AUTODESK UNIVERSITY 2013

Autodesk® Inventor® to Autodesk® Revit®: Building Product Manufacturing Workflow

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MA2467

In this class, you will learn how to use Autodesk® Product Design Suite to transform Autodesk Inventor models into intelligent models in Autodesk Revit for Building Information Modeling (BIM). We will focus on simplifying the Inventor model, removing intellectual property, adding necessary connectors and metadata, and finally, importing the model into Revit. We'll also describe how to add value to your simplified BIM models by creating compelling visualization materials with Autodesk® Showcase® visualization software.

Learning Objectives

At the end of this class, you will be able to:

- Simplify Inventor models to protect intellectual property and prepare for BIM exchange
- Recognize Inventor model features in order to export as native Revit models
- Transform non-Inventor CAD models into Revit models using Autodesk Inventor
- Add value to BIM models through Autodesk Showcase visualization tools

About the Speaker

Adam Smith is a Product Manager for Autodesk Inventor and lives in Portland, Oregon. He has an MBA in Innovation Management and has served as a fellow for the National Collegiate Inventors and Innovators Alliance. An inventor himself, Adam is constantly in awe of the amazing designs created by Autodesk customers.

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Inventor to Revit: Creating BIM Ready Content

The following exercises will teach you how to convert an existing Inventor assembly or part to become a native Revit Family file.

In this class, we will do the following:

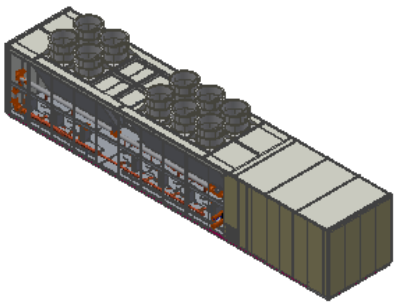
- Create an RFA file from an existing Inventor assembly
- Create an RFA file from an imported non-native part (Solidworks model)
- Create an ADSK file from an imported non-native part with BIM information and some further operations on ADSK file in Revit

Sample datasets which correspond to the exercise instructions can be downloaded from the course files website for:

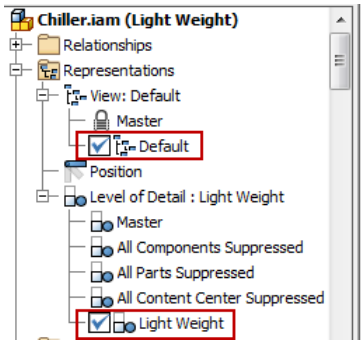
MA2467 Autodesk® Inventor® to Autodesk® Revit®: Building Product Manufacturing Workflow

Exercise 1 – Create a RFA file from an existing Inventor assembly

1. Open Chiller.iam in Inventor 2014 from \Chiller Exercise\Chiller.iam



2. Click **Simplify** tab in the Ribbon; make sure the current **View Representation** is “Default” and **Level of Detail** is “Light Weight” to help you get a good performance during the exercise.



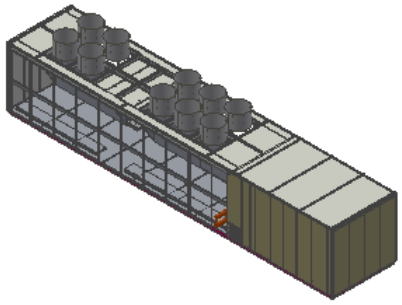
3. Use **Include Components** command to create a simple View Representation.

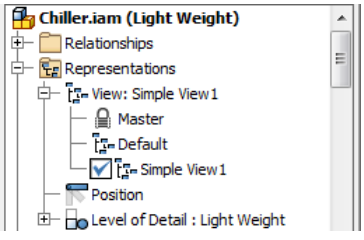
    a. Activate **Include Components** command in the **Simplify** tab.

    b. Pick the key components (including fan tubes, housing and pipes) from the graphic window by referring to the picture below.

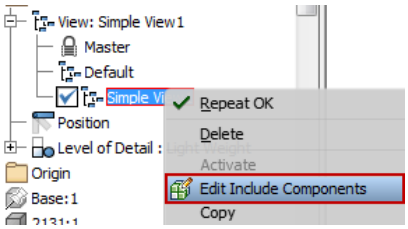
    c. Check on “Select all occurrences” option when selecting the fan tubes and pipes to reduce clicking times.

    d. Click **OK**, a new **View Representation** is created and called Simple View 1.

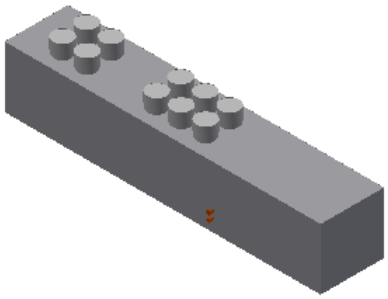




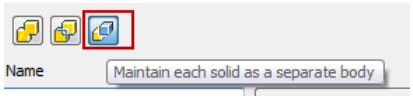
4. (Optional) Activate **Edit Include Components** command to add or remove components from the current View Representation, from the Right click context menu of the Simple View 1 browser node.



5. Activate **Define Envelopes** command. Replace the tubes with Bounding Cylinder, and replace the housing with a Bounding Box. Resizing is not needed in this model.

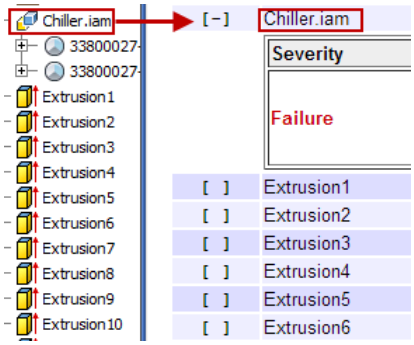


6. Activate **Create Simplified Part** command. Choose “Maintain each solid as a separate body” option, and click **OK**. Then a new simplified part will be created and opened.

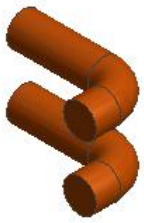


7. When the new simplified part is created, you will be guided to **BIM** tab. Activate **Check Revit Features** command, all features in the Model browser tree will be checked to find the feature that are not available for Revit feature translation. You will find a feature of “Derive” that doesn’t pass the checking from the report. You are suggested to go to BIM

Feature Recognize (**Recognize Revit Feature**) environment to convert this feature to be available for Revit.

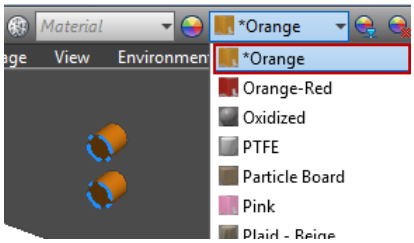


8. Activate **Recognize Revit Features** environment from the **BIM** tab, and choose the first option of “Keep features recognized by Revit” in the message dialog. So only these two elbow pipes will be involved in the feature recognition, and others will be kept outside of the **Recognize Revit Feature** environment.

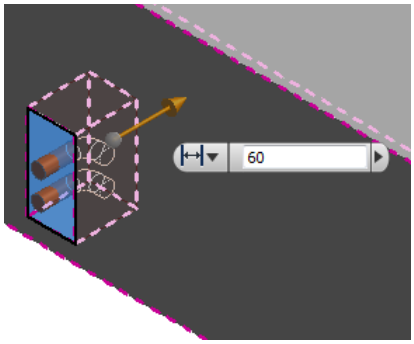


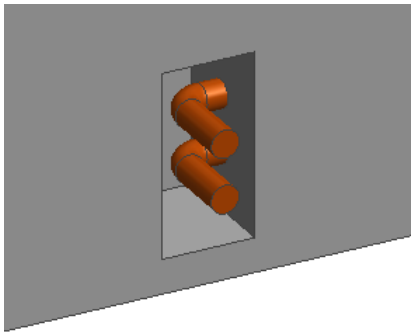
9. Activate **Recognize Sweep** command in **Recognize Revit Features** panel. Select the selection option of “Select Face” in the Mini-toolbar, and pick the Start and End face from the pipe. Click OK to recognize the sweep feature. After two sweep features are recognized, you can click **Finish Recognize Revit Features command** to exit the environment.

10. Add “Orange” color appearance for these two sweep features.

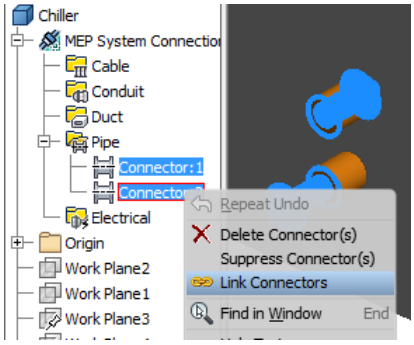


11. For this model, an extra feature is needed to be created. Switch to 3D Model tab, and create a cut Extrusion to make these two pipes to be visible in the housing box.

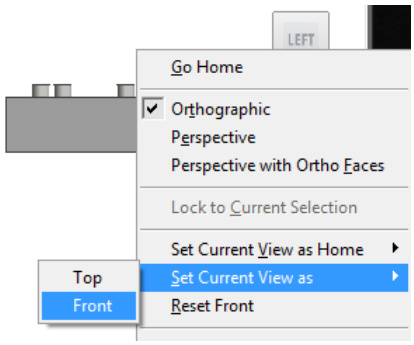


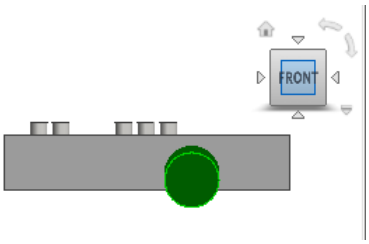


12. Switch back to **BIM** tab and activate **Check Revit Features** command again to make sure all features are available for Revit feature translation.
13. Activate **BIM Exchange** environment in the **BIM** tab.
14. Activate **Pipe Connector** command,
    a. Select the upper pipe face, and set
        i. System Type: Hydroid Return
        ii. Loss Method: Specific Loss
        iii. Flow Configuration: Calculated
        iv. Flow Direction: In
        v. Click Apply to Create.
    b. Select the lower pipe face, and set
        i. System Type: Hydroid Supply
        ii. Loss Method: Specific Loss
        iii. Pressure Drop: 4.51psi
        iv. Flow Configuration: Calculated
        v. Flow Direction: Out
        vi. Click OK to Create.
    c. Link these two connectors from the right click context menu.



15. Set the face in which the pipes are visible to be oriented to Front by changing the ViewCube.





16. Activate **Export Building Components** command,

    a. Select the File Type of Revit Family Files (*.rfa)

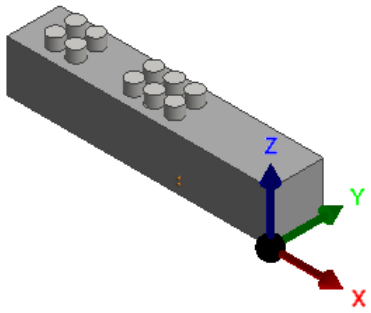
    b. Set the Component Type of “23.75.10.24.21 Cooling and Freeze Components” by searching “Chiller”

c. Input the Manufacturer name of “Mammoth” in the Component Properties list in Identity Data group.

d. Select the Orientation method of “ViewCube” and locate the insertion point in a corner by clicking and moving the trial sphere of the manipulator.

e. Click “Check Design” button to go through the list to make sure the connectors are health and the model complexity is low.

f. Click OK to export Revit Family file. Open the report to review translation details.



(Optional, if you have Revit 2014 installed)

17. Open the Revit Family file in Revit 2014, activate the 3D view and change the appearance style to be Realistic. During checking, you will find that

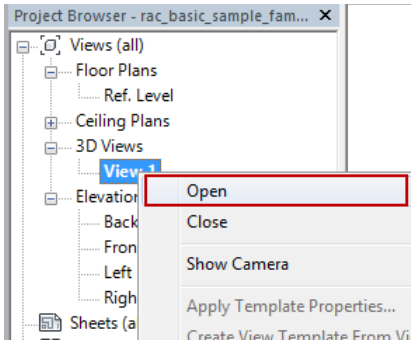
    a. The color is consistent with Inventor model

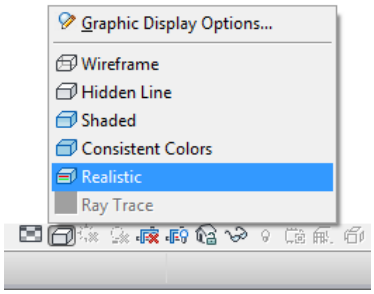
    b. The category and identity data is kept

    c. The connectors and its properties are kept

    d. The Orientation and insertion point is consistent with Inventor

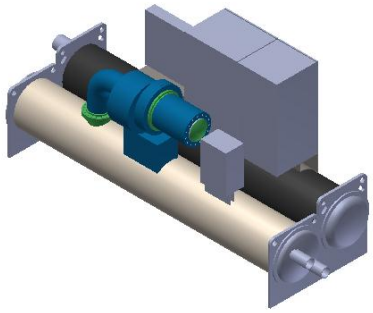
    e. Each feature is translated successfully. However, not all features can be driven directly by changing parameters so far. Some manual work is needed.





Exercise 2 – Create a RFA file from an imported non-native part (Solidworks model)

1. Open Solidworks part file “DAY chiller_YMC2 YM252514M1.SLDPRT” in Inventor 2014. All features will be converted to Base solids.

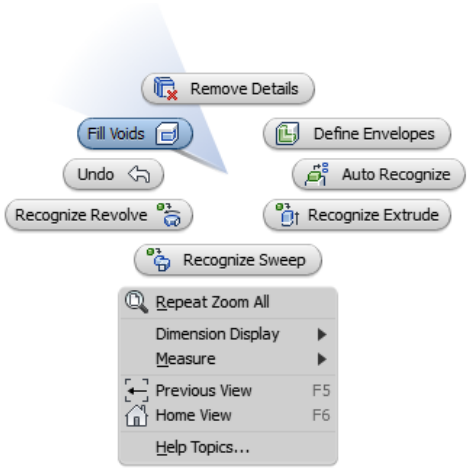


2. Click **BIM** tab in the Ribbon, and use **Check Revit Features** to check how successfully the features will be translated when export to Revit Family file.

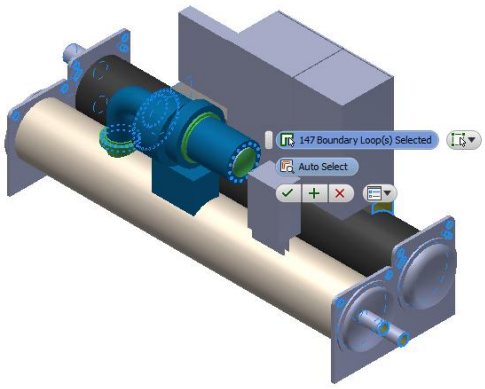
- Tips are provided for Failures in the report

Base1	Unsupported
Severity	**Message**
Failure	The feature type is not supported in Revit Family files. **Tips:** You can enter the BIM Feature Recognize environment by Revit

3. Under **BIM** tab, click **Recognize Revit Features** to enter **Recognize Revit Features** environment. Activate **Fill Voids** command in **Simplify** panel or **Marking Menu** (via right-click).

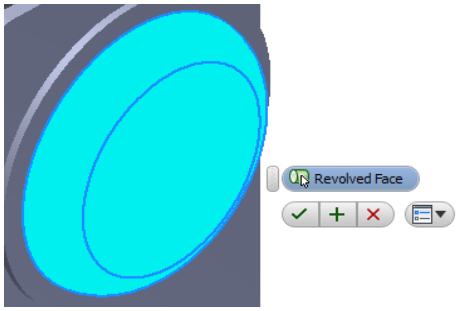


4. Click **Auto Select** in the “Fill Voids” mini-toolbar to select all voids, and click Apply or OK to fill selected voids.

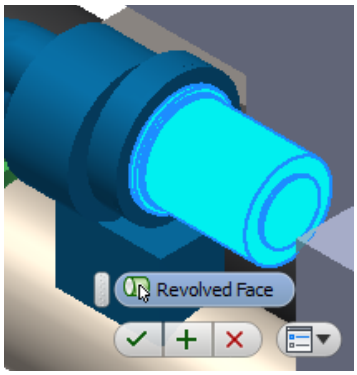


5. Activate **Recognize Revolve** command in **Recognize Revit Features** panel or Marking Menu. Pick **Revolved Face** from the model and then click Apply to recognize revolve feature.

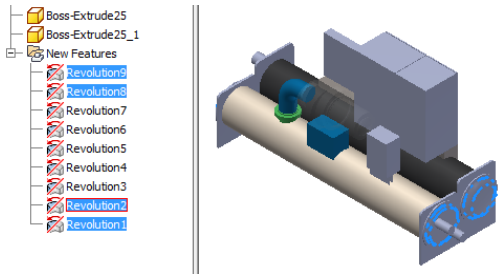
- Recognize four revolve features at the ends of Chiller.



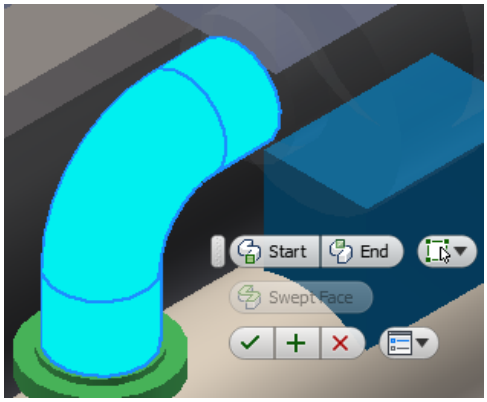
- Recognize five revolve features in the middle of Chiller (it is recommended to recognize dependent features from small to large)



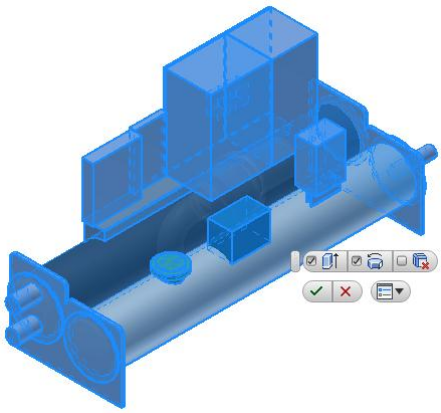
Recognized features will be shown Transparent in the graphic window, and new nodes are added in the browser tree.



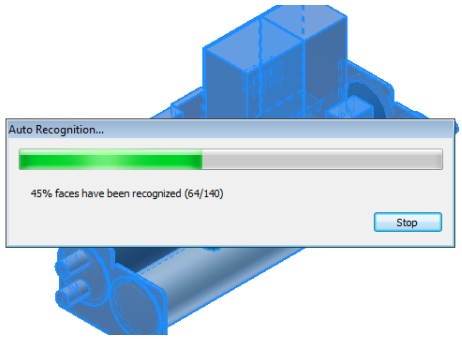
6. Activate **Recognize Sweep** command in **Recognize Revit Features** panel or Marking Menu. Select the selection option of “Select Loop” in the Mini-toolbar, and pick the Start and End loops from the pipe. Click OK to recognize the sweep feature.



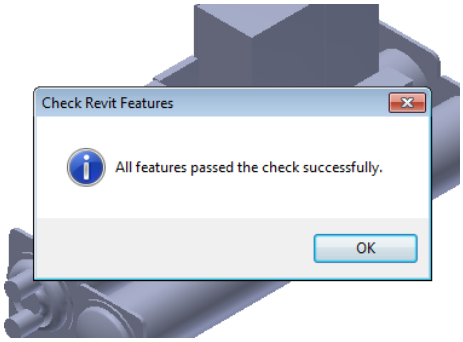
7. Activate **Auto Recognize** command in **Recognize Revit Features** panel or Marking Menu. Check off the option of “Remove Details” from Mini-tools and make sure “Recognize Extrude” and “Recognize Revolve” checked on. Click OK to recognize all of left features. After all features are recognized, you can click **Finish Recognize Revit Features** command to exit the environment.



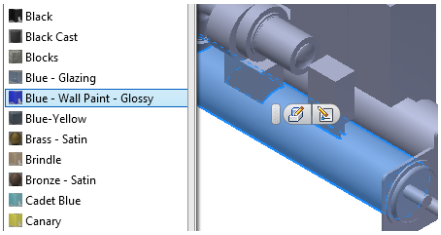
- A progress bar is shown when executing auto recognize and user can click Stop to cancel.

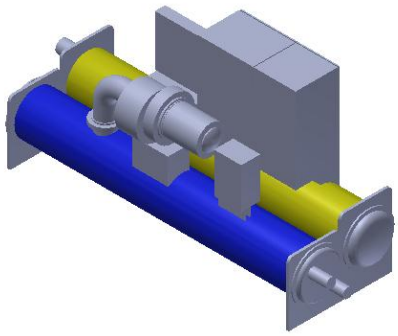


8. Click **Check Revit Features** under **BIM** tab again to check how successfully the features will be translated when export to Revit Family file. All features passed now.



9. Assign appearances “Blue – Wall Paint - Glossy” & “Yellow” two Chiller pipes separately. Save the file.



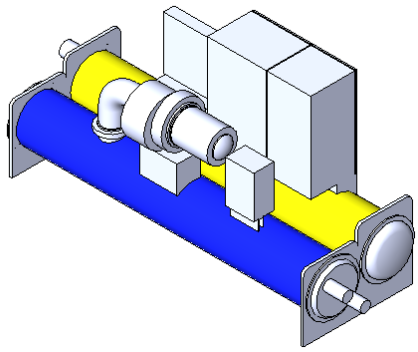
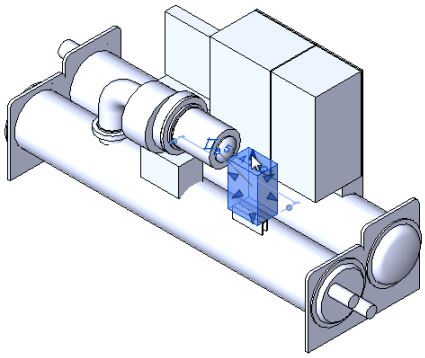
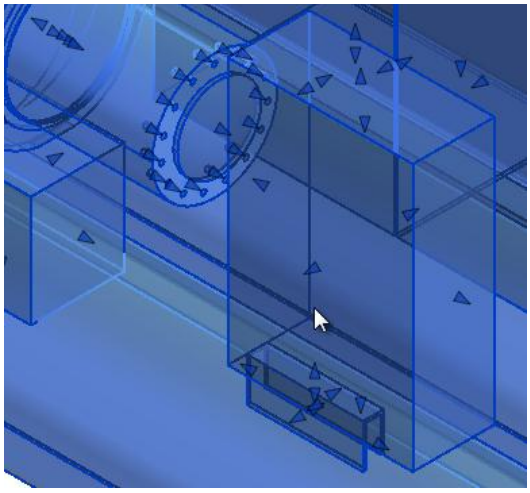


10. Click **BIM Exchange** to enter **BIM Exchange** environment. Activate **Export Building Components** dialog, choose **Revit Family Files** in the File Type and click OK. Enter a name to save RFA file in the Save Copy As dialog.

(Optional, if you have Revit 2014 installed)

11. Open the saved Revit Family File in Revit 2014. Activate 3D view and switch the appearance style to be Realistic. You can check:

- The appearance is consistent with Inventor model
- The Orientation and insertion point is consistent with Inventor
- Each feature is translated successfully.



12. Try to edit the features in Revit. E.g. changing the size.