



CADWorx Plant Professional #2818: SmartPlant Interoperability: delivering intelligent CADWorx models to Smart 3D projects

CADWorx interoperability with Smart 3D
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Contents

| | |
|---|-----------|
| Workshop..... | 3 |
| Overview | 3 |
| Objective | 3 |
| Outline | 3 |
| Getting started..... | 4 |
| Logging in to the VM..... | 4 |
| SmartPlant Interop Publisher: translating a CADWorx model with intelligence..... | 5 |
| About the CADWorx model | 5 |
| Model organization..... | 6 |
| Explore SmartPlant Interop Publisher | 6 |
| Project Settings | 7 |
| Translation Settings | 8 |
| Translate CADWorx model (AutoCAD DWG) | 10 |
| Visualize a CADWorx model in SmartPlant Review | 14 |
| Querying model properties / attributes | 17 |
| Attaching a CADWorx model to Smart 3D using Project Management | 19 |
| Attach CADWorx (reference 3D) model | 19 |
| Applying a transformation..... | 24 |
| Working with a CADWorx model in Smart 3D..... | 27 |
| Navigation and model view manipulation | 27 |
| Defining the workspace..... | 27 |
| Applying Surface Style Rules..... | 29 |
| Showing and hiding CADWorx model elements | 30 |
| Querying CADWorx model properties in Smart 3D | 31 |
| Routing a Smart 3D pipe from an intelligent CADWorx nozzle | 34 |
| Activate Interference Checking | 34 |
| Routing a Pipeline | 35 |
| Generating a piping isometric | 43 |
| Complementary workshop | 48 |
| Appendix I: Translating 3D models with SmartPlant Interop Publisher | 49 |
| Description and Business Value..... | 49 |
| Business Value | 50 |

| | |
|---|----|
| Translating CADWorx models to Smart 3D: MicroStation pre-requisite..... | 50 |
| Supported Formats | 51 |

Workshop

Overview

Joint venture projects typically involve a number of contractors. Projects primarily executed in Smart 3D, will receive models - process units, design packages, skid units etc. – produced by smaller contractors designed in other systems having different model formats.

Ultimately, all models need to be brought together into a single view, to enable pipe routes to be completed, ties to be made, hook-ups at interfaces to be verified, obstructions and clashes to be detected and rectified, and to generate final isometrics and bills of materials.

Supporting this workflow, and ultimately providing a comprehensive model handover to the owner operator, SmartPlant Interoperability, provided via SmartPlant Interop Publisher, enables Intergraph's own and 3rd party model formats to be brought together in Smart 3D. In this workshop, you'll step through the entire process to see how easy it is to introduce a CADWorx model including its intelligence into an existing Smart 3D environment.

Objective

The primary objective of this workshop is to show you that a CADWorx model can be transferred to Smart 3D with intelligence. Please note that it is not the intention of this workshop to teach you how to use or model in Smart 3D.

Outline

During this session you will learn how

- A multi-discipline CADWorx model must be prepared for transfer to Smart 3D
- To process CADWorx design files through SmartPlant Interop Publisher to provide input for SmartPlant Review and Smart 3D
- To review the CADWorx model in SmartPlant Review
- To use Project Management to
 - Attach a CADWorx model to Smart 3D
 - Apply a transformation (position, scale, rotate) to the CADWorx model
- Work with the CADWorx model in Smart 3D
 - Define the workspace view to display the CADWorx model as part of a larger Smart 3D model
 - Change the display of the CADWorx model's surfaces/colors
 - Show and hide CADWorx model objects
 - View CADWorx model properties / attributes

Time permitting, you will also learn about the following in Smart 3D...

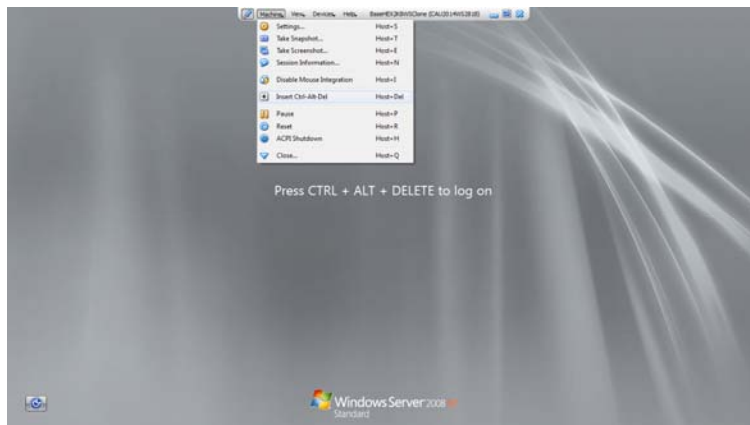
- Creating and routing a pipeline
- Interference checking
- Generating piping isometrics

Note. Should you run out of time but still wish to complete this workshop whilst at the conference...providing no other workshop sessions are running in this room...you're welcome to come back to this room to continue with any part of this workshop that you were unable to finish in the allotted time. No one else will use your VM, so you will be able pick-up exactly where you stopped.

Getting started

Logging in to the VM

If the VM is not already logged in for you, choose Insert Ctrl-Alt-Del from the Machine menu that pops-down when you move the mouse cursor to the top of the screen.



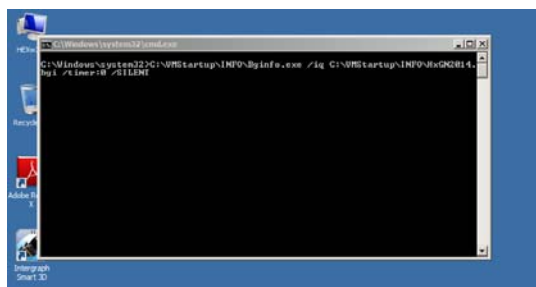
Double click on the S3DAdmin user



and enter password - **HxGN.2014**

Note. Sometimes the Caps Lock control is reversed by Oracle Virtual Box. You may find this to be the case on your system. If it is, caps will be on when the lock is off, and caps will be off when the lock is on.

You will be logged in and the first thing you will see is a command window. You need to wait for this to close before continuing.



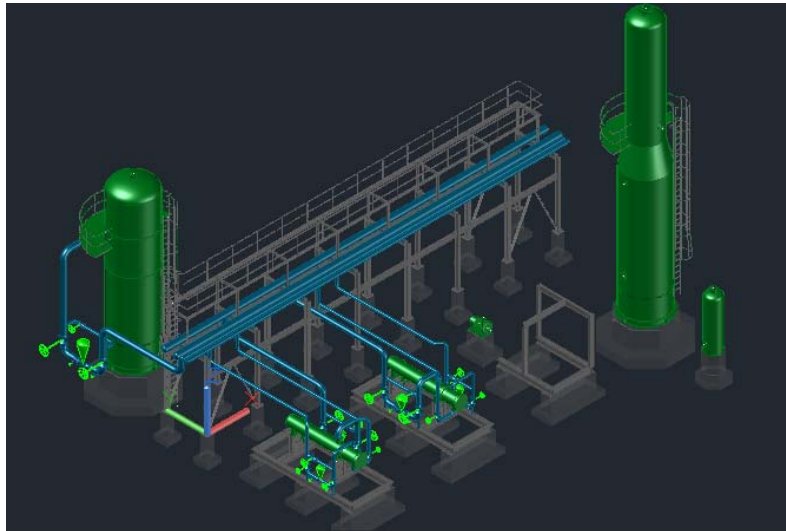
Let's get started!

SmartPlant Interop Publisher: translating a CADWorx model with intelligence

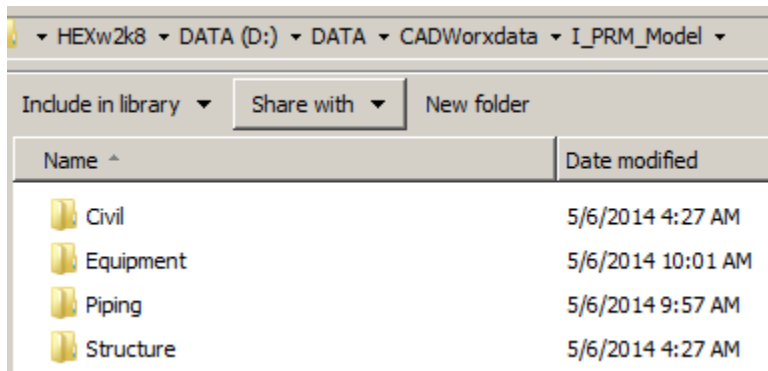
Note. You should spend no more than 10mins on this section.

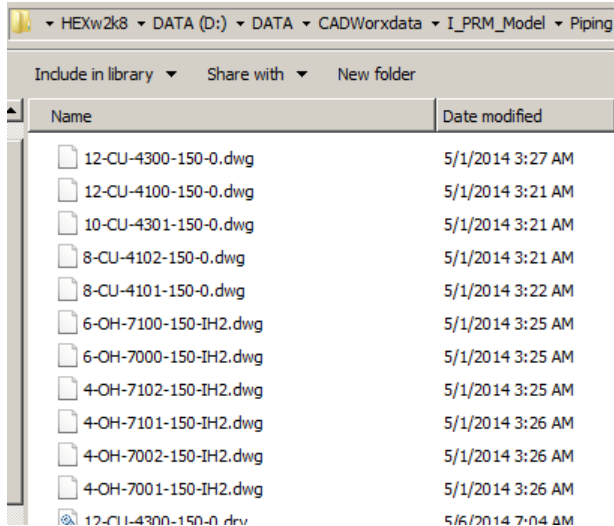
About the CADWorx model

You are going to translate this CADWorx (demo) model via SmartPlant Interop Publisher to create input files needed for SmartPlant Review and Smart 3D.



Note. Only the design files are needed for this workshop, therefore CADWorx is not installed on the VM.





Model organization

As you would expect, it's important to ensure before handing over your CADWorx model to an EPC who is using Smart 3D that all design files have the correct content, and the design files themselves are stored in a folder structure that represents the plant breakdown structure. It will then be possible for the EPC who takes delivery of your model to replicate and create the same breakdown structure under the Reference 3D tab in Smart 3D.

Note. In the example that follows, although you start with the design files stored in discipline folders, this structure is not maintained in Smart 3D.

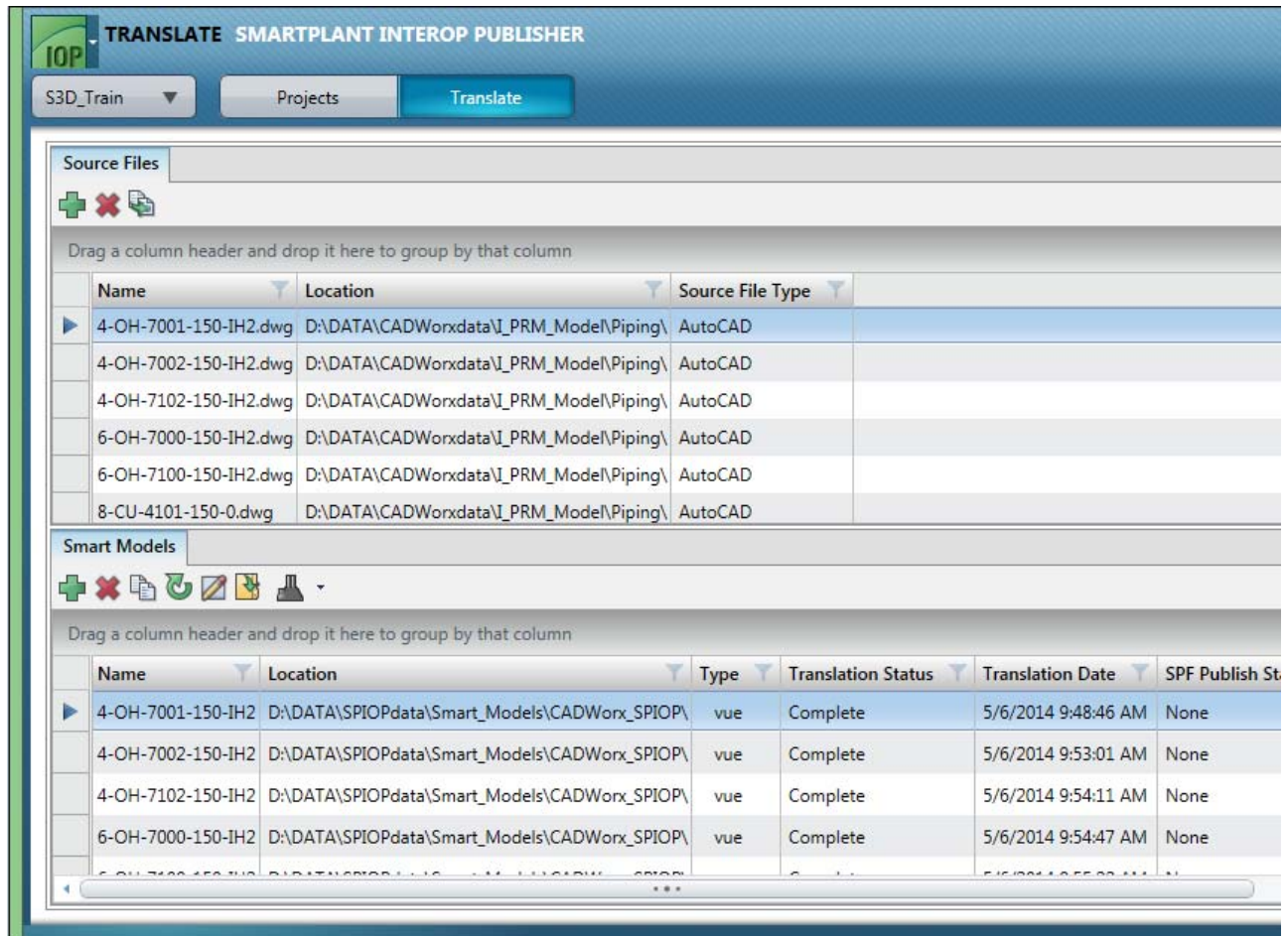
Explore SmartPlant Interop Publisher

Double click



You'll notice that the main window is split into two sections, one containing the Source Files (inputs) and one containing the Smart Models (outputs).

You will see that several of the files you will work with during this workshop are already processed and listed in view below



Note. Time is limited during this workshop so the files you are going to work with throughout are provided in a partially complete state.

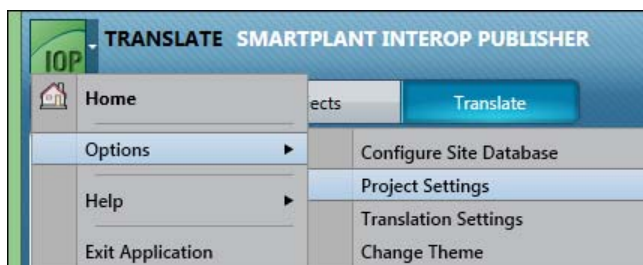
Project Settings

Take a quick look at the Project Settings...

Click on



then select Project Settings from the pop-out menus



This dialogue appears

Project Settings
S3D_Train

Smart Model Location: D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP

Project Schema: C:\Program Files\SmartPlant\Interop Publisher\SPRSchema.txt

Label Schema: C:\Program Files\SmartPlant\Interop Publisher\SPRLabelSchema.

SmartPlant Review Site Name: Hexagon

SmartPlant Review Site ID: HxGN

Logging Options: Detailed Log

Log File Location: C:\Temp

Mapping Options: Generic

Mapping Files Location: C:\Program Files\SmartPlant\Interop Publisher\3DInteropMappir

Target Applications: ☒ SmartPlant Review, ☐ SmartPlant Foundation, ☒ Smart 3D

Graphic Options: ☒ Keep lines and line strings, ☐ Turn on validation

Concurrent Translations: 1

Buttons: Cancel, Save

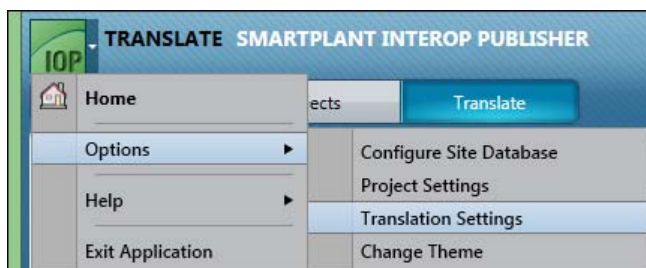
The main options to note are

- **Smart Model Location** – this is where the translated data will be saved on disk
- **Mapping Options** – used to set either the default mapping configuration supplied out of the box, or, to choose a custom mapping developed by the user
- **Target Applications** – used to specify what outputs are created, in this case only the files for SmartPlant Review (MDB2, VUE) and Smart 3D (IOP, ZVF) will be output.

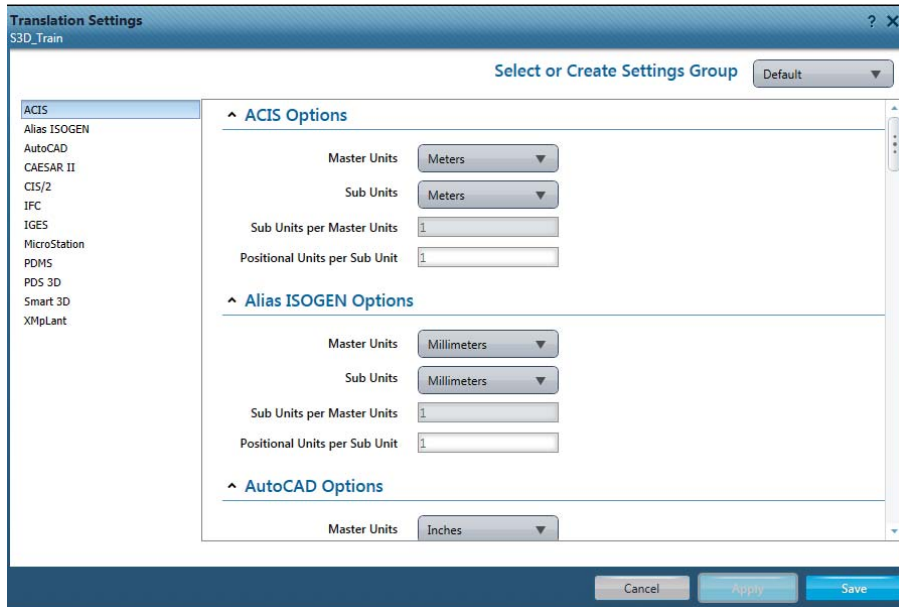
Click Cancel to close the dialogue and to return to the main window.

Translation Settings

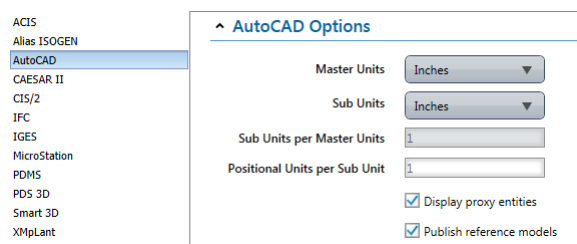
Take a quick look at the Translation Settings



This dialogue appears



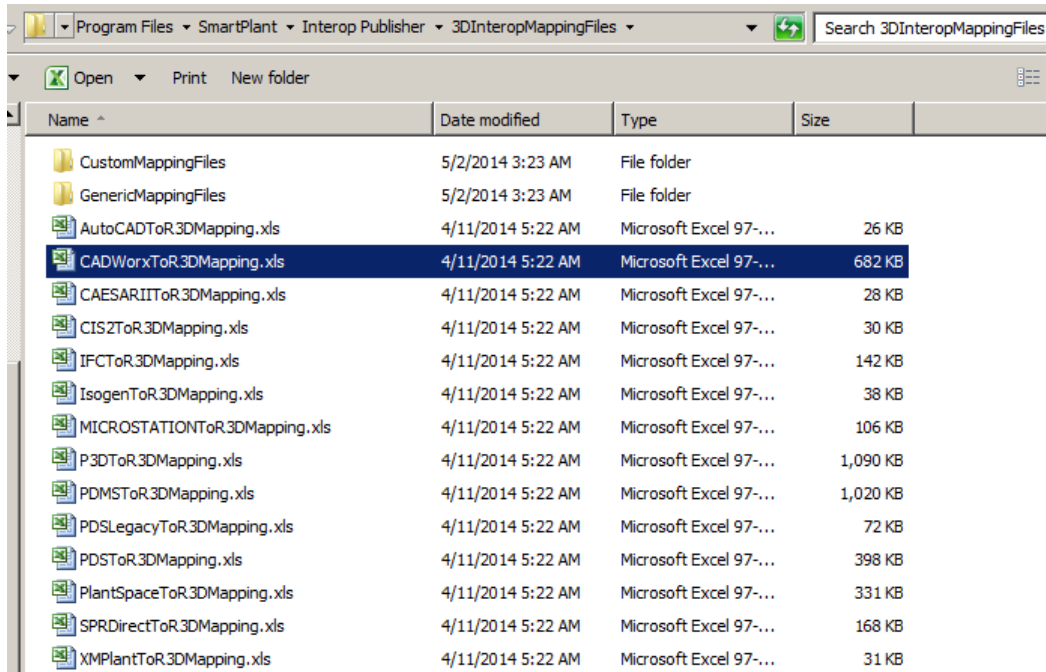
Select AutoCAD from the list and the window updates to show the current saved settings for AutoCAD under the Default Settings Group



Note. The CADWorx model is in imperial units (bores=inches and lengths=inches). This doesn't matter to Smart 3D, in fact later, you will work in bores=inches and lengths=mm.

Click Cancel to return to the main window.

Note. You're probably wondering why there isn't an entry for CADWorx in the list. Well, CADWorx models are AutoCAD design files, so only this option is required in the software. SmartPlant Interop Publisher can automatically detect whether it is translating a native AutoCAD file, or an AutoCAD file containing CADWorx objects and associated attribution. It will also automatically select and use the appropriate mapping configuration from those supplied out of the box.



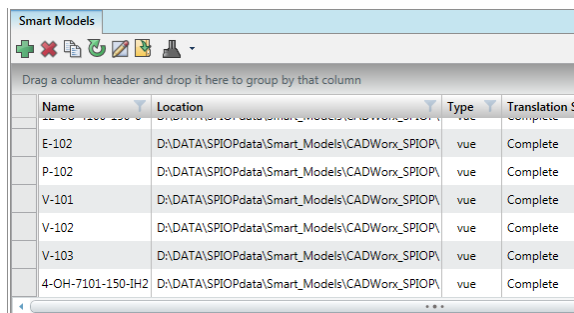
Translate CADWorx model (AutoCAD DWG)

Note. Processing of data held in a CADWorx project database is not supported currently, only the design files are processed.

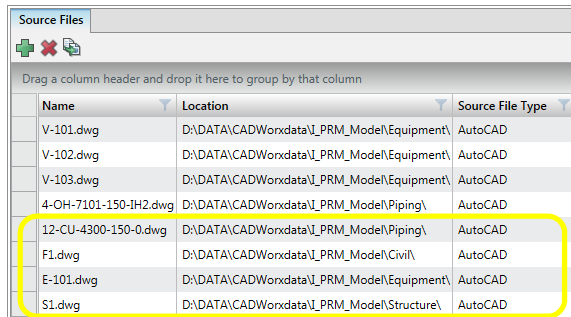
The following files are not processed yet

| Model discipline | File | Location |
|------------------|----------------------|---|
| Piping | 12-CU-4300-150-0.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Piping |
| Civil | F1.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Civil |
| Equipment | E101.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Equipment |
| Structure | S1.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Structure |

If you use the slider bars found on the right-side of both the Source Files and Smart Models windows, you'll see that these files don't exist in either window currently

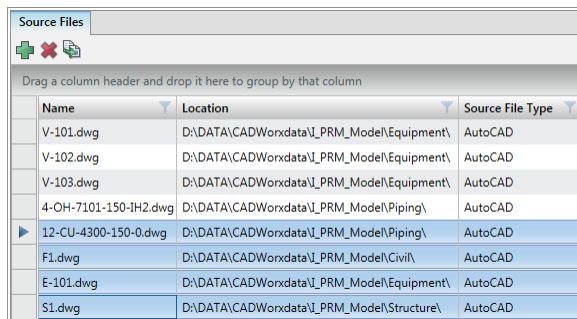


Using the information in the table above, click on the + symbol above the Source Files window, browse to each location in turn and select each missing file so that the Source Files window updates to show



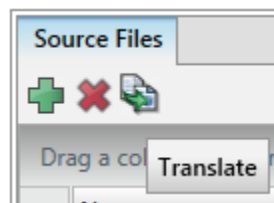
| Name | Location | Source File Type |
|-----------------------|--|------------------|
| V-101.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Equipment\ | AutoCAD |
| V-102.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Equipment\ | AutoCAD |
| V-103.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Equipment\ | AutoCAD |
| 4-OH-7101-150-1H2.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Piping\ | AutoCAD |
| 12-CU-4300-150-0.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Piping\ | AutoCAD |
| F1.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Civil\ | AutoCAD |
| E-101.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Equipment\ | AutoCAD |
| S1.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Structure\ | AutoCAD |

Using the CTRL key + mouse left-hand mouse button (LHB), select these files by clicking on the grid next to the Name column

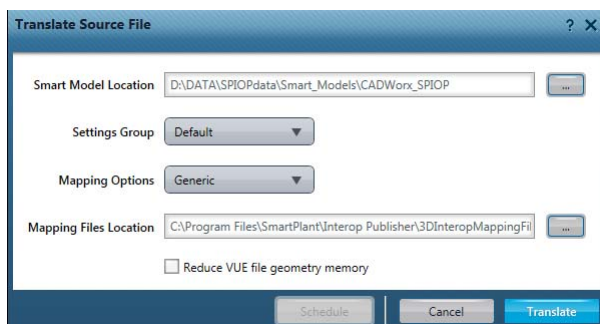


| Name | Location | Source File Type |
|-----------------------|--|------------------|
| V-101.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Equipment\ | AutoCAD |
| V-102.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Equipment\ | AutoCAD |
| V-103.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Equipment\ | AutoCAD |
| 4-OH-7101-150-1H2.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Piping\ | AutoCAD |
| 12-CU-4300-150-0.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Piping\ | AutoCAD |
| F1.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Civil\ | AutoCAD |
| E-101.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Equipment\ | AutoCAD |
| S1.dwg | D:\DATA\CADWorxdata\I_PRM_Model\Structure\ | AutoCAD |

Now click the Translate button (right-most icon) on the toolbar



This dialogue appears



Translate Source File

Smart Model Location: D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP

Settings Group: Default

Mapping Options: Generic

Mapping Files Location: C:\Program Files\SmartPlant\Interop Publisher\3DInteropMappingFil

☐ Reduce VUE file geometry memory

Schedule Cancel Translate

Accept the defaults and click Translate.

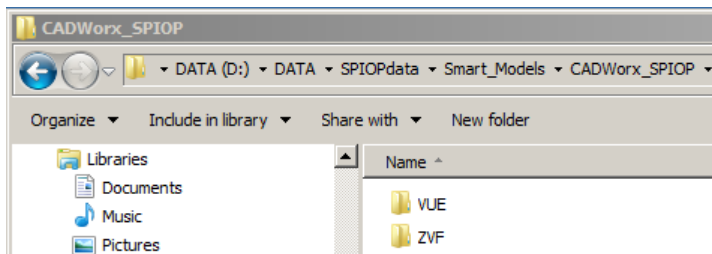
Translation begins and the Smart Models window updates to show

| Smart Models | | | | |
|---|---|------|--------------------|--|
| | | | | |
| Drag a column header and drop it here to group by that column | | | | |
| Name | Location | Type | Translation Status | |
| V-103 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | Complete | |
| 4-OH-7101-150-IH2 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | Complete | |
| 12-CU-4300-150-0 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | In Progress | |
| F1 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | None | |
| E-101 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | None | |
| S1 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | None | |

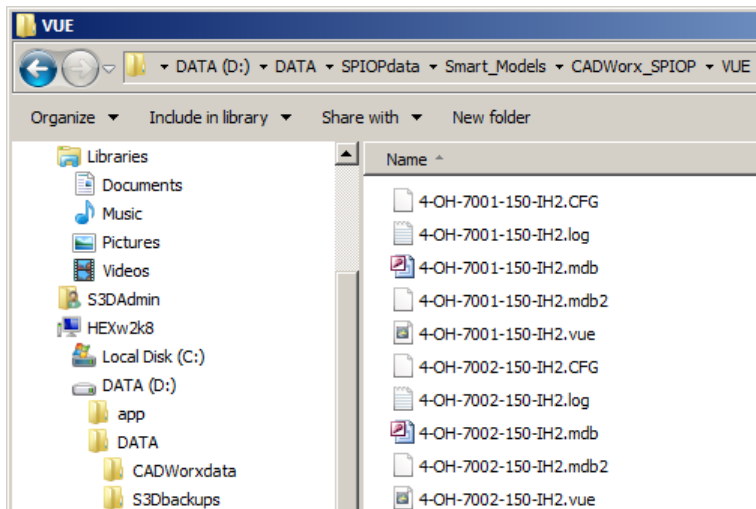
Whilst the files are translating...read and do the following...

But just what does the translation process produce?

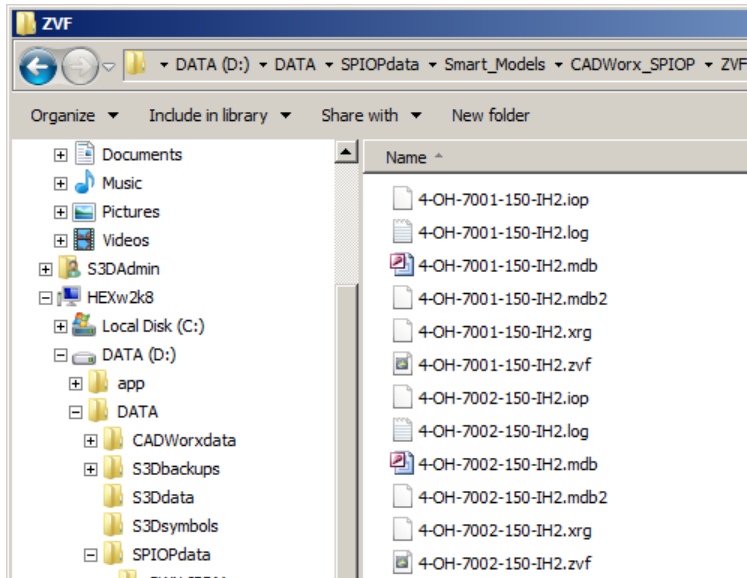
Use the Windows key + E to open Windows Explorer, and then browse to



The VUE folder contains the files required to visualize the model in SmartPlant Review

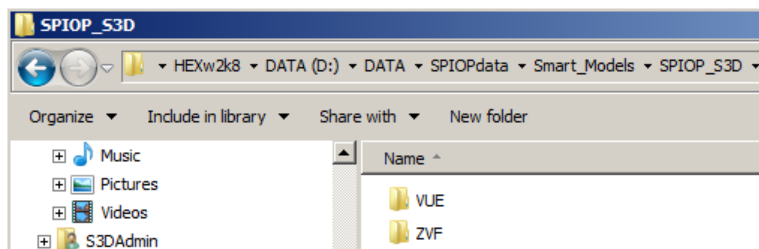


The ZVF folder contains the files required to reference the CADWorx model in Smart 3D



Note. MicroStation is not present on this VM therefore the files you are currently translating cannot be used for the subsequent stages of this workshop. Refer to Appendix I [later](#) for further information about this pre-requisite.

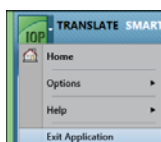
From this point on you will use pre-processed files that were prepared earlier, using MicroStation. These files are located in this folder



Translation should now be complete

| Smart Models | | | | |
|---|---|------|--------------------|--|
| Drag a column header and drop it here to group by that column | | | | |
| Name | Location | Type | Translation Status | |
| V-103 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | Complete | |
| 4-OH-7101-150-IH2 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | Complete | |
| 12-CU-4300-150-0 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | Complete | |
| F1 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | Complete | |
| E-101 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | Complete | |
| S1 | D:\DATA\SPIOPdata\Smart_Models\CADWorx_SPIOP\ | vue | Complete | |

Exit the application.



Visualize a CADWorx model in SmartPlant Review

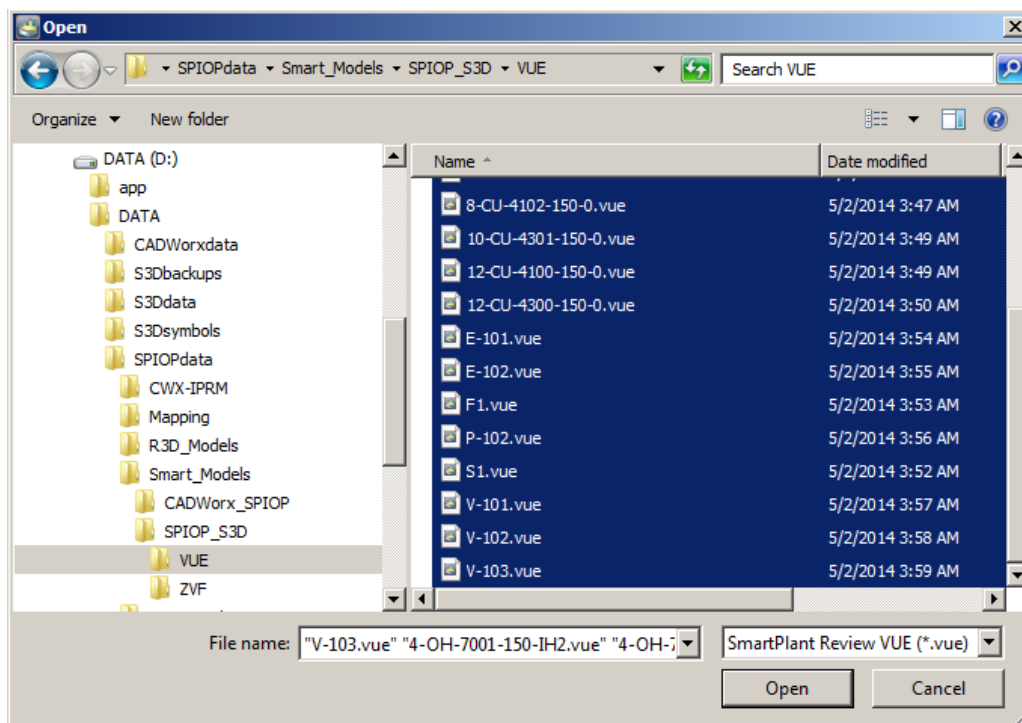
Note. You should spend no more than **5mins** on this section.

Start SmartPlant Review

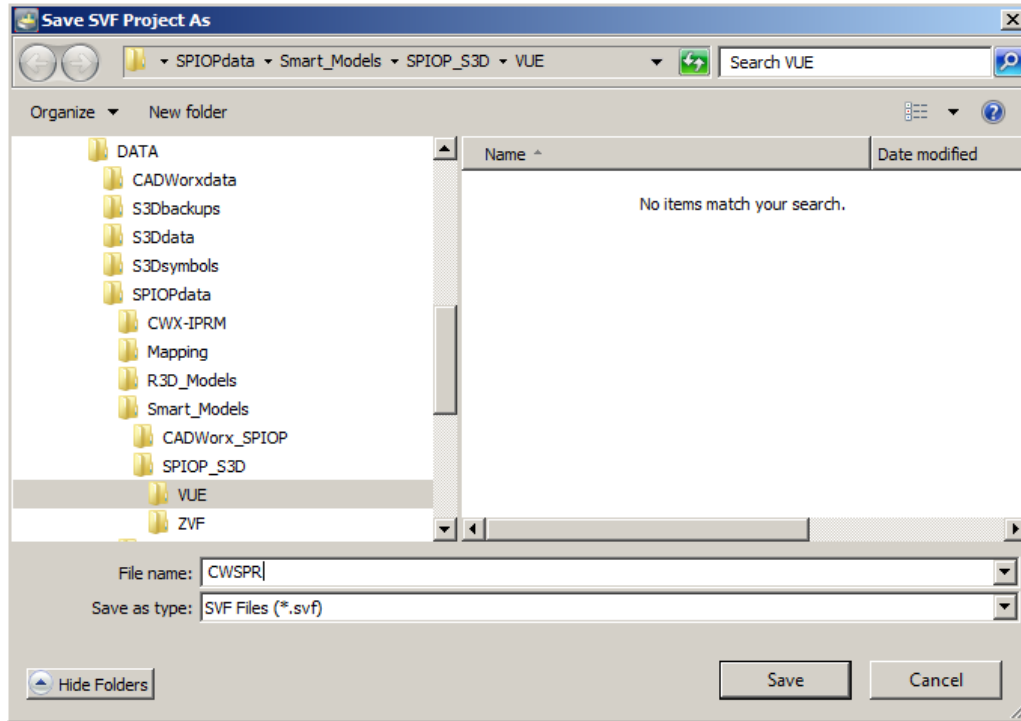


Choose File > Open and browse to D:\DATA\SPIOPdata\Smart_Models\SPIOP_S3D\VUE.

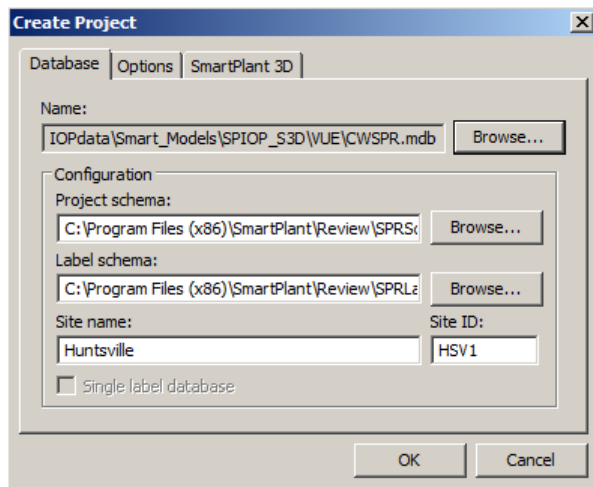
Select all of the files with a .vue extension then click Open



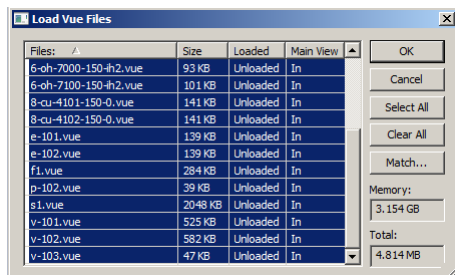
Enter CWSR as the name of the SVF Project then click Save



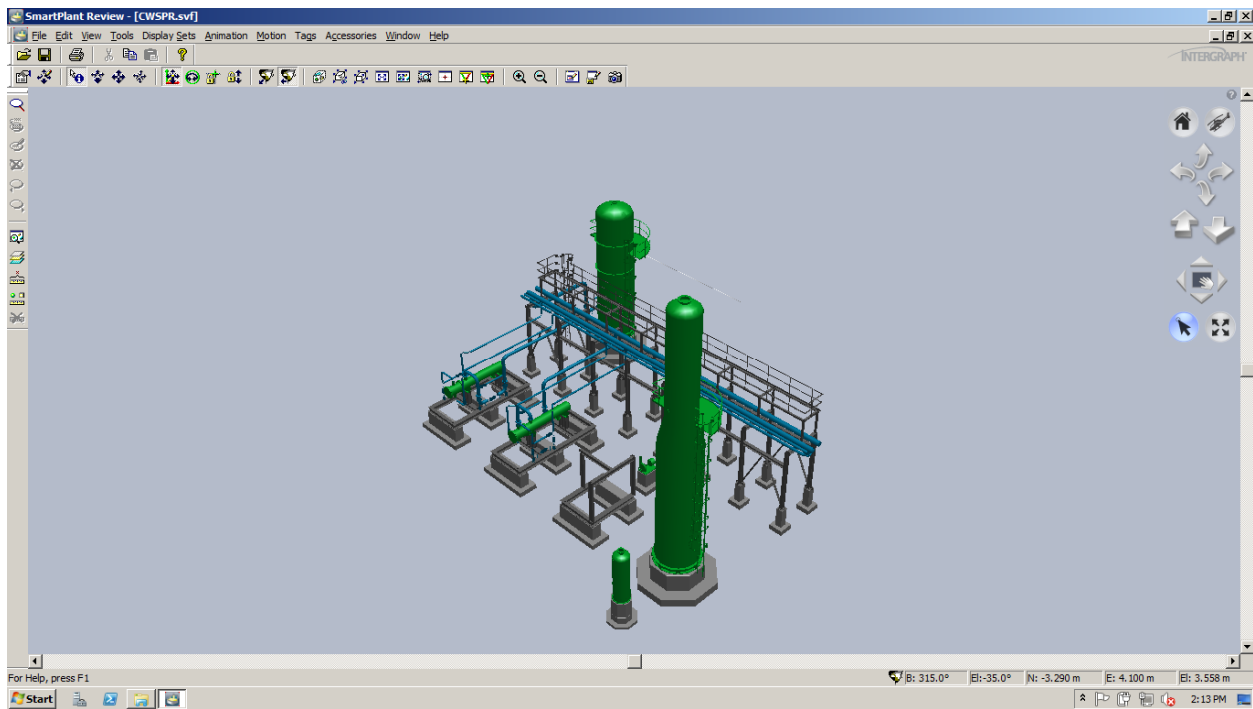
Accept the default settings on this dialogue and click OK to continue



And do the same for the next dialogue too - just click OK to continue



The CADWorx model will appear



Note. If it doesn't appear, you may need to open a new window.

Using these controls



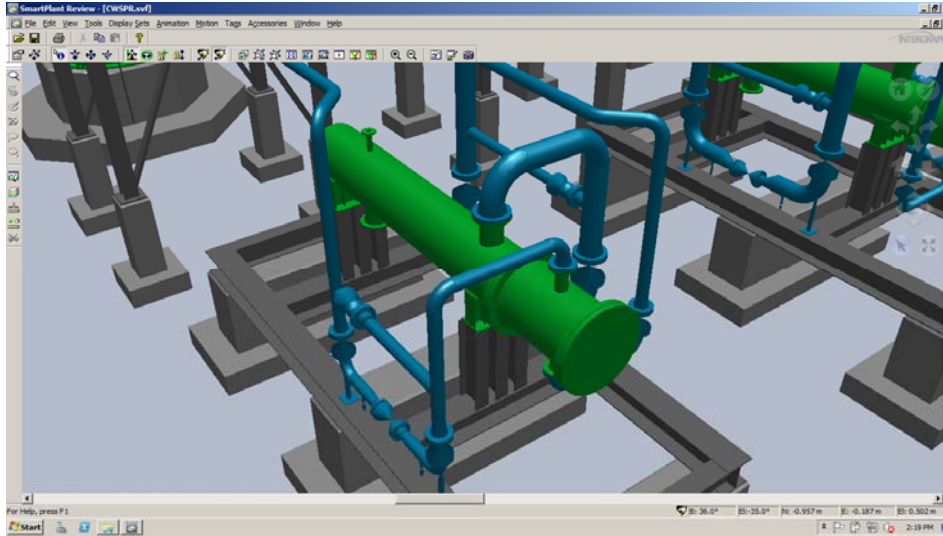
And optionally some of these



And these

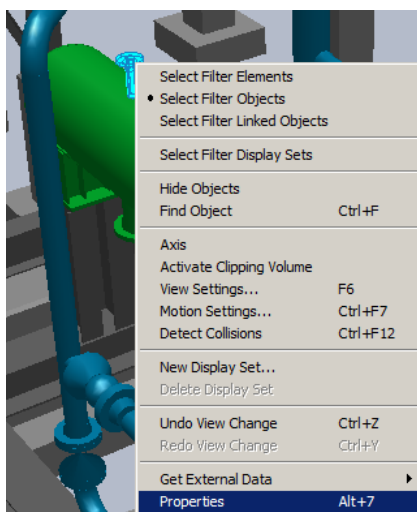
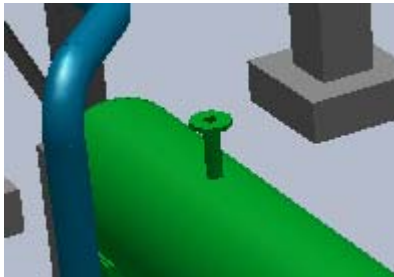


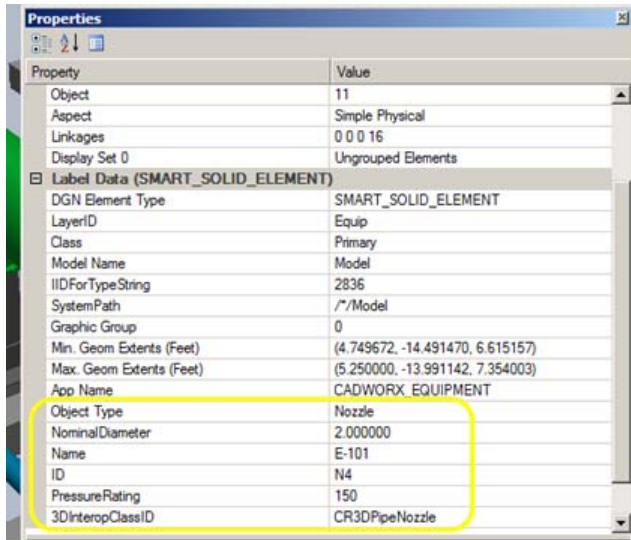
manipulate and navigate the model so that equipment E-101 is displayed as shown



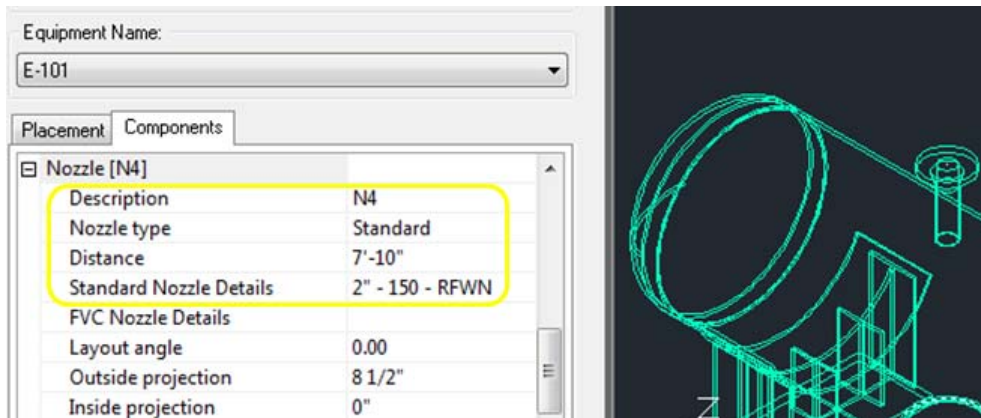
Querying model properties / attributes

Click on this nozzle with the LHB to select it, then right click and select Properties from the pop-up menu





Looking at the same nozzle in CADWorx...



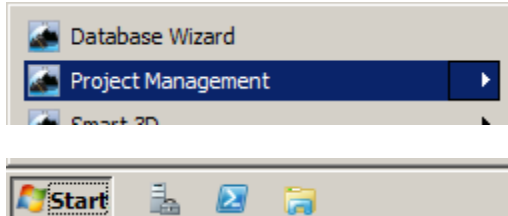
You will make a connection to this nozzle in Smart 3D later.

Select File > Exit to close SmartPlant Review.

Attaching a CADWorx model to Smart 3D using Project Management

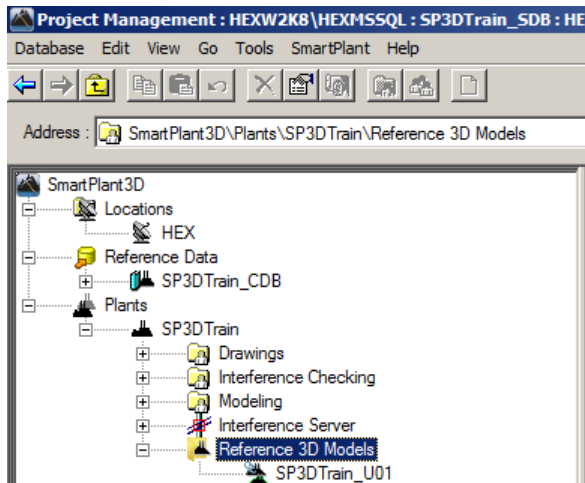
Note. You should spend no more than **10mins** on this section.

Start Project Management

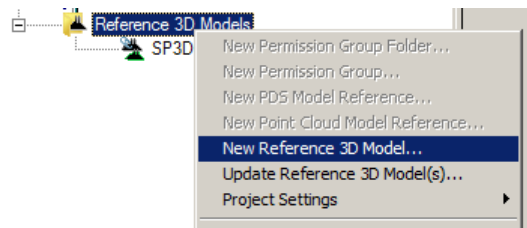


Please be patient whilst the software loads and configures itself.

Expand the tree to show



Right click on Reference 3D Models and choose New Reference 3D Model from the pop-up menu



Attach CADWorx (reference 3D) model

Clicking in each field one by one, make the settings shown below then click OK

New Reference 3D Model

General

| Property | Value |
|------------------------|--|
| Model Name | CW_S3D |
| Description | CADWorx to S3D |
| Model Type | SmartPlant Interop Publisher |
| Interference Detection | Participate |
| File Path | D:\DATA\SPIOPdata\Smart_Models\SPIOP_S3D |

Reference Point

Easting: 0.00 m Northing: 0.00 m Elevation: 0.00 m Units: m

Transformation

Rotation

East Angle (deg): 0.00 deg North Angle (deg): 0.00 deg Up Angle (deg): 0.00 deg

Scale Factor: 1

Target Point

Easting: 0.00 m Northing: 0.00 m Elevation: 0.00 m Units: m

OK Cancel



Please be patient...it will take approximately 15-20 secs for the information to be added to the database.

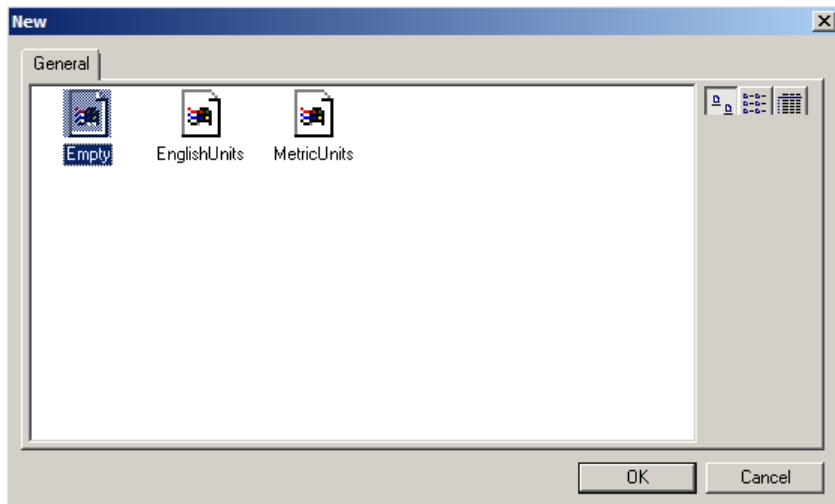


Minimize the Project Management window so that it remains open and accessible via the Task bar.

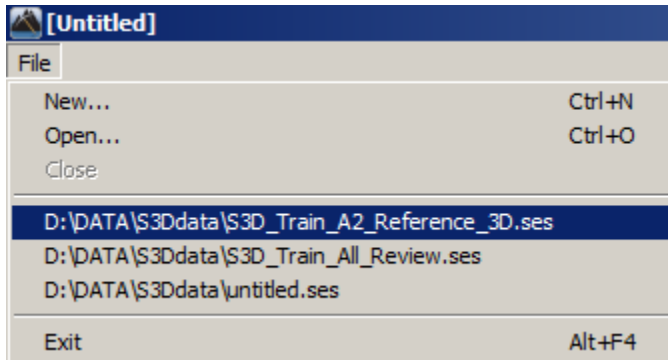
Start Smart 3D

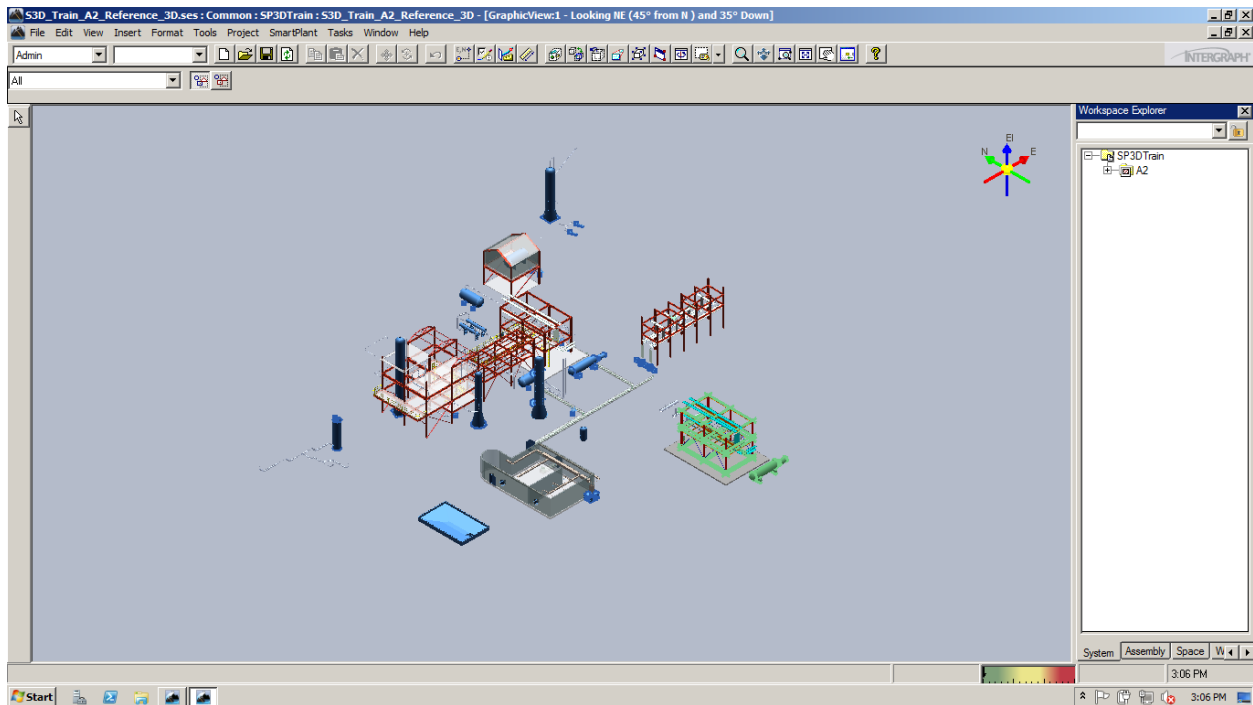


Click cancel to close this dialogue



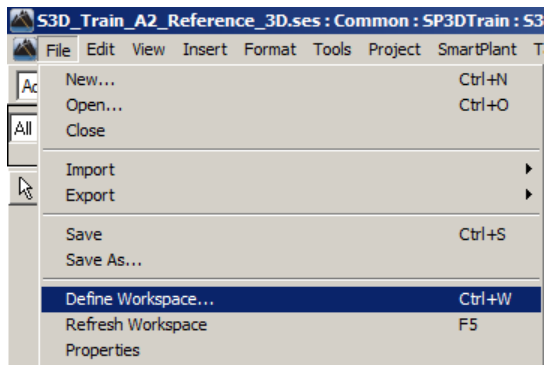
Select S3D_Train_A2_Reference_3D.ses from the most recently used entries on the File menu



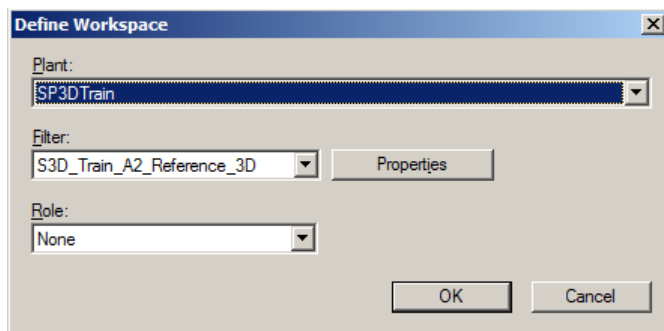


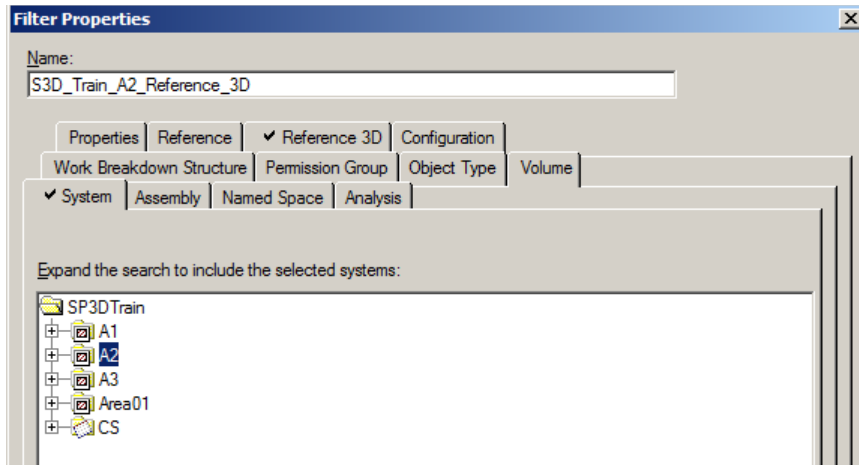
The CADWorx model is not shown yet; to display it, you must update the WorkSpace view to include the smart (Reference 3D) model 'CW_S3D'

Select

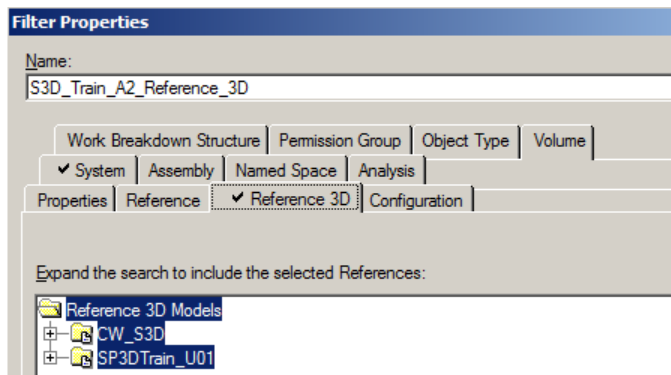


Select Properties





Select the ☒ Reference 3D tab and make sure the entire tree is selected as shown (click at the top part of the tree to do this)

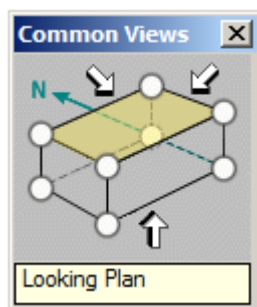


Click OK to close this dialogue and OK again to execute the database query.

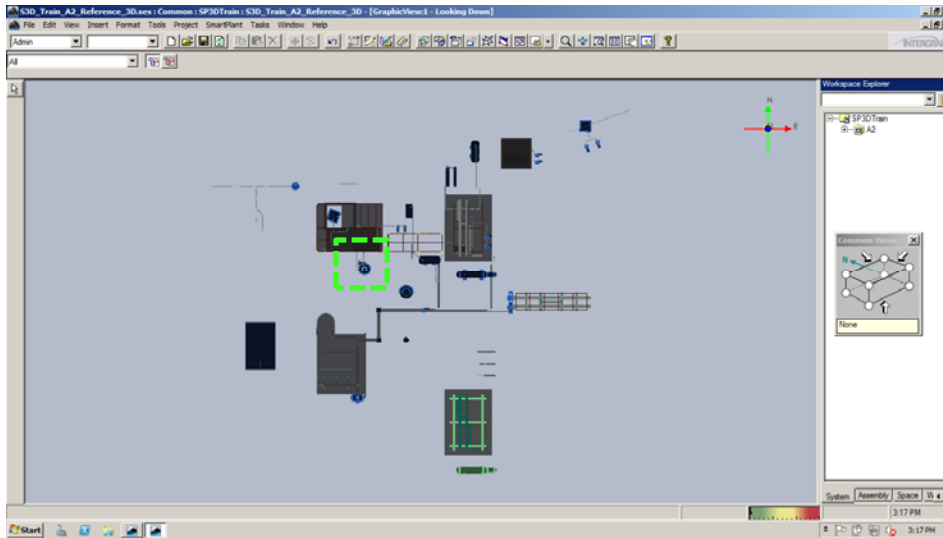
Be patient whilst Smart 3D refreshes the view.

Initially, you will see little change in the model displayed?

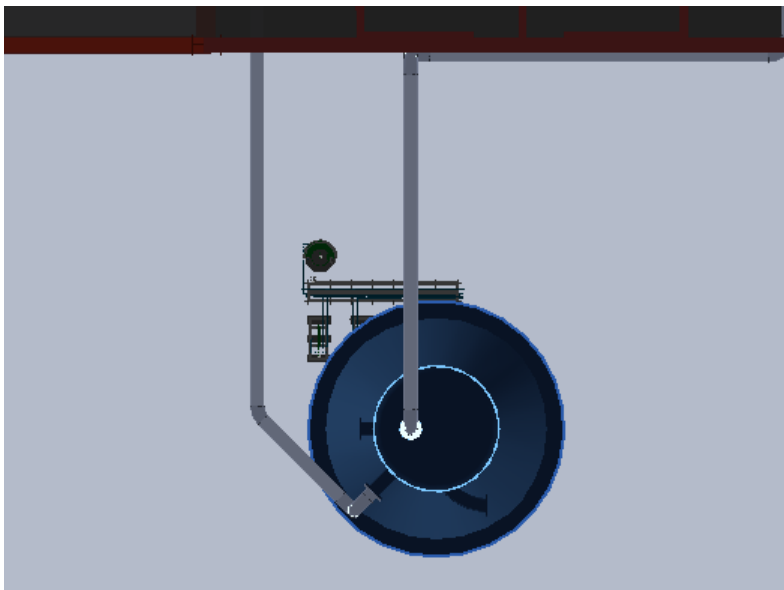
Select  then click Plan



Select  and zoom in to the area highlighted below by the green dashed box



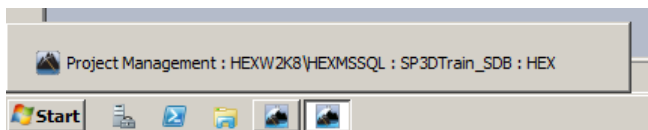
Notice the very small CADWorx model positioned at E0, N0, U0 (the bottom-left vertical column of the pipe rack is actually at this co-ordinate).



A transformation needs to be applied to move the model and to scale it in line with the design units.

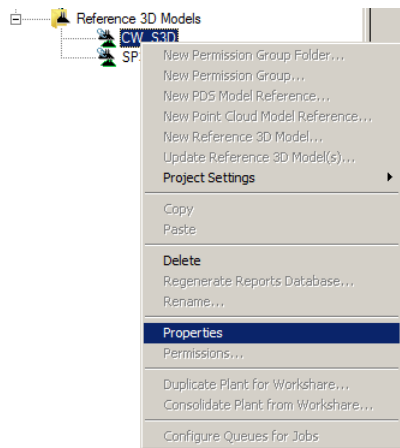
Applying a transformation

Find Project Management on the taskbar

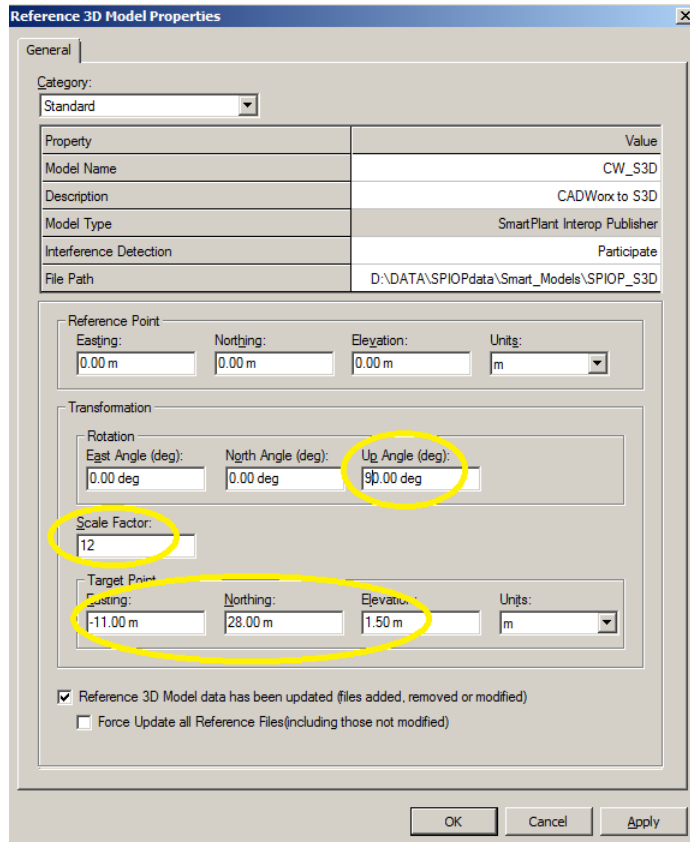


Click on the icon to maximize the window

Right click on the CW_S3D entry under Reference 3D Models in the tree and select Properties




Change the properties to show




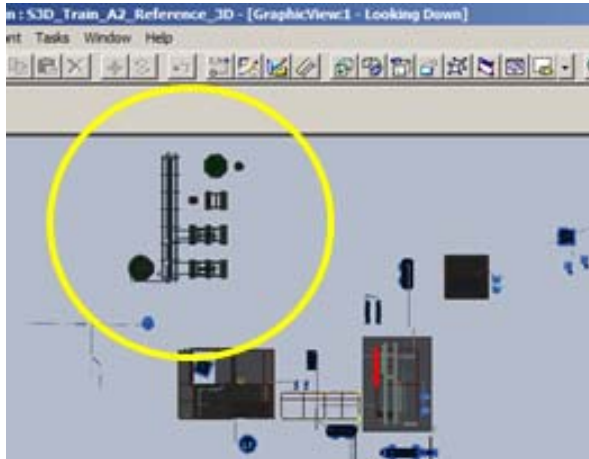
Click Apply followed by OK to close the dialogue.

Note. The session file is set-up to use Imperial bores and Metric co-ords and lengths whereas the master and sub-units of the CADWorx model are in Inches. To resize the model therefore, a scale factor of 12 must be applied.

Return to Smart 3D.

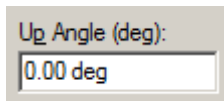
Click  to refresh the workspace view.

Click  to fit the model.




The CADWorx model is now the correct size but is still displayed in the wrong orientation.


Switch back to Project Management and set Up Angle to be 0.00 deg, and then click Apply and OK



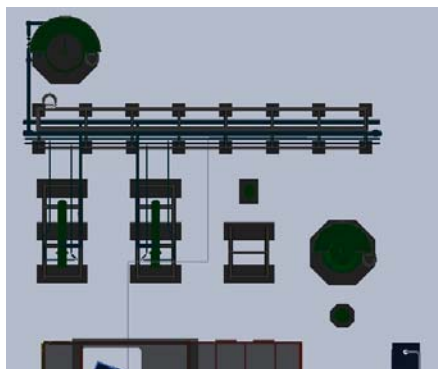
Close Project Management using Database>Exit.

Return to Smart 3D.

Click  to refresh the workspace view.

Click  to fit the model.

Click  then zoom in to the area where the CADWorx model is displayed by striping a window as shown



Working with a CADWorx model in Smart 3D

Note. You will spend the remaining **20mins** on this section.

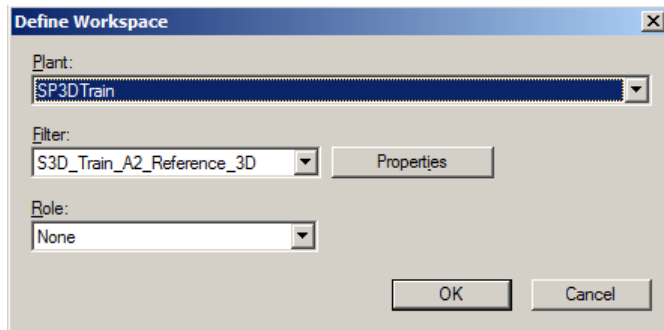
Navigation and model view manipulation

Defining the workspace


To make it easier to work with S3D, first, modify the filter that controls how the model is displayed so that only unit U03 and the CADWorx model are shown.

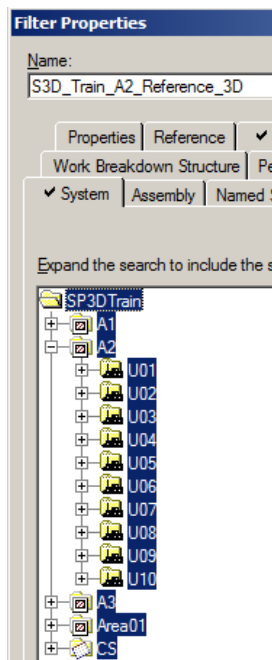
If zoomed in, click  to fit the model.

Select File > Define Workspace or press CTRL+W.

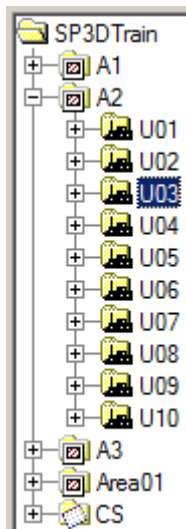


Click on Properties.

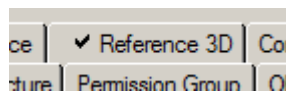
Click on  the next to A2 to expand the tree



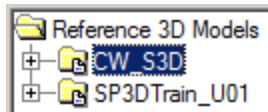
Click on U03, this will deselect everything else in the list



Switch to the Reference 3D tab



Click on

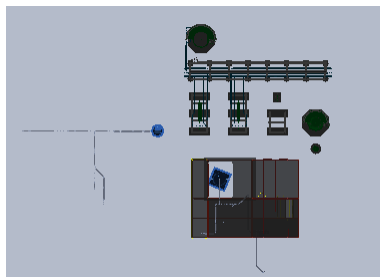


Click OK to update the filter and close this dialogue.

Click OK again to close the Define Workspace dialogue.

Please be patient whilst the query is executed.

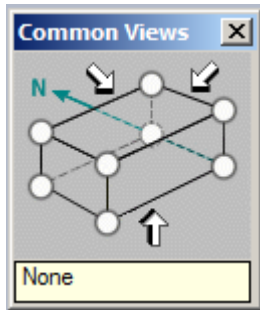
The workspace view updates to show



Note. Any number of filters can be set-up meaning different views can be quickly switched between.

Click  to save changes to the session file.

Click  to display the Common Views dialogue



Quickly experiment with the common views cube and the tools below before continuing.



- Fit View



- Zoom window



- Pan

Note. A right mouse button click anywhere in the main window terminates any of these modes.

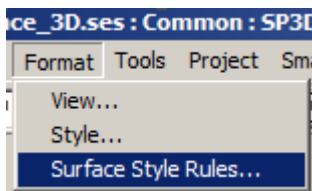
Applying Surface Style Rules

Note. This section is optional, skip it if you wish (go to section Showing and hiding CADWorx model elements).

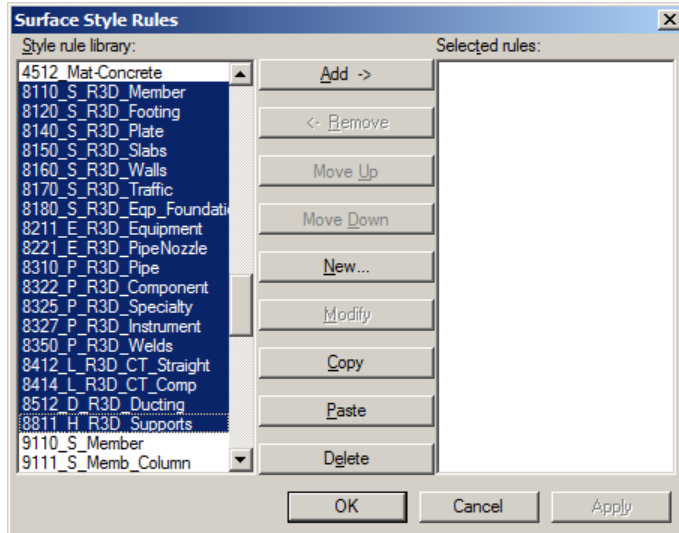
You'll notice that the CADWorx model is displayed in different colors to those used for the S3D model.

Surface Style Rules control how referenced models are displayed.

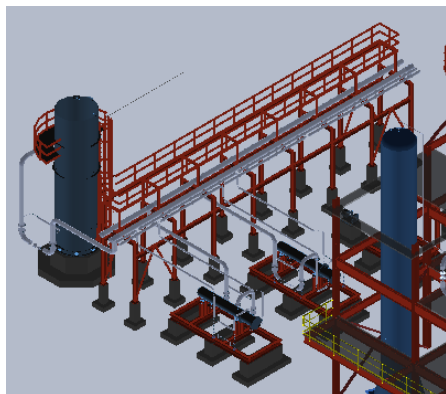
Select




Using the slider bar to find them first then Shift + LHB, select the entries shown then click Add to move them to the right-side of the dialogue, then click OK to apply the change and to close the dialogue



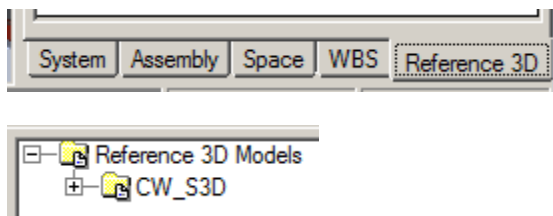
The model will refresh and now the CADWorx model is displayed as if it were originally created in S3D



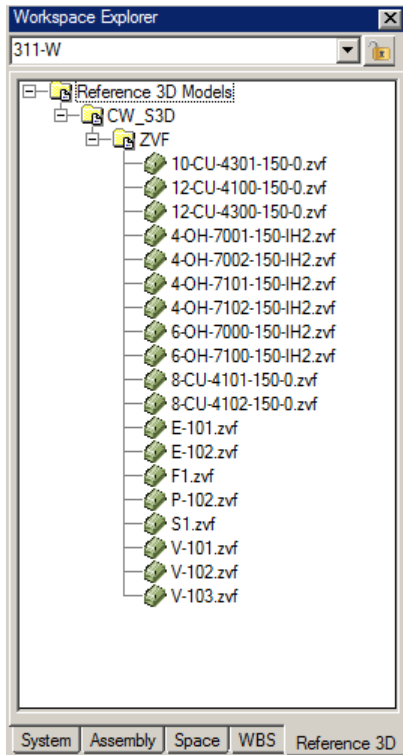
Click  to save changes to the session file.

Showing and hiding CADWorx model elements

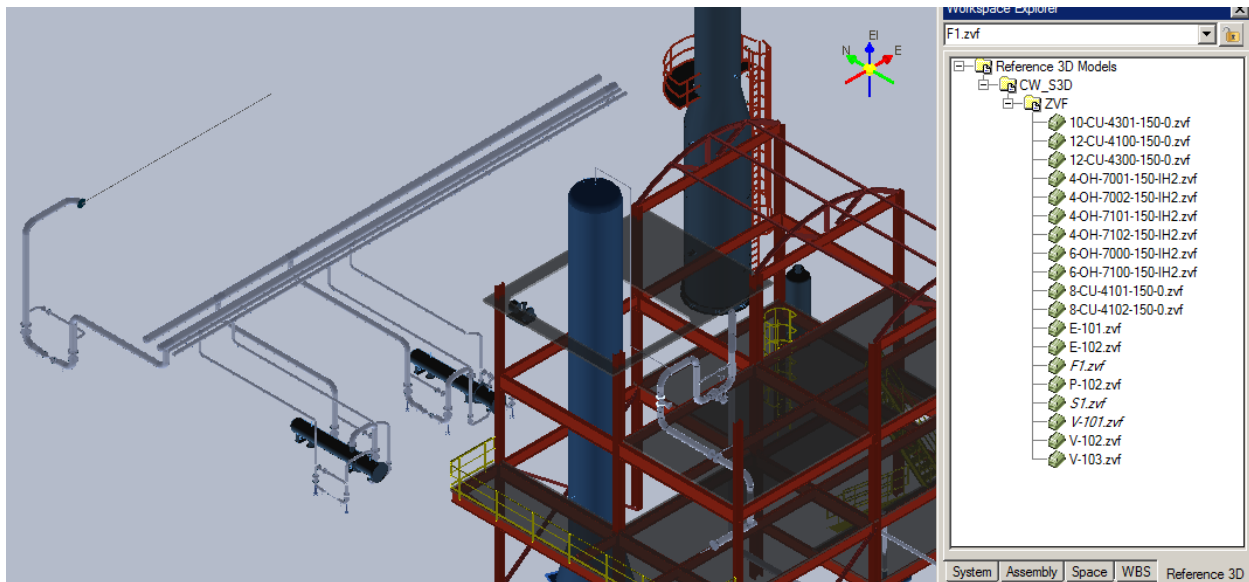
Make the Reference 3D tab on the Workspace Explorer active by clicking on it



Expand the tree as shown



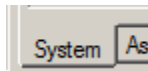
Right click on each entry in turn in the list to hide F1.zvf, S1.zvf and V-101.zvf so that the workspace view updates to show



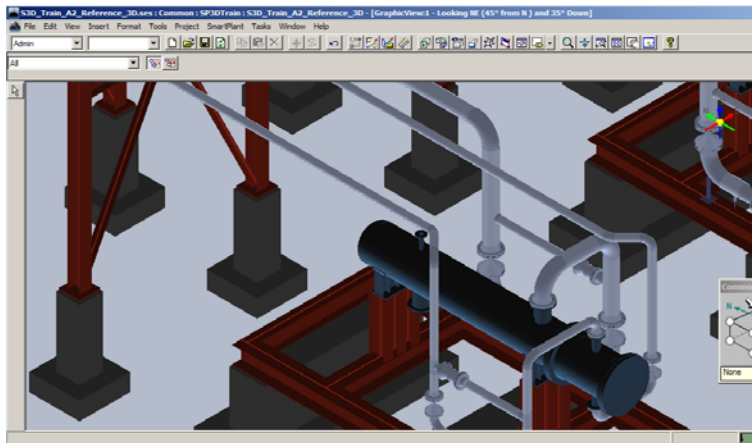
Using the Show option on the same pop-up menu, show everything again so that the model view returns to what it was previously.


Querying CADWorx model properties in Smart 3D

Click on the System tab on the Workspace Explorer to make it active

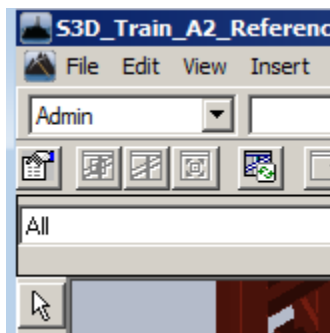


Zoom in so that the view is as shown

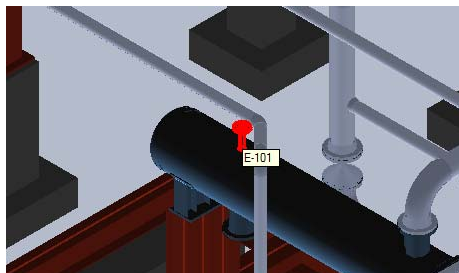


Tip: The Zoom tool  is useful to make minor adjusts to the zoom. Click and hold down the LHB whilst moving the mouse diagonally-left or diagonally-right to either zoom the view in or out.

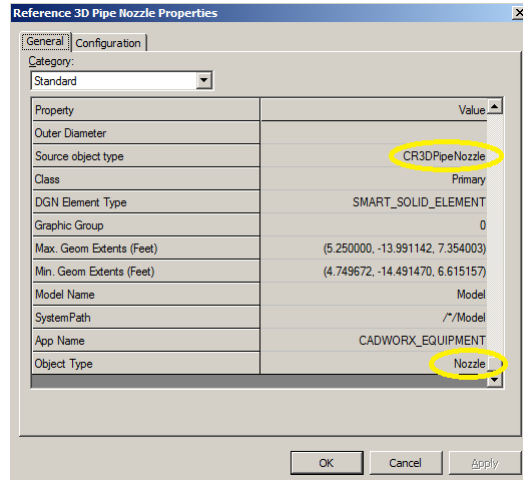
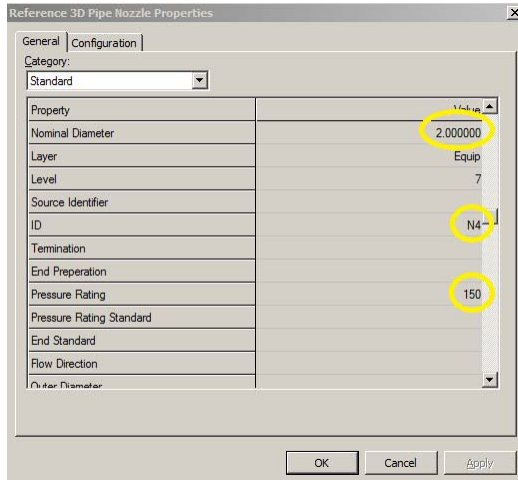
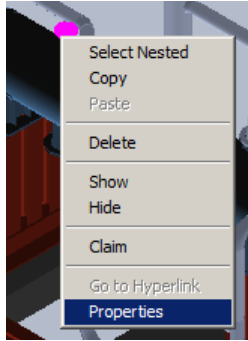
Click on the Select command  icon to ensure these settings are active



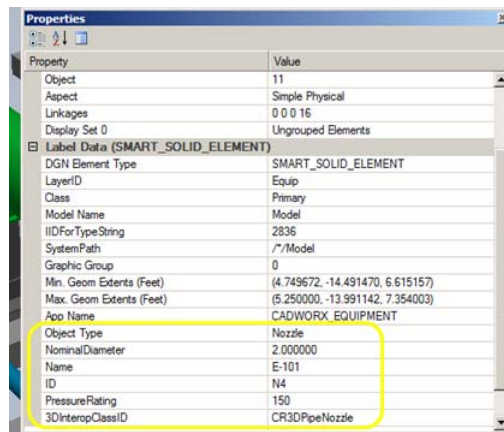
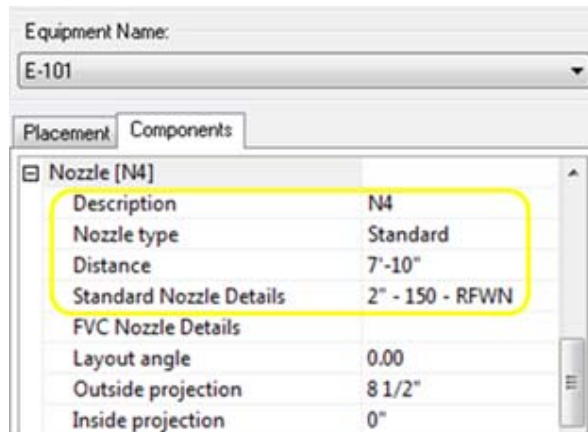
Click on this nozzle on equipment E101



Right click and select Properties from the pop-up menu



Comparing with the same nozzle in CADWorx and SmartPlant Review seen earlier...



Time permitting use the same technique to query the properties of other CADWorx model objects.

###

The main objective of this workshop was to show you that a CADWorx model can be transferred to Smart 3D with intelligence, so if you've reached this point by the end of the 45mins, you've achieved what you needed to!

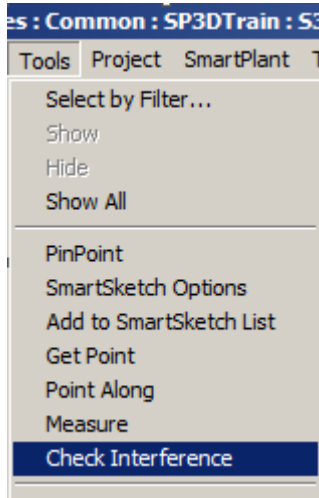
Everything else that follows is considered to be optional and advanced. If you have time, please continue, otherwise, don't forget, this document is yours to take away!

Routing a Smart 3D pipe from an intelligent CADWorx nozzle

As well as being a database solution, Smart 3D is also a task-based solution. So far you have been working with the Common task, now you will work with the Piping task.

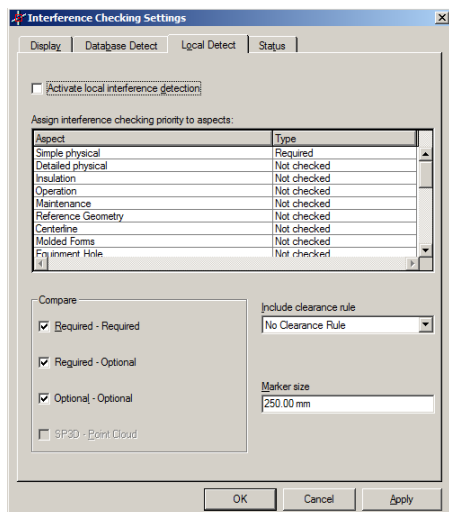
Activate Interference Checking

In Smart 3D, interface checking is a process that runs silently in the background, always looking for clash situations.



Note. The toolbar area automatically re-configures itself to show additional icons, selection boxes etc.

Click the Properties  icon to invoke this dialogue



Check this box then click Apply followed by OK.

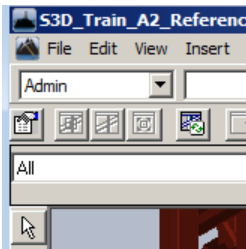


Note. In a large project, particularly if Smart 3D is integrated with SmartPlant P&ID, the pipelines that need to be modelled would already be present in piping hierarchy, under the relevant Area\Unit.

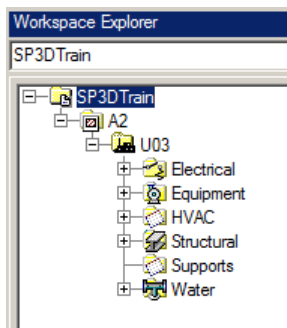
Next, you will create the required piping hierarchy to create a new pipeline on-the-fly.

Routing a Pipeline

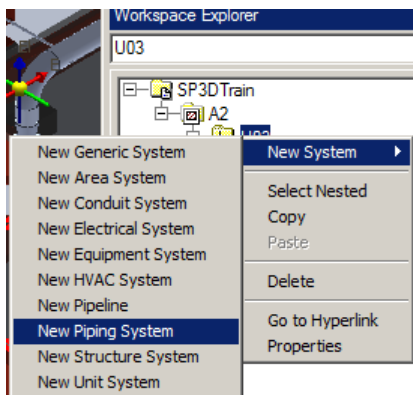
First, click on the Select command  icon to ensure these settings are still active



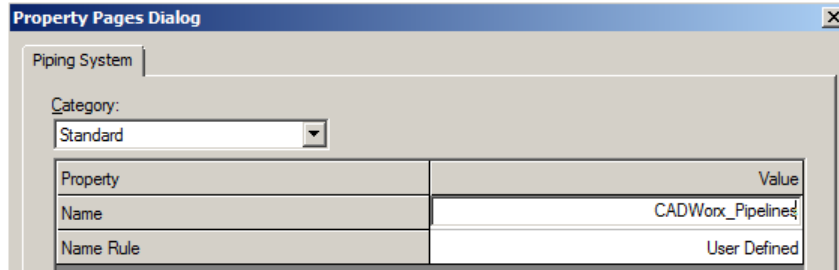
Next, expand or collapse the Workspace explorer tree so that it looks like shown



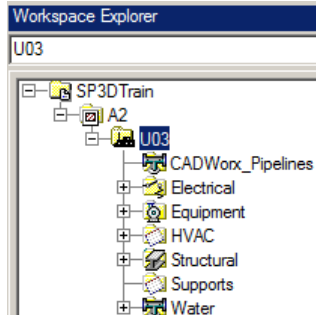
Select U03, right-click and pick New Piping System from the New System pop-out menu



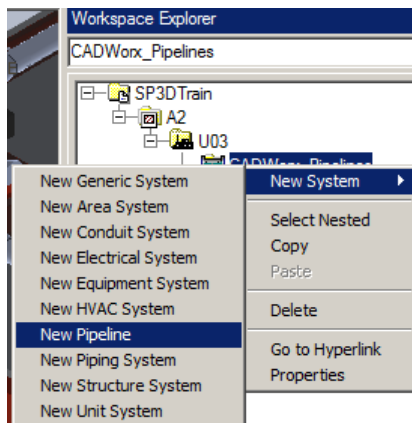
Type the name shown below in to the dialogue then click OK



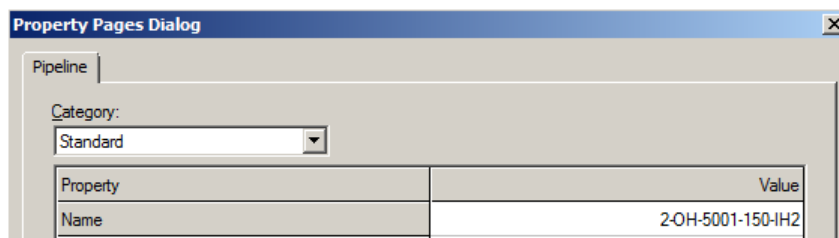
The Workspace Explorer updates to show

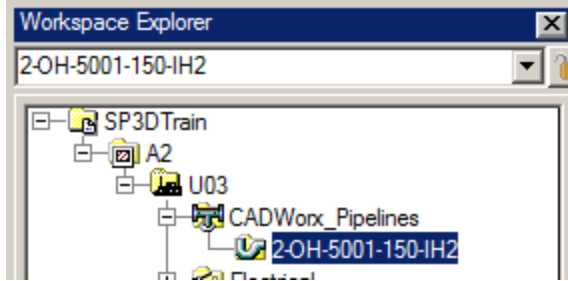


Right click on the new entry and select New Pipeline from the menu system

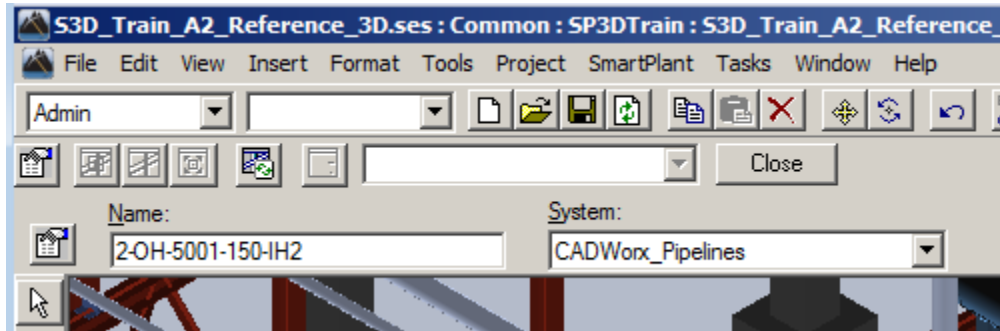


Type the name shown then click OK

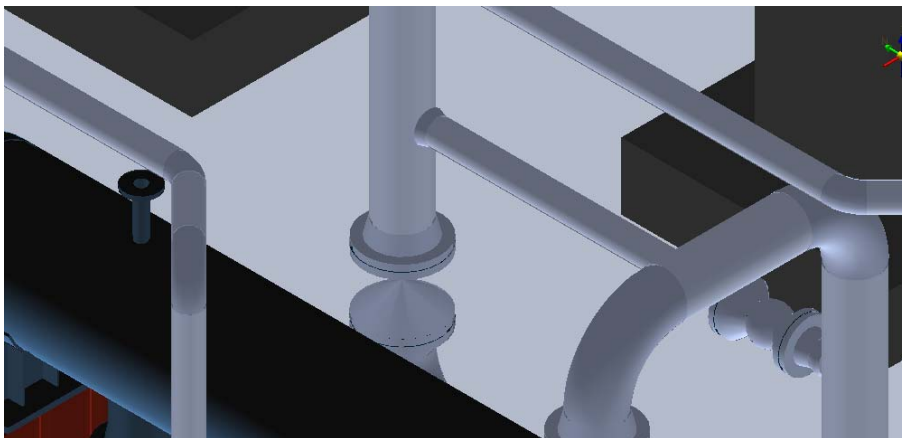




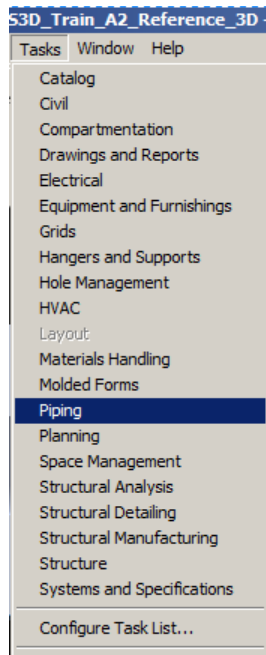
Notice that toolbar area also changed




Now, using the navigation techniques learnt earlier, zoom in and adjust the window display so that you have this view



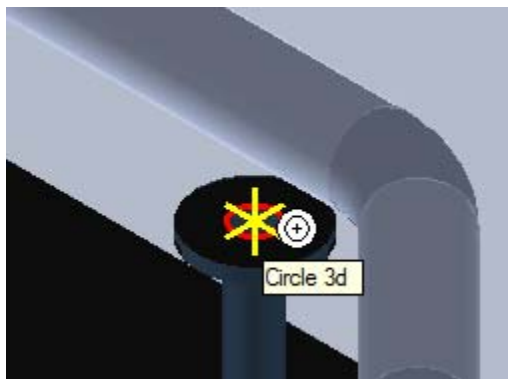
Select the Piping task from the drop-down



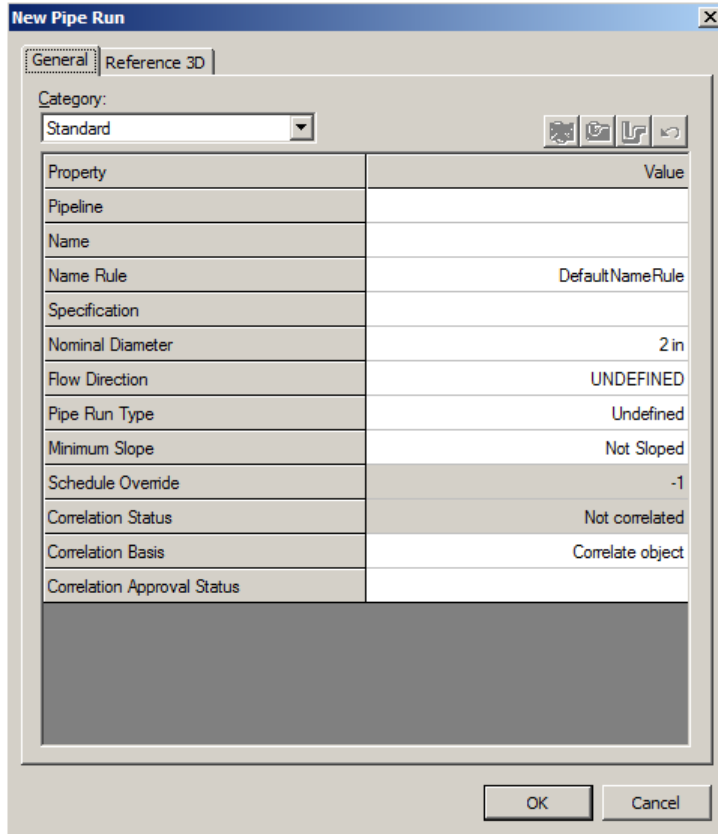
Smart 3D reacts and re-configures the user interface.

Click the Pipe Routing  icon from the toolbar at the left-hand side of the screen

Move the mouse cursor over nozzle N4, and when you see the fly text update to what's shown below, click once with the LHB



Please be patient at this point as at first it may seem that nothing is happening, but this dialogue will appear eventually

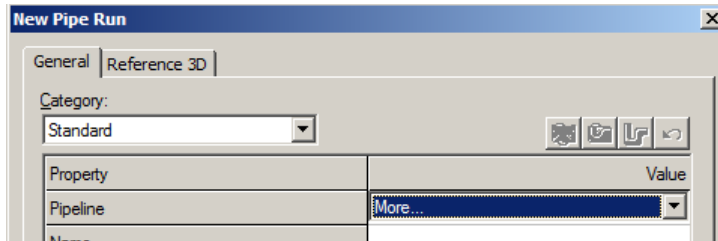


The 'New Pipe Run' dialog box is shown with the 'General' tab selected. The 'Category' dropdown is set to 'Standard'. Below this is a table with the following properties and values:

| Property | Value |
|-----------------------------|------------------|
| Pipeline | |
| Name | |
| Name Rule | DefaultNameRule |
| Specification | |
| Nominal Diameter | 2 in |
| Flow Direction | UNDEFINED |
| Pipe Run Type | Undefined |
| Minimum Slope | Not Sloped |
| Schedule Override | -1 |
| Correlation Status | Not correlated |
| Correlation Basis | Correlate object |
| Correlation Approval Status | |

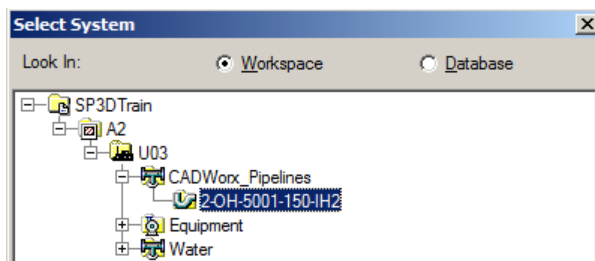
At the bottom of the dialog are 'OK' and 'Cancel' buttons.

Click on the Pipeline field and select More ...



The 'New Pipe Run' dialog box is shown with the 'Pipeline' field expanded, displaying a dropdown menu with the option 'More...' selected.

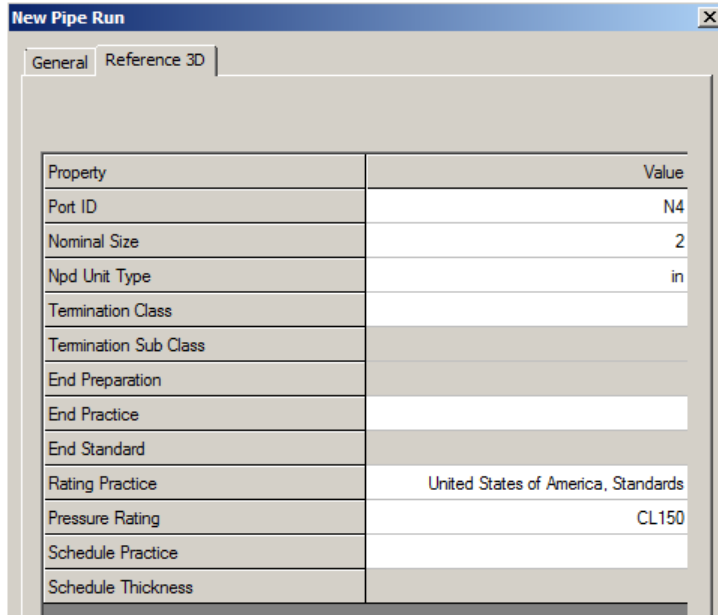
Select the pipeline shown then click OK



The 'Select System' dialog box is shown with the 'Look In:' section set to 'Workspace'. The tree view displays the following structure:

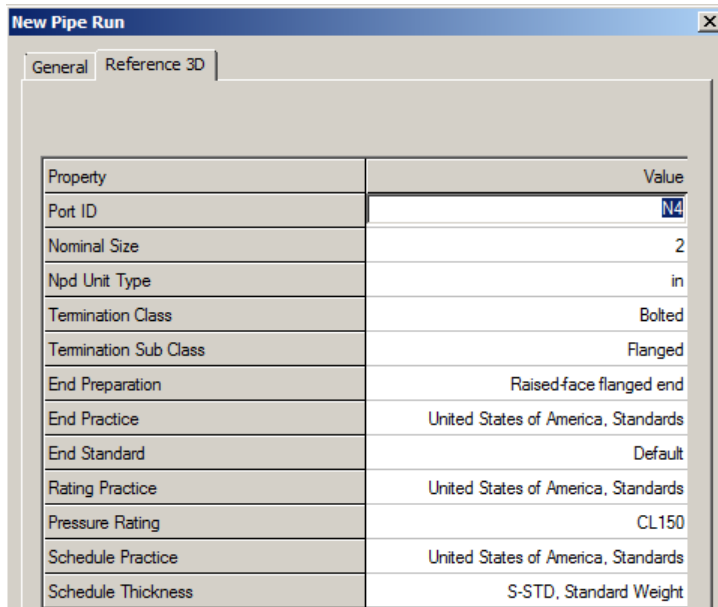
- SP3DTrain
 - A2
 - U03
 - CADWorx_Pipelines
 - 2-OH-5001-150-IH2 (selected)
 - Equipment
 - Water

Click on the Reference 3D tab



| Property | Value |
|-----------------------|-------------------------------------|
| Port ID | N4 |
| Nominal Size | 2 |
| Npd Unit Type | in |
| Termination Class | |
| Termination Sub Class | |
| End Preparation | |
| End Practice | |
| End Standard | |
| Rating Practice | United States of America, Standards |
| Pressure Rating | CL150 |
| Schedule Practice | |
| Schedule Thickness | |

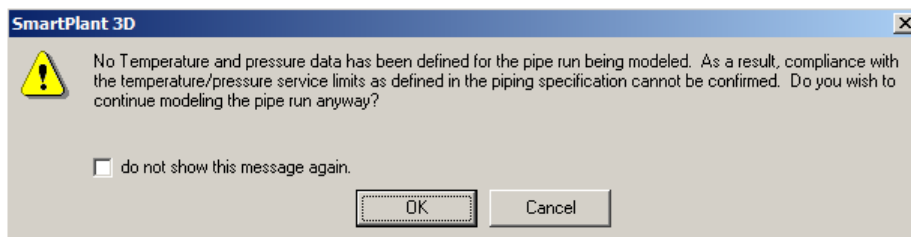
Click on the Reference 3D tab, set the following exactly as shown, then click OK to close the dialogue




| Property | Value |
|-----------------------|-------------------------------------|
| Port ID | N4 |
| Nominal Size | 2 |
| Npd Unit Type | in |
| Termination Class | Bolted |
| Termination Sub Class | Flanged |
| End Preparation | Raised-face flanged end |
| End Practice | United States of America, Standards |
| End Standard | Default |
| Rating Practice | United States of America, Standards |
| Pressure Rating | CL150 |
| Schedule Practice | United States of America, Standards |
| Schedule Thickness | S-STD, Standard Weight |

Please be patient whilst Smart 3D updates the database.

You will probably see this dialogue pop-up...just press OK to accept it...

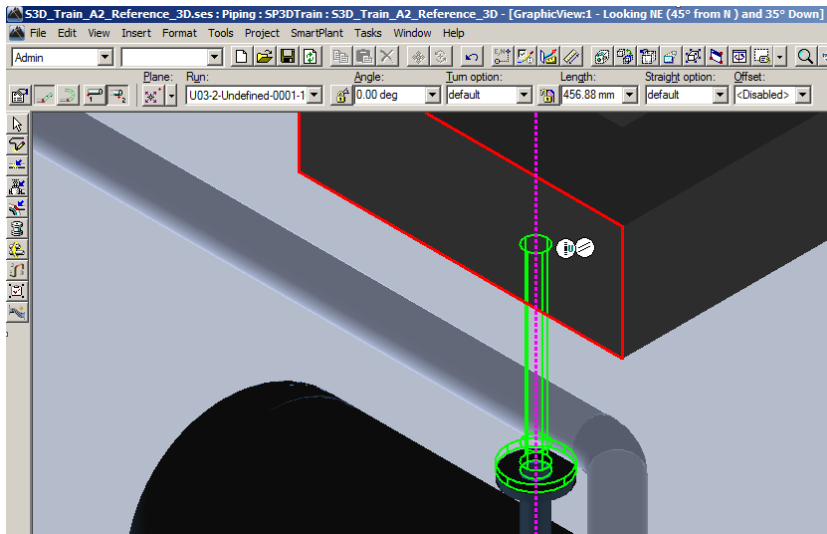


 No Temperature and pressure data has been defined for the pipe run being modeled. As a result, compliance with the temperature/pressure service limits as defined in the piping specification cannot be confirmed. Do you wish to continue modeling the pipe run anyway?


☐ do not show this message again.

OK Cancel

The view should update to show the pipe dynamically connected by a flange to the nozzle



The pipe and flange are not fully placed just yet, so don't click anything or anywhere in the window!

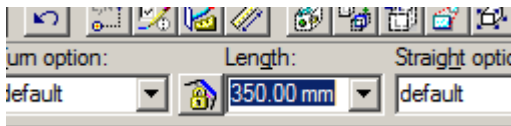
Note. If you make a mistake and need to start again, use the Undo  command to roll back what you've done so far, up to the point where the Pipe Run is deleted.

You'll notice when you place the mouse cursor close to the vertical axis that these glyphs appear next to the end of the pipe



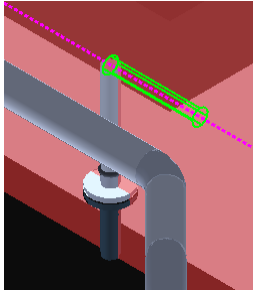
These are SmartSketch settings, they work in a “similar” way as snaps do in AutoCAD, and are used to control routing behavior and help guide the user to make accurate routes in any of the orthogonal planes/axes – N/E/Plan etc.

Enter the length shown and press Enter in the field



Then, ensuring the glyphs as shown above are displayed next to the end of the pipe, click once in the view.

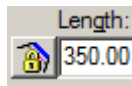
The vertical pipe and attached flange are placed



Note. If the Reference3D Object Type had not been recognized by Smart 3D as a true Nozzle, it would not be possible to make an intelligent piping connection. If the component had simply been a generic graphical element, it would be necessary to first place a Smart 3D nozzle on top of the CADWorx nozzle before being able to route from the nozzle, which would result in additional components being introduced that are not actually needed in the real world.

The system remains in routing mode and dynamic routing is constrained to the North plane.

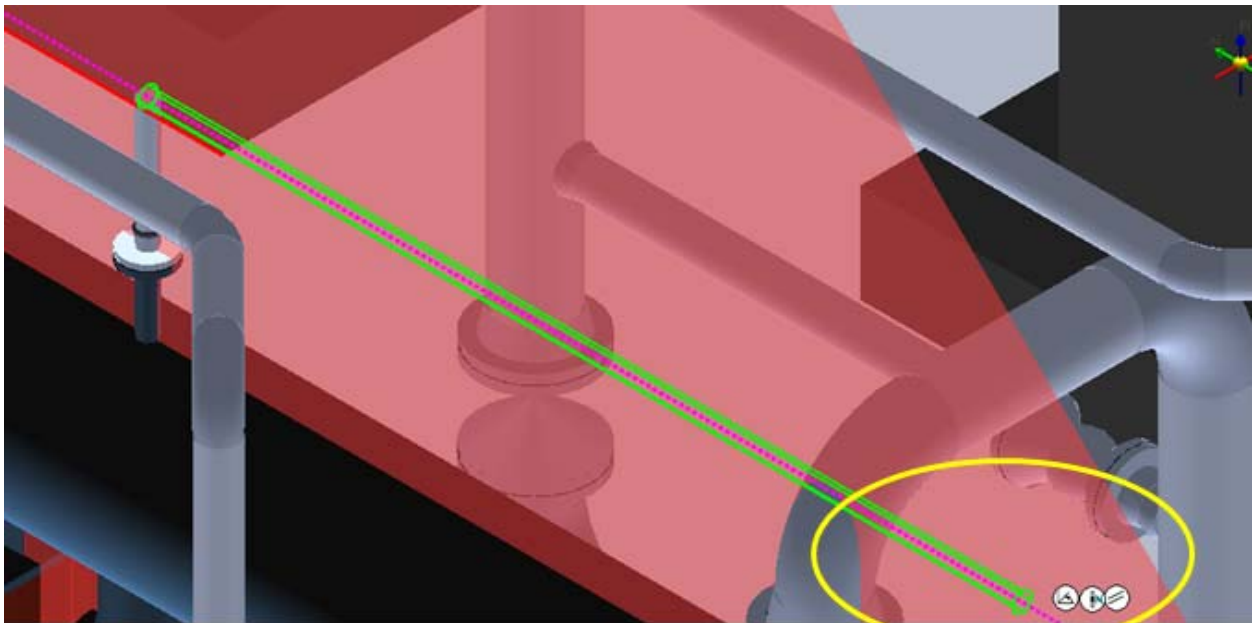
The length of pipe is also locked at 350mm.



Click the padlock icon to unlock the length so that as the cursor moves it is varies again.

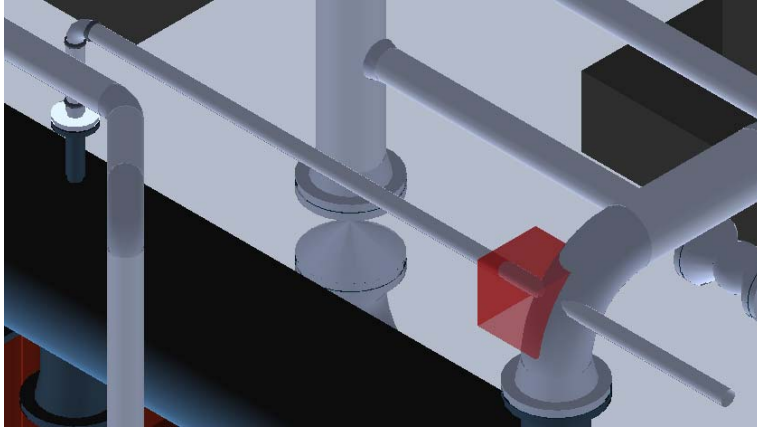
Continue routing...

Ensuring you see the N glyph, click once with the LHB again somewhere in the area highlighted below



Right click anywhere to terminate pipe routing mode.

After a few seconds, Smart 3D will identify that a clash exists between the CADWorx model and the Smart 3D pipe, and will highlight it as shown below



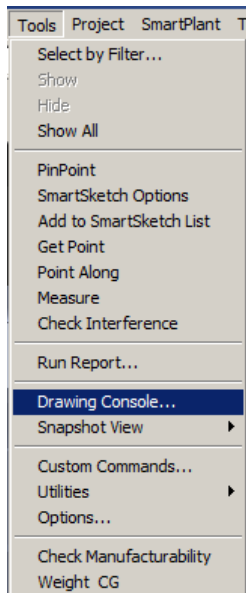
Note. Unfortunately there's insufficient time during this workshop to go any deeper into pipe routing in Smart 3D.

Don't worry about fixing the clash; just continue with the final task...

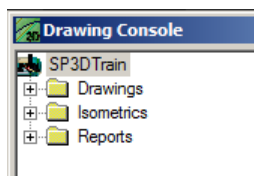
Generating a piping isometric

Next you'll use ISOGEN to create a piping isometric for your pipeline.

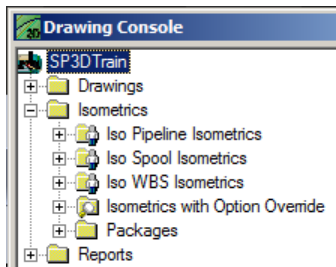
Select



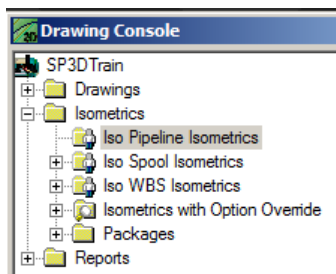
This dialogue will appear



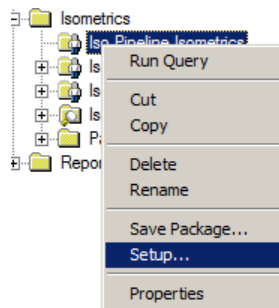
Expand the Isometrics tree



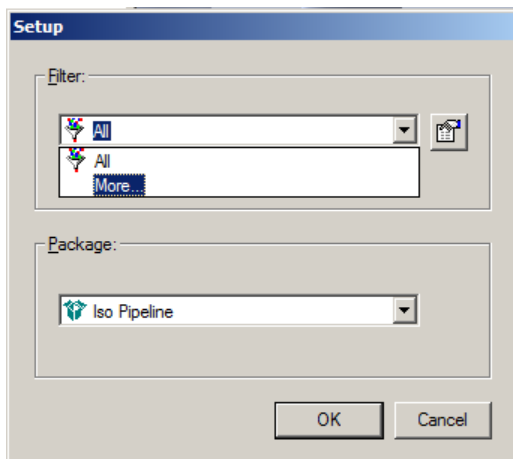
Expand the Iso Pipeline Isometrics tree then select any children at the top level and delete them by right clicking on the entry and choosing delete from the pop-up menu. Repeat until the Iso Pipeline Isometrics folder is empty as shown



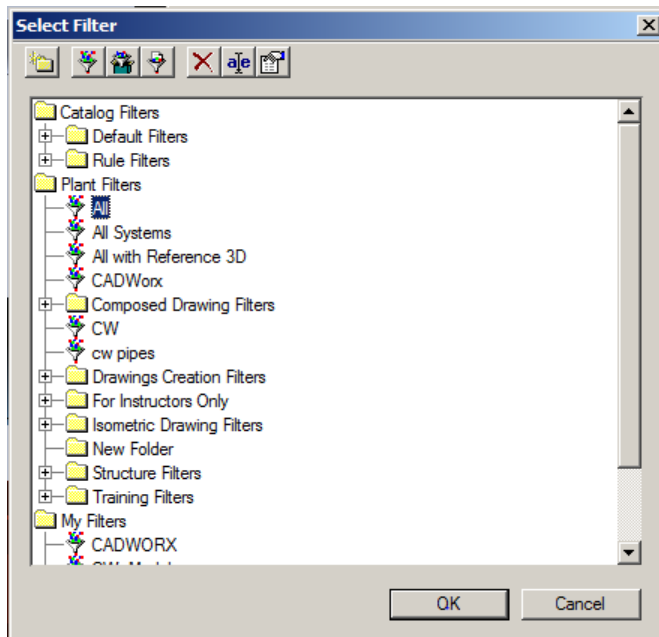
Right click on Iso Pipeline Isometrics and select Setup



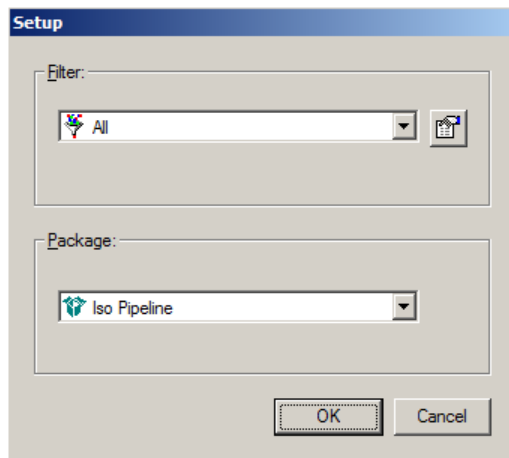
Pick More... from the drop-down



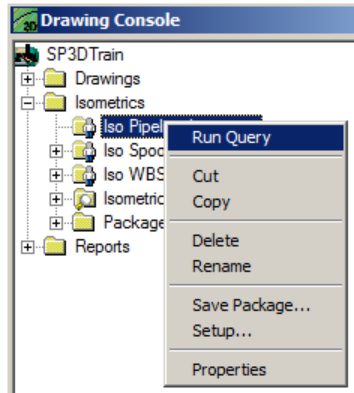
Pick All from the Select Filter dialogue then click OK



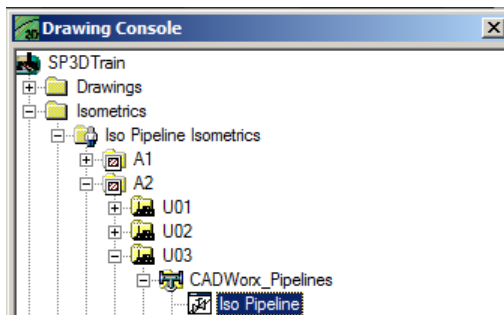
Click OK to close the Setup dialogue



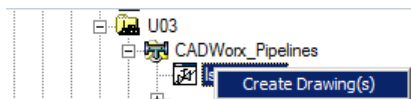
Right click and select Run Query



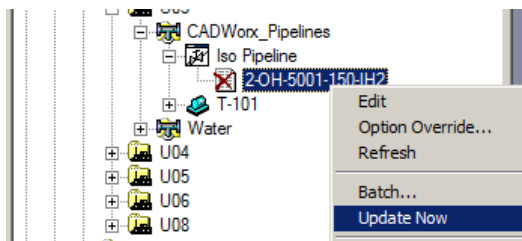
Please be patient whilst Drawing Console executes the query and populates the tree



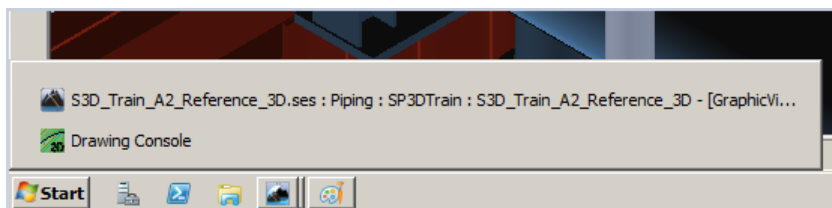
Right click on Iso Pipeline and select Create Drawing(s)



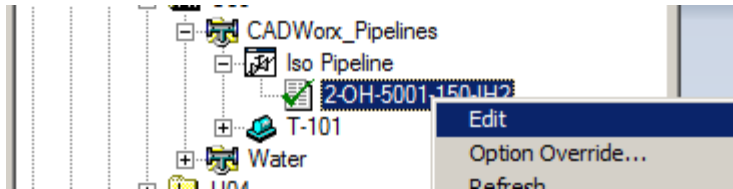
Right click and select Update Now




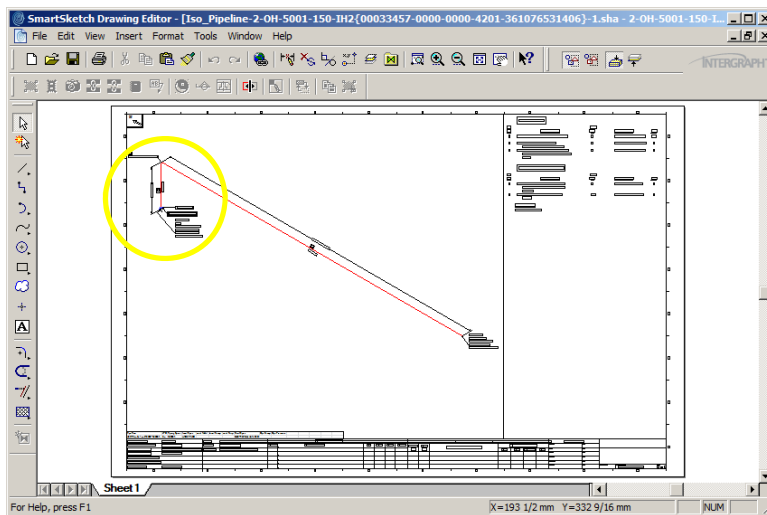
Drawing Console will have minimized itself to the Task bar, click to reinstate



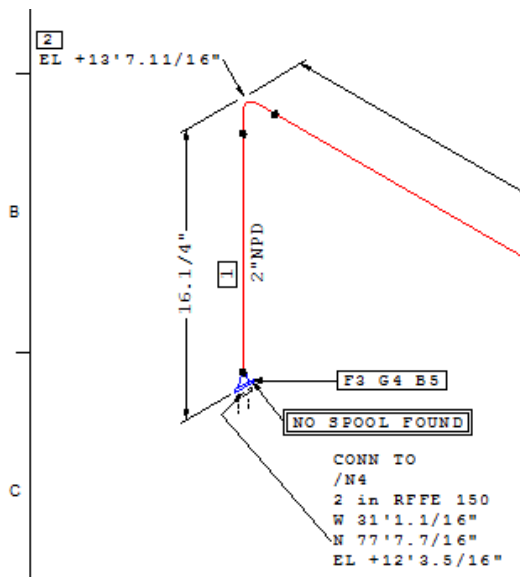
Right click on the drawing, which should include a green tick symbol, and pick Edit



Double click on the SmartSketch banner to maximize the main window then click  to fit the drawing



Use the Zoom tool  to zoom in to the highlighted area



Notice the connection to nozzle N4 on equipment E-101.

Unfortunately this is all we have time for during this workshop.

Don't forget to read the additional information found in Appendix I at the back of this document.

Complementary workshop

Feel free to attend this complementary session to be held in room #304/5 @ 15.30pm on Wed 4 June.

Session Detail

| | |
|-------------------------|---|
| Session ID | 2155 |
| Session Title | Using SmartPlant Interop Publisher Smart Models in Intergraph Smart 3D |
| Abstract | SmartPlant Interop Publisher (SPIOP) can be used for managing, positioning, and translation of Smart Models generated from various sources such as Smart 3D, PDMS, PDS, CADWorx, and other systems. This allows common mapping and data processing in SPIOP to reference the models into Smart 3D using SmartPlant Reference Data, and therefore the source-specific mapping can be eliminated. This hands-on workshop will explain the workflows and benefits of using SPIOP to reference 3D data into Smart 3D. |
| Track | Process, Power & Marine |
| Sub-Track | Project Execution |
| Focus Area | Design |
| Discipline | Piping & Mechanical |
| Length | 45 Minutes |
| Audience Type | User |
| Employee Speaker | Robert Stuchlik Senior Support Consultant Intergraph PP&M United States |
| Day and Time | Wed 4 June 15:30 |

Appendix I: Translating 3D models with SmartPlant Interop Publisher

Description and Business Value

The SmartPlant® Interop Publisher (Publisher, SPIOP) provides a single solution to handle various 3D model and data formats (graphics and object properties) for display and use in Intergraph SmartPlant Review, Smart 3D, SmartPlant Foundation, and SmartPlant Construction applications. (Note: an additional add-on module is required to publish to SmartPlant Foundation and SmartPlant Construction.)

Built upon proven technology, Publisher will simplify your project configuration by offering quick and effective integration of multiple 3D models from sources like PDS, PDMS, PlantSpace, MicroStation, AutoCAD, CADWorx, Caesar II, SAT, IFC, XMLPlant, i-model or even multiple Smart 3D sources. Source model graphics and object property files are mapped into a common graphic and data format. Consult the Intergraph web pages or product documentation for a complete list of supported source model formats.

Typical users include project managers, administrators, engineering leads, who need to prepare various 3D formats for use in the project. Add the source files to the project and translate the files, which results in the Smart Model that can be used with the Intergraph applications. If needed, you may optionally transform the resulting Smart Model (moving, rotating and/or scaling the model), or you can perform this step later in SmartPlant Review or SmartPlant 3D application themselves. You can then provide the Smart Model to joint venture partners for their use.

In Smart 3D, you attach the Smart Model as a reference to the Smart 3D project to view it and model against it. You can:

- Attach multiple Smart Models (reference files) from different sources to your Smart 3D model.
- Inspect and provide property views for the referenced model objects.
- Filter objects from referenced models based on their type and properties.
- Extract drawings using graphic and label rules, showing relative positioning of objects from referenced models with limited annotation.

In SmartPlant Review, you can open and combine Smart Models for design reviews. You can:

- Walk through the 3D Smart Models to understand the design or construction status during a design review
- Perform clash detection against objects in the Smart Models
- Perform motion collision detection by moving Smart Model objects along a path

In SmartPlant Foundation, you can register the Smart Models with the corresponding plant (Note: an add-on module is required to publish to SmartPlant Foundation and SmartPlant Construction.)

- Publish the 3D model graphic and object property data using the delivered mapping and data formats, delivered OOTB with Publisher
- If needed, custom properties that you wish to include in the translated model, you must map them using the Schema Editor in SPF
- In SmartPlant Foundation, query and view the 3D model along with associated links to other non-graphic data stored for with plant in SPF
- Using SmartPlant Construction retrieve components from the resulting Smart Model to create construction work packages

Business Value

You can use data from different sources such as PDS, PDMS, Tekla, AutoCAD, or Microstation files, and use the resulting model in Intergraph applications. SmartPlant Interop Publisher supports generic industry standards, such as Building Information Management (BIM), including Industry Foundation Classes (IFC), CIS/2, and others.

SmartPlant Interop Publisher provides solutions for business cases such as the following:

- Provides the ability to work with a wide range of datasets from Intergraph and non-Intergraph formats such as PDMS and XMpLant
- Model data in other formats such as PDMS and XMpLant can be translated to the format recognized by SmartPlant Enterprise applications. This allows for heterogeneous tools to be used on a single project.
- Supports disconnected workshare
- Because the data is translated to files at the source site and attached as a reference at the target site, live connection between the databases is not required. Periodic publish and update of the Smart Models allows multiple partners to work on a joint venture project.
- Allows for better security in joint venture projects
- Network connectivity is not required. The translated files can be transferred using any appropriate mechanism.
- Allows you to protect your intellectual property
- Share only what you want your partners or subcontractors to see by filtering specific sections of the plant or object properties you want to include or exclude from model data that is shared.
- Supports parallel design for increased productivity
- If a project has several similar units, only one unit has to be modeled and translated. This translated unit can then be attached multiple times with the required positioning.
- Allows for better use of survey data from laser scanning for construction and as-built projects

The converted 3D model can be viewed when displaying laser data in the SmartPlant Enterprise applications.

Translating CADWorx models to Smart 3D: MicroStation pre-requisite

MicroStation SELECTseries3 08.11.16.357 or later is used to access the RealDWG library, which will then use the CADWorx Object Enablers to translate the CADWorx proxy objects to give a true representation of the graphics in Smart 3D.

Natively, SPIOP uses the OpenDWG Library to translate AutoCAD documents. By default, this handles a standard AutoCAD file pretty well. However, AutoCAD documents can have “proxy” objects created by 3rd party vendors (MicroStation, CADWorx, etc.). In order to view those proxy objects in AutoCAD (not just the line-representation) you must use an “Object Enabler” to see the actual proxy object and not a stand-in object.

The OpenDWG library that Intergraph uses cannot load object enablers. This means natively, we can’t see proxy objects inside an AutoCAD file.

MicroStation uses the RealDWG library to translate AutoCAD documents. RealDwg can use object enablers to view/translate proxy objects.

SPIOP will first check for MicroStation, and if it is installed, use it to translate all AutoCAD documents. If not, it will roll back to its internal OpenDWG library. If it uses MicroStation, then it uses the (CADWorx) Object Enablers as well to translate any AutoCAD files and their proxy objects. Otherwise, it will use the internal library and will not translate the proxy objects.

Supported Formats

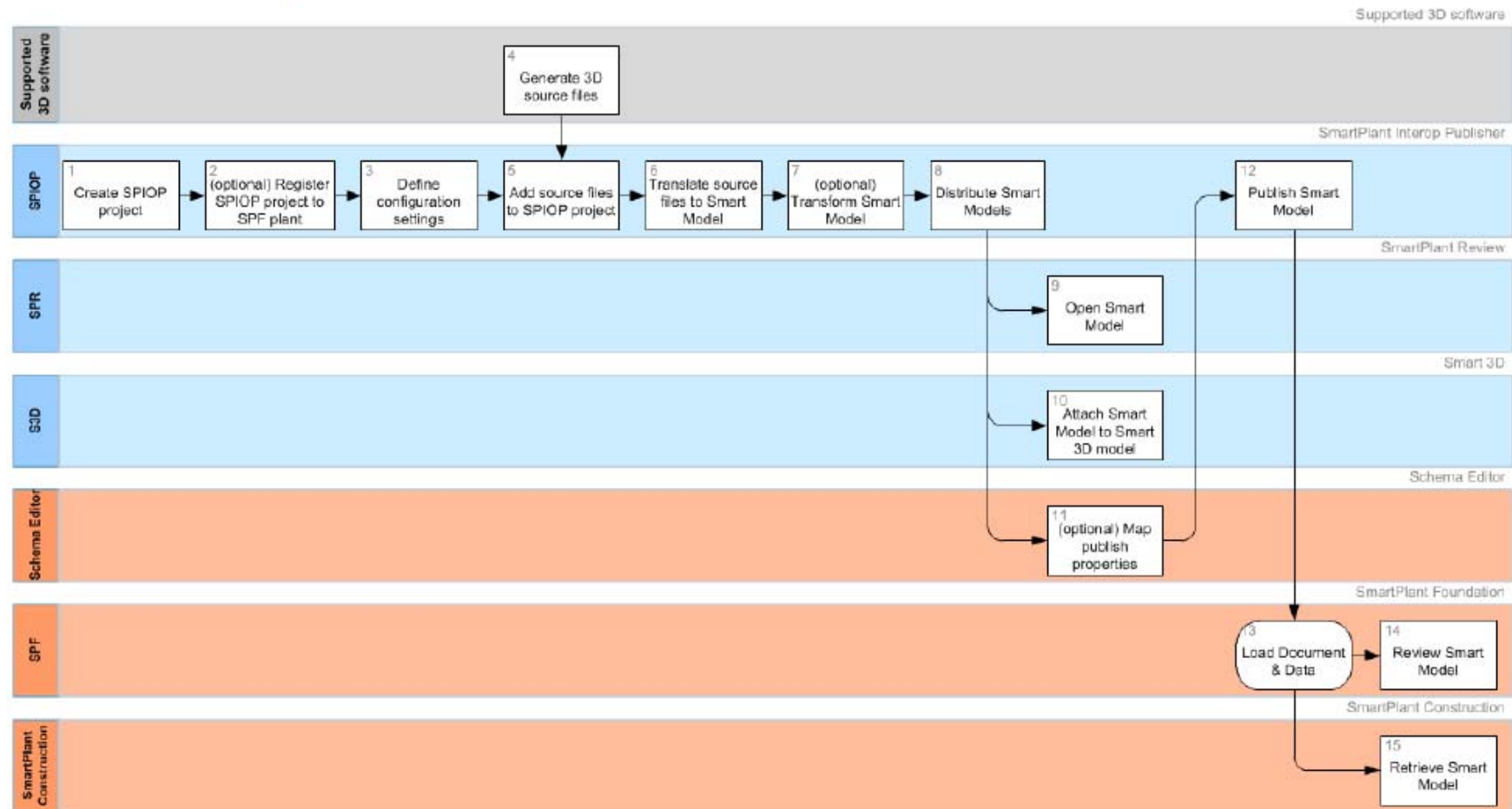
SmartPlant Interop Publisher enables you to work with file types from a variety of data sources as shown in the tables below. To further expand our data source coverage, SmartPlant Interop Publisher supports several generic formats, which can allow other systems or companies using these formats to also be supported.

In terms of Intergraph software, the following are supported:-

| Company | Application | Graphic File | Data File | SmartPlant Interop Publisher License | Notes |
|-------------------|--|---------------|-----------|--------------------------------------|---|
| Intergraph (SPE) | Smart 3D v2009.1 and above in an integrated environment | ZVF | XML | No | A license of SmartPlant Interop Publisher is not needed to reference this format in S3D |
| | Smart 3D v2009.1 and above in a non-integrated environment | VUE | XML | No | A license of SmartPlant Interop Publisher is not needed to reference this format in S3D |
| | Smart 3D Pre v2009.1 | VUE | XML | No | A license of SmartPlant Interop Publisher is not needed to reference this format in S3D |
| | Smart 3D using SmartPlant Review Direct | VUE | MDB2 | Yes | |
| | PDS, FrameWorks® Plus | DRI, DGN | DRV, TAG | Yes | |
| | ISOGEN® (IDF, PCF, POD) | IDF, PCF, POD | IDF, PCF | Yes | |
| Intergraph (ICAS) | CADWorx Equipment, CADWorx Plant, CADWorx Plant Professional | DWG | DRV | Yes | AutoCAD proxy-enabled objects are supported ¹ . |

¹ Requires Bentley MicroStation SELECTseries3 (08.11.09.357 or later) to be installed on the workstation used to handle CADWorx proxy objects via SmartPlant Interop Publisher.

Basic Workflow diagram



If you have any questions or queries, please feel free to contact me

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