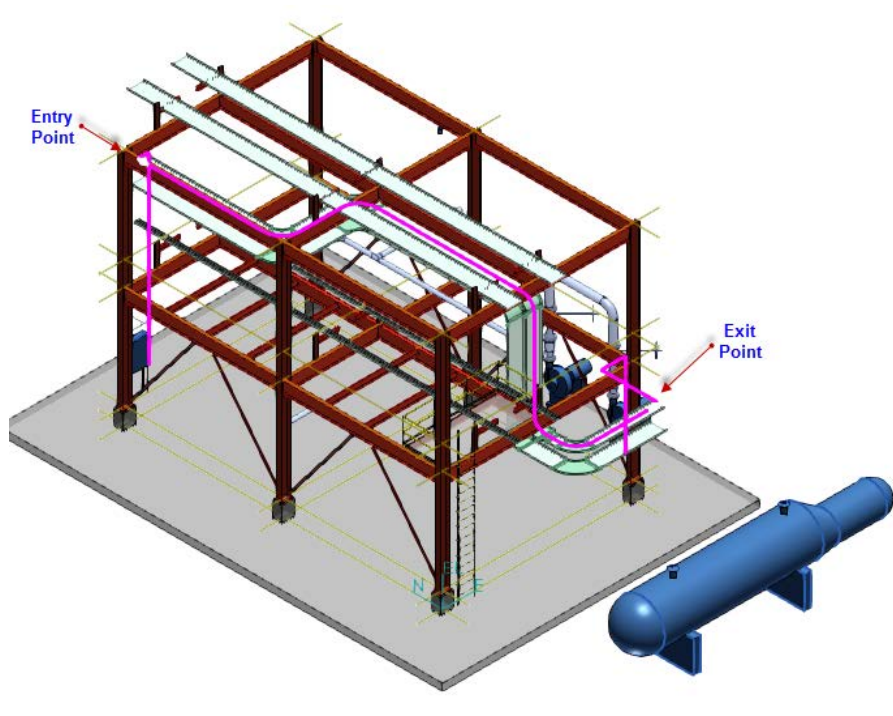
**NOTE** Smart 3D creates the cables in an electrical system with the same name as the cable schedule document. It creates a new system in case the required system does not exist. Smart 3D searches the equipment defined in the cable schedule and automatically selects



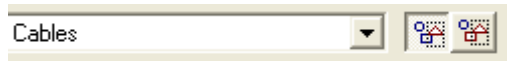
the equipment to which the new cable is connected. If the equipment is not in the model, then the cable is not created in the model.

## Route Cables Retrieved from SPEL

The next step is to route a cable retrieved from SPEL.

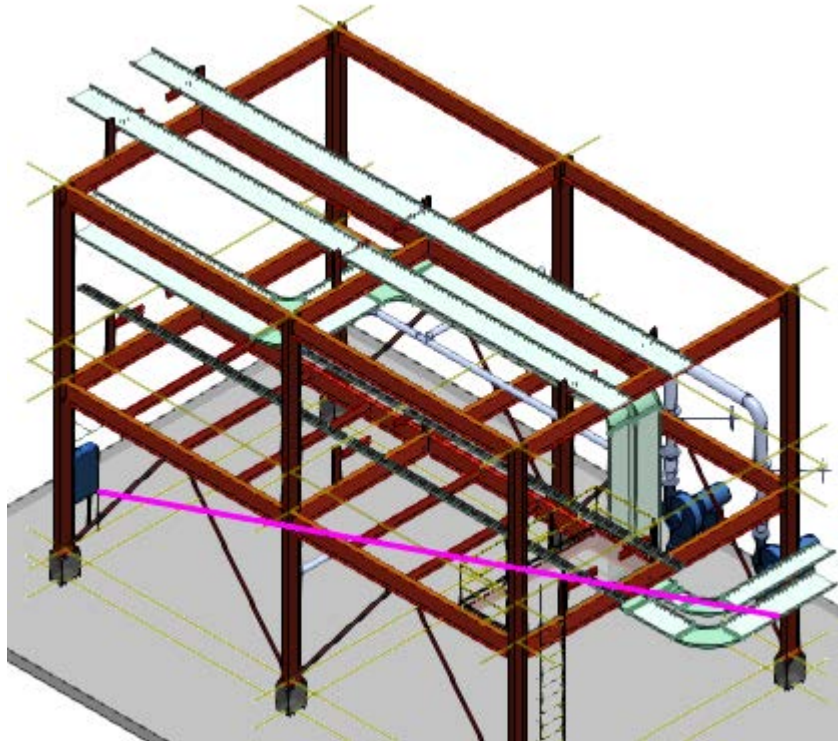


1. Under **Locate Filter**, select **Cables** to select cable objects in the model.



2. In the **Workspace Explorer**, select **CABLE-3**.

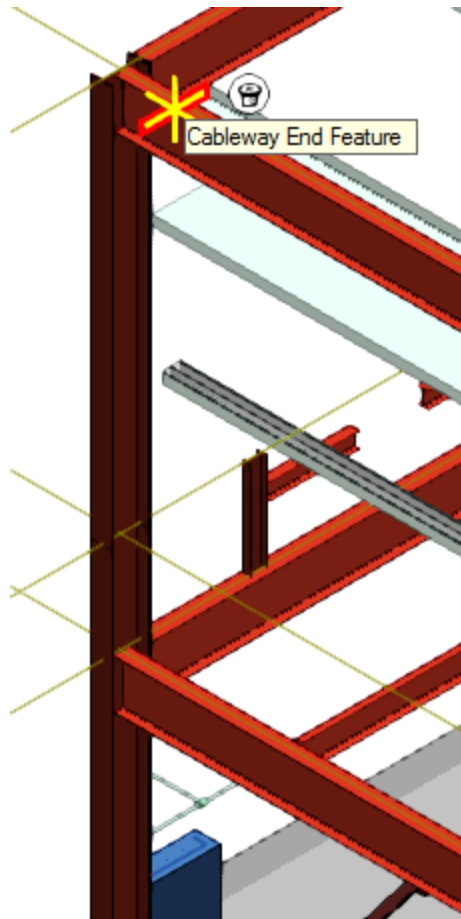
The **Edit Cable Path** ribbon displays and the cable is highlighted in the model.



3. Select **Set Entry Point** .

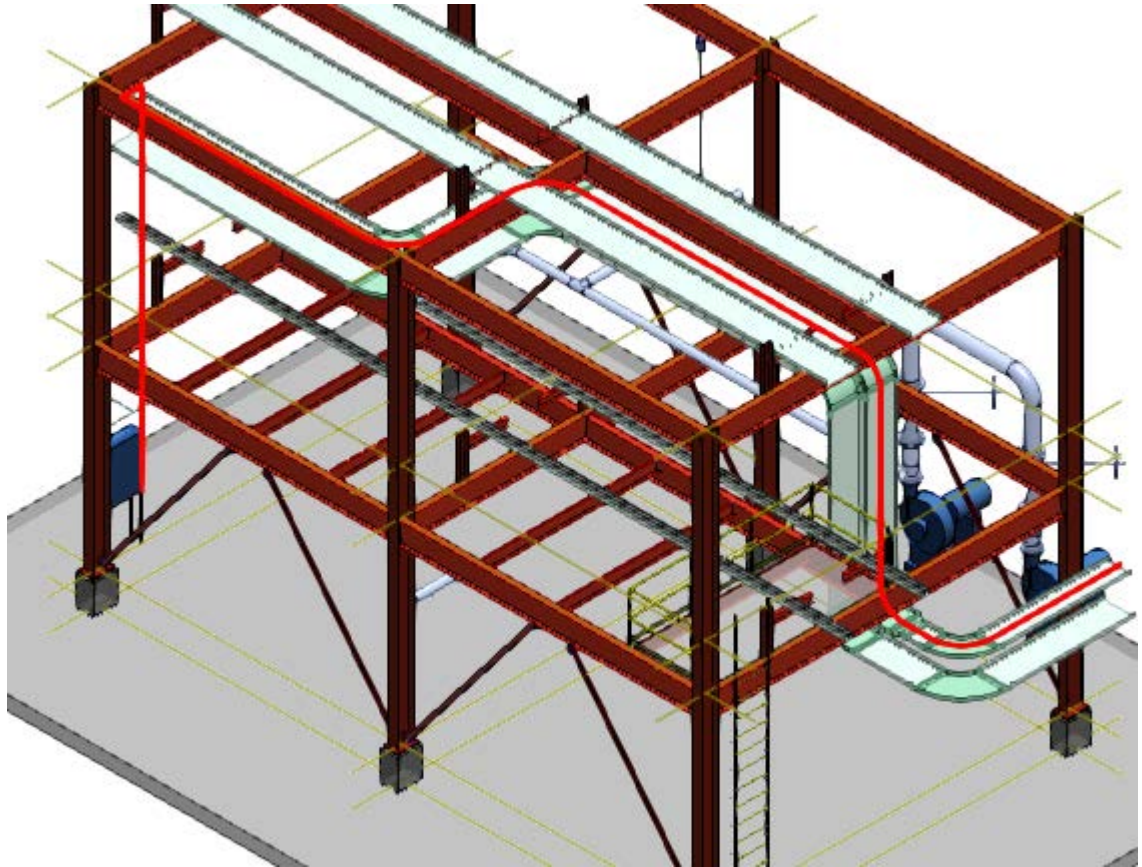
The system prompts for the entry point position on the cableway.

4. Select the end feature of the top tray above the **Electrical Device**.



*The system shows the cable path.*

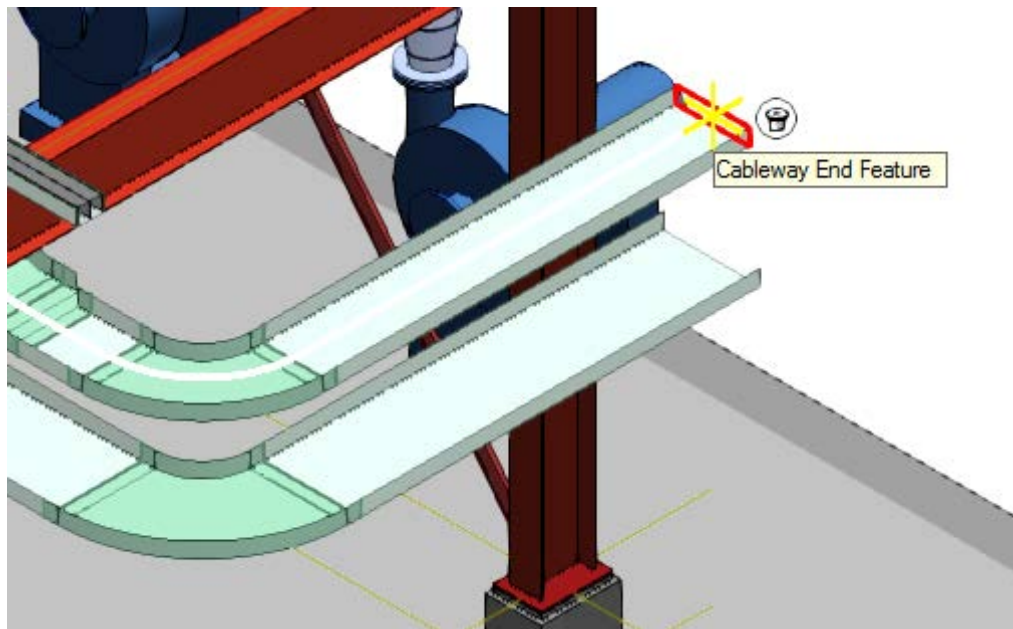
5. Ensure that the cable goes through the top tray.



6. Click **Accept Selection** ✓.

*The system prompts for the exit point position on the cableway.*

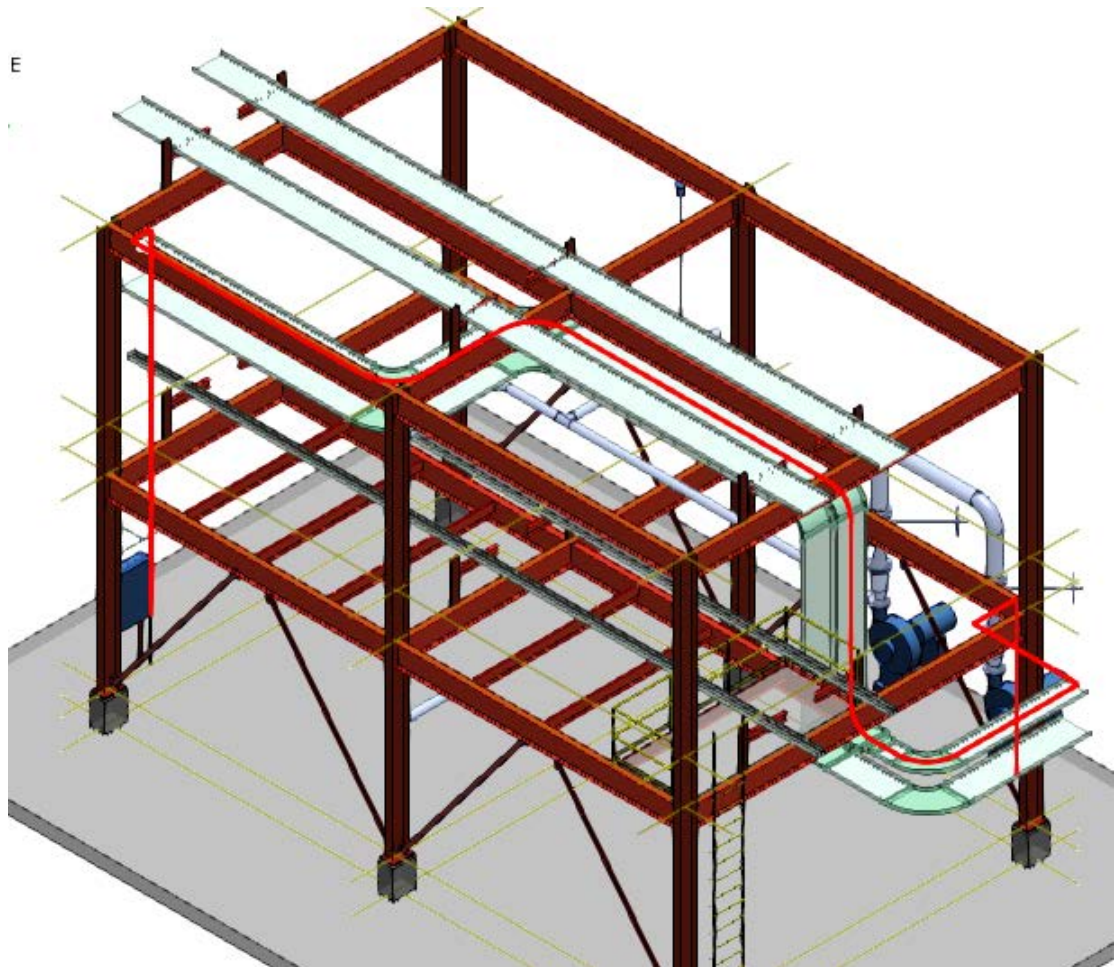
7. Select the end feature at the other end of tray as the exit point.



8. Click **Finish** to define the cable path.



9. Select the cable in the model.



10. Click **Properties**.

The **Cable Properties** dialog box displays.

**Cable Properties**

Definition | Occurrence | Configuration | Route | Relationships

Category: Standard

Property	Value
Part Number	3+1/C - 10 mm <sup>2</sup> - (Power / mm <sup>2</sup> )
Part Description	3+1/C - 10 MM <sup>2</sup> - (POWER / MM <sup>2</sup> )
Mirror Behavior Option	
Unit Weight	0.66 lbm/ft
Cable Diameter	0 ft 0.85 in
Minimum Bend Radius	0 ft 0.00 in
Number of Conductors	3
Load Rating	
Power Capacity	
Temperature Rating	75 Degc
Voltage Rating	
Impedance	
Rated Voltage	600.00 V
Cable Category	Power
Specification	Power - mm <sup>2</sup>
Formation	3 x 10 mm <sup>2</sup> + 1 x 10 mm <sup>2</sup>
Conductor Arrangement	3+1 Core Cable

OK Cancel Apply

11. Notice that the cable part number comes from the cable schedule document.

For more information related to the integration of cables with SPEL, see *Using Smart 3D in an Integrated Environment: An Overview* in the *Smart 3D Integration Reference Guide*, and *Retrieving Cable Data: An Overview* in the *Electrical User's Guide*.