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Put a Little Bit of Fusion 360 in Your Infrastructure

Steve Olson
MESA, Inc.

Learning Objectives

- Learn how to create 3D models of infrastructure elements in Fusion 360
- Discuss different methods for taking a model from Fusion 360 to InfraWorks
- Learn how to export Fusion 360 models in formats that are compatible with InfraWorks
- Learn how to import and place models from Fusion 360 in an InfraWorks conceptual model

Description

Are you struggling with modeling 3D elements for your InfraWorks conceptual model in AutoCAD software or 3ds Max software? AutoCAD and 3ds Max can do great jobs of modeling 3D elements for InfraWorks software—but there's a better option out there. Fusion 360 3D CAD/CAM software is a fun-to-use and easy-to-learn 3D modeling package that's capable of supplying models to InfraWorks. This course will start with an overview of how to model in Fusion 360. Then we'll discuss and explore the paths between Fusion 360 and InfraWorks, examining pros and cons of each method along the way. Finally, the instructor will demonstrate how to place these Fusion 360 models in an InfraWorks conceptual model.

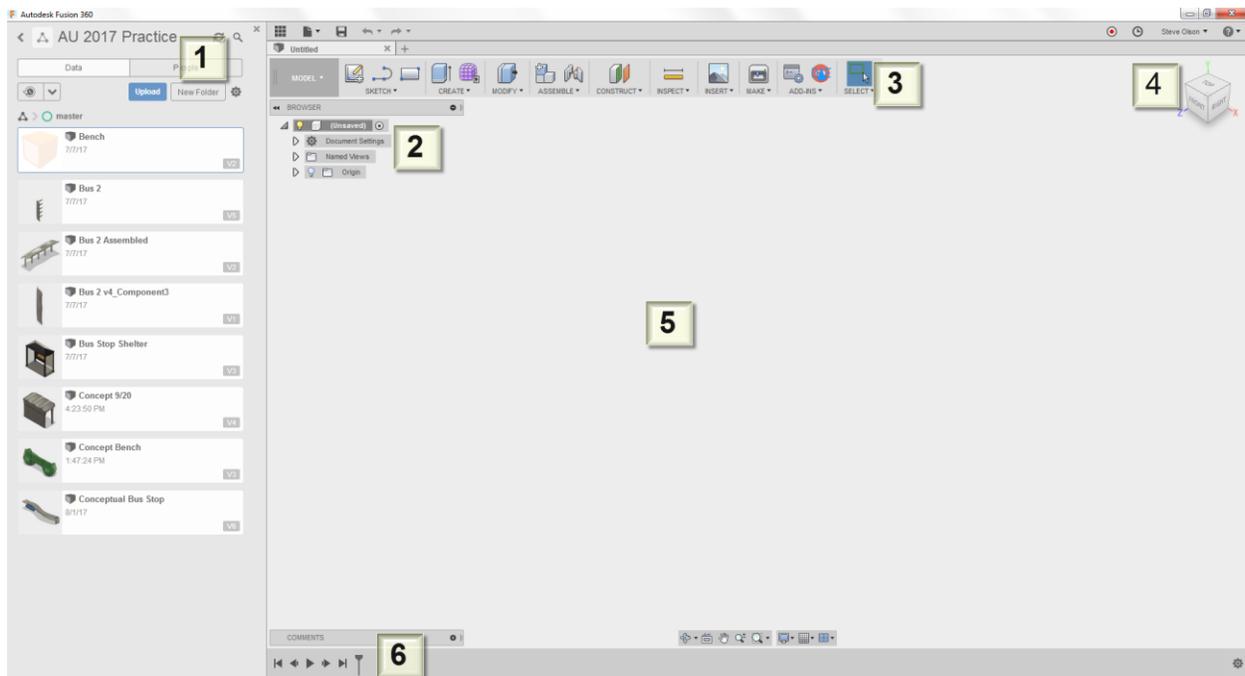
Speaker

Steve Olson is the Manager of Training Services at MESA Inc., an Autodesk Reseller serving Western Pennsylvania, Ohio, and beyond. He has over 12 years of experience with a variety of Autodesk Products, which include Inventor, Fusion 360, Vault, AutoCAD, AutoCAD Civil 3D, InfraWorks, ReCap, and more. Steve gained industry experience during his 5 years as a draftsman and Vault administrator for Fleetwood Folding Trailers, a manufacturer of RVs. At MESA, Steve teaches classes, develops and runs training programs, supports Autodesk products, and consults with customers regarding their use of Autodesk products. He is an Autodesk Certified Instructor, AutoCAD Civil 3D Certified Professional, and Fusion 360 Certified User. Since 2015, he has been serving as a member of the Autodesk Authorized Training Center Leadership Council. Steve has spoken at AU and MESA sponsored Events. He contributes course content to 3DTraining.com and operates the It's a CAD World blog and YouTube Channel.

Modeling in Fusion 360

Fusion 360 is a cloud-connected 3D modeling tool. Fusion 360 offers users two modeling workflows. One that utilized parametric sketches and features, the other is a direct modeling workflow. Fusion 360 is easy to learn and fun to use. However, this handout will not be an exhaustive how to, but can capture a few tips and tricks to contain some quick start information.

User Interface



1. Data Panel – Access to Projects and Designs
2. Browser – Access to Model Origin, Construction Geometry, Bodies and Components
3. Tool Bar – Simplified Interface with Tools and Drop-downs
4. View Cube – Navigation tool similar to most Autodesk products
5. Modeling Window – 3D modeling window
6. Timeline – Chronological history of the design showing sketches and features

Sketching

Most designs will be based on some sketched profile. Here are some tips and best practices related to sketches.

1. When the Sketch command is clicked, the user will be asked to pick a location for the sketch. Valid selections are flat model faces or surfaces, the part origin, and construction planes.
2. It is best practices to fully define your sketch with dimensions and constraints.
3. It is recommended to center the initial sketch on the origin as best as possible. This will better enable you to leverage the origin planes later for mirroring or creating joints.

4. Construction Geometry can be helpful when you have sketch entities that are not intended to close a profile.
5. Existing geometry can be Projected into a Sketch to help define the shape.
6. If sketching on a plane in the middle of the part, Slice can be used to visibly remove the part on one side of the sketch plane.

3D Modeling

Typically, the sketches are then turned into 3D features by Extruding or Revolving the sketch. Here are some tips and best practices related to part features.

1. Fillets, mirroring, and patterns can be done at the sketch level or feature level. It is best practices to do them with features because editing becomes easier.
2. Fusion 360 will allow for the creation of assemblies.
3. It is possible for your model to contain bodies or components or both. A benefit of components is that assembly joints can be defined. Assembly Joints can be animated through Motion Studies or the Animation Workspace.
4. Joints are geometric constraints between two components. There are several different types of Joints, each one removes a certain number of degrees of freedom.
5. If a component has been modeled in its proper location in an assembly, an As Built Joint can be created.

For additional instruction on how to model in Fusion 360, check out the following links:

Fusion 360 YouTube Channel

<https://www.youtube.com/user/AutodeskFusion360>

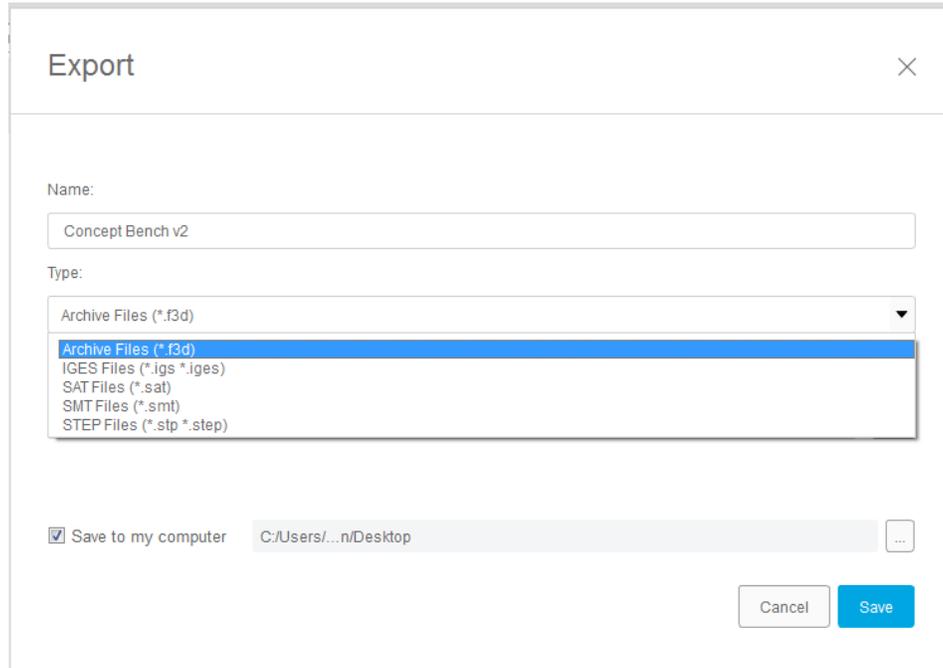
Fusion 360 Free Udemy Course (Free)

<https://www.udemy.com/product-design-fusion-360/>

Plus many more

Fusion 360 and InfraWorks Compatible Formats

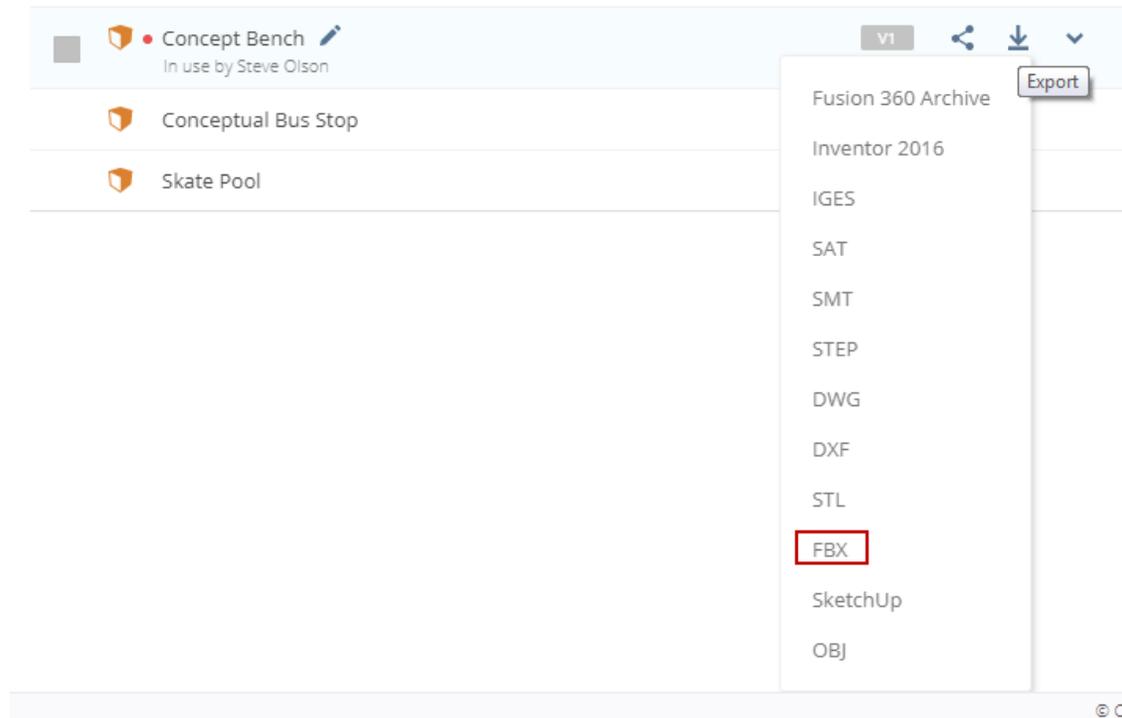
When going from one software to another, there are two big questions. First, what formats provide an easy transition. Secondly, is scaling going to be an issue. At first glance, you may find a disconnect between what Fusion 360 will export and what InfraWorks will accept. While in Fusion 360, the export options are standard formats, but limited in number. File formats like IGES, SAT, and STEP are pretty universally acceptable, especially in the manufacturing world.



One of my first attempts was to take the STEP file to AutoCAD and then take the 3D AutoCAD file to InfraWorks. That worked okay, but this approach had too many strikes for me. First, a two step process was undesirable. Also, the model didn't always carry the appearances, and there were scaling issue.

So, my next move was to look at the Fusion 360 App Store to find an add-in that would export to something like an FBX or DAE file. There were two that offered FBX export, but there was a cost associated with those appds. If you are like me, you don't like paying for apps. So I continued searching and found a free app that would export a DAE file. If are looking for a way to go from Fusion 360 to a DAE, you can find that app [here](#).

Then one day I discovered something that changed my approach to connecting Fusion 360 to InfraWorks. I heard that there was a way to export Fusion 360 model to an Inventor format from the Fusion Team site, which is the web site that sits behind Fusion 360 and provides data management and collaboration workflows. While I was exploring that option, I saw that Fusion 360 did offer a significantly larger list of possible exports, through this site, one of which was FBX. From that moment on, using the Fusion Team site became my go-to method for connecting Fusion 360 to InfraWorks. The only difference is that I have to wait a few minutes for Fusion 360 to generate the file. Then I get an email with the exported file attached.



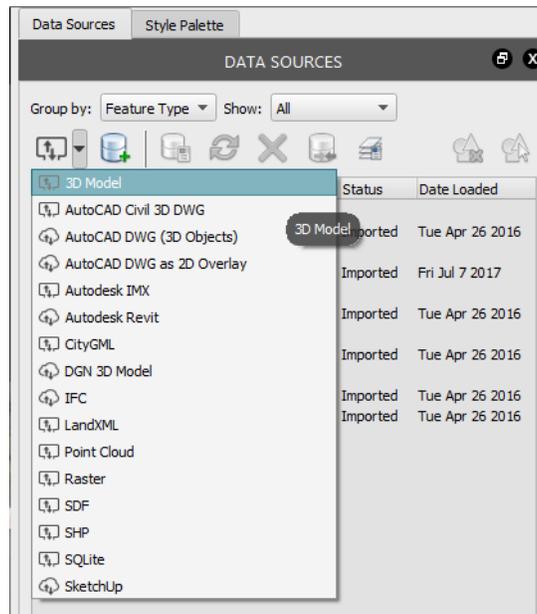
So now that I found my ideal file format, I had to make sure I didn't have any scaling issues. I can say that the FBX file format gave me fewer scaling issues than previous used methods. There are two ways to bring the FBX file into the InfraWorks model, connecting to it as a data source and importing it into a style. I have had no scaling issues when connecting to the FBX as a data source. When importing the FBX into a style, I have found that I would get a scaling issue if the model was last saved in units other than meters. I can tell that the InfraWorks reads the units of the FBX when I connect to it as a data source. It appears that InfraWorks does not do that when using the FBX as part of a style definition. The solution is really easy, just change the units in the Fusion 360 model to meters before exporting.

Taking Fusion 360 Models to InfraWorks

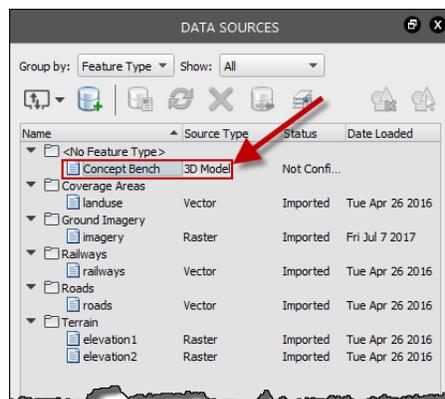
As previously mentioned, there are two methods for bringing FBX files into an InfraWorks model. First is connecting to the FBX as a data source and the other is importing the model to a Style.

Connecting to a FBX as a Data Source

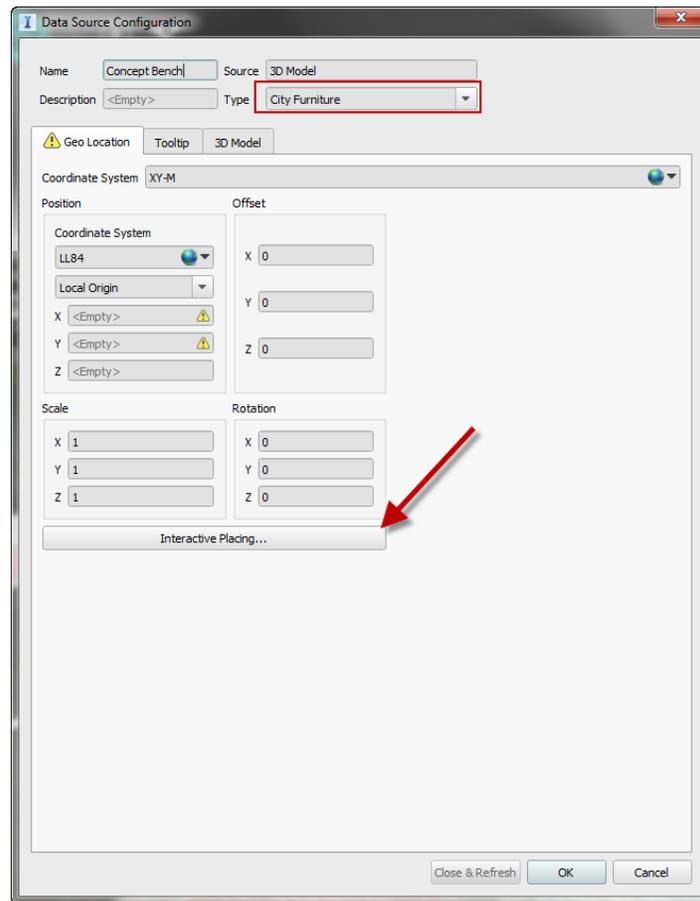
1. Open the Data Source palette. Click on the drop down that represents the types of connections that can be made and select **3D Model**



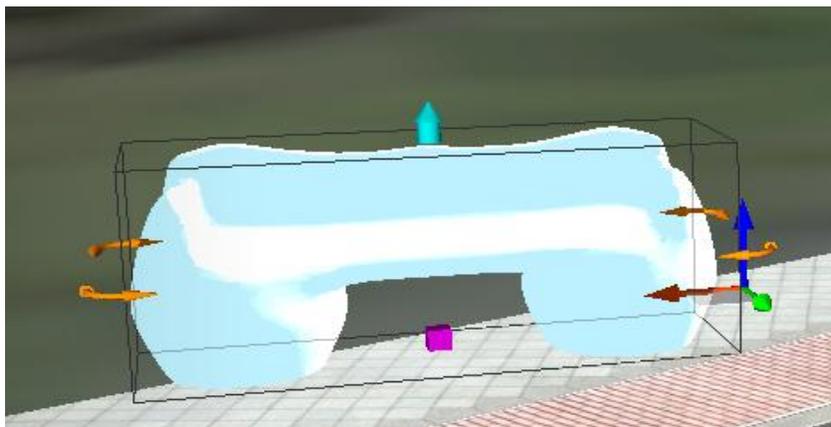
2. InfraWorks will open a dialog for you to browse to the data source file
3. The file will be added to the list of Data Sources. Most likely, InfraWorks will not automatically classify the file, so right click on the file and choose **Configure**.



4. In the Configure Data Source dialog, set **Type** to **City Furniture** then click **Interactive Placing...** to set the location for the model.

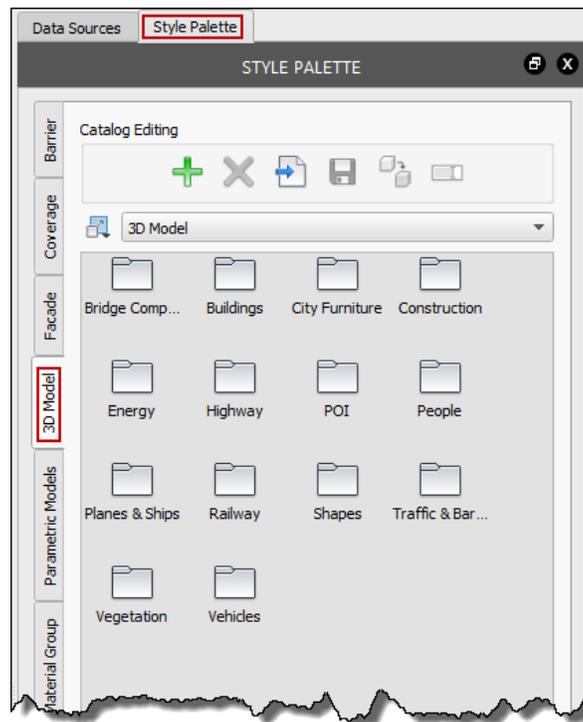


5. Click **Close & Refresh** to complete the placement of the model.
6. After the model is placed, if it needs to be rotated or moved, selecting the model will display movement handles for adjustments.

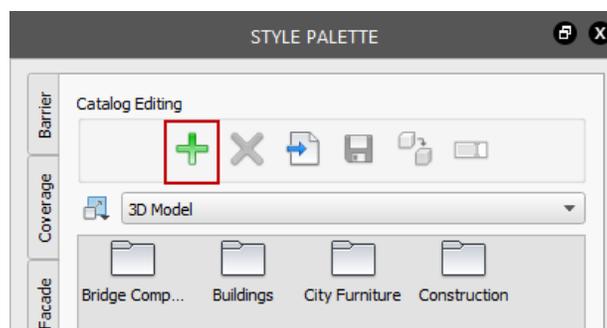


Using a FBX as Part of a Style Definition

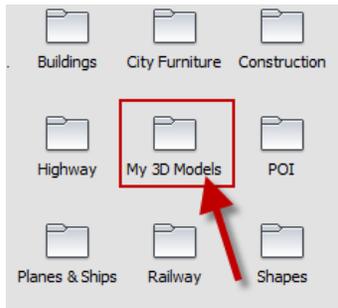
1. Open the **Style Palette** and click on the **3D Model** Tab



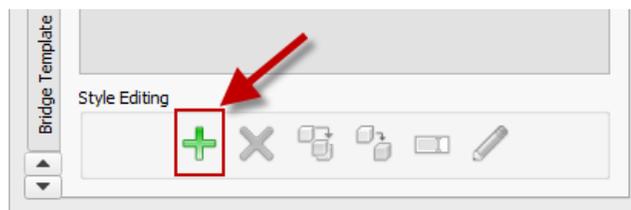
2. Add a new Style Catalog by clicking on the green + under Catalog Editing



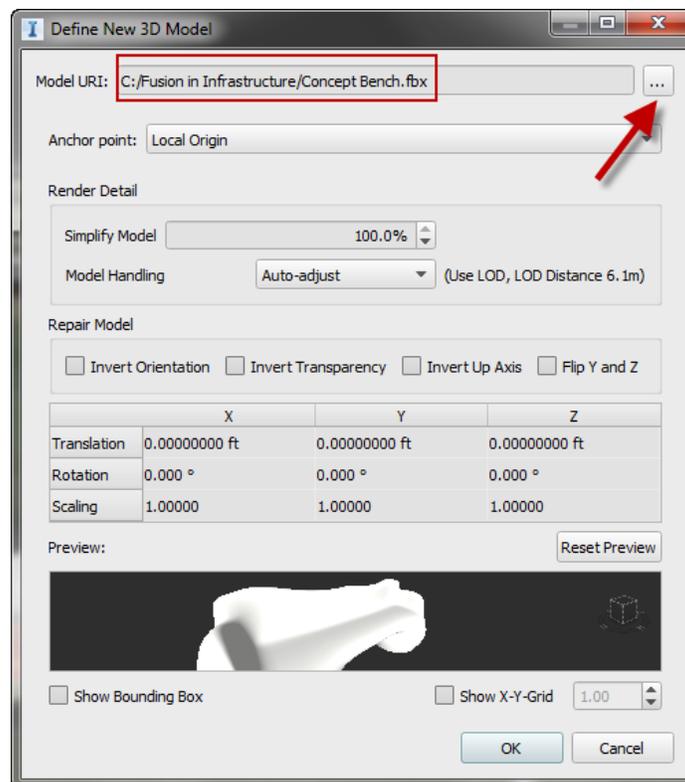
3. InfraWorks will create a new folder, name it something meaningful to you



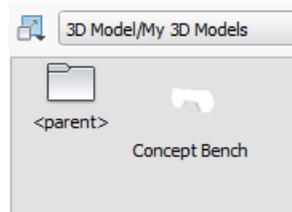
4. Double click to enter the new folder. At the bottom of the Style Palette, click on the green + to create a new style.



5. In the Define New 3D Model dialog, the first option is the 3D model for this style. Clicking the ellipsis will open a dialog for browsing to the file. The only other options that would be needed in this dialog would be the scaling, but if you exported the FBX file properly, scaling should not be an issue. Click OK.



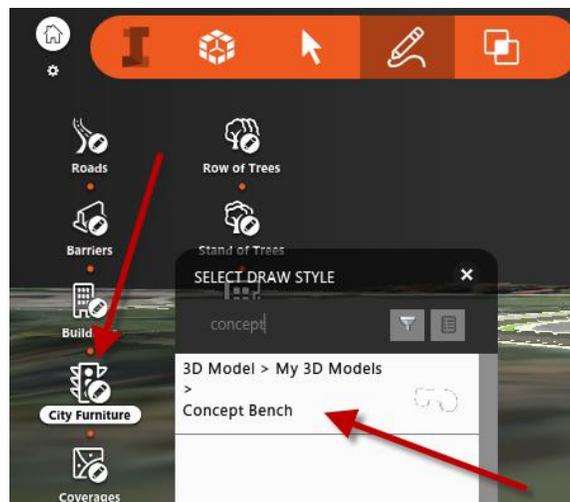
6. InfraWorks will then add the model to the Style Palette and wait for the name of the new style. Enter a meaningful name.



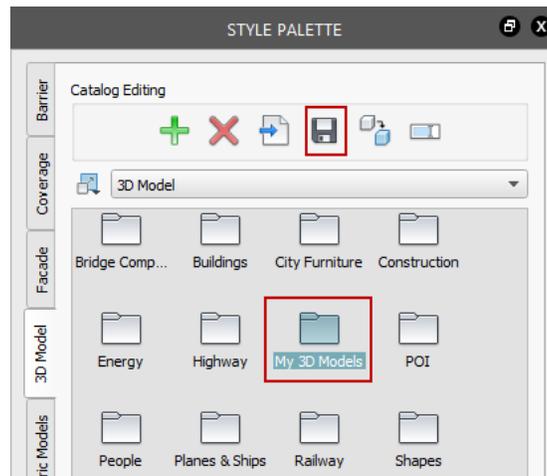
Placing Fusion 360 Models in InfraWorks

Each method for connecting to the model offers different placement techniques. The process of connecting to the FBX as a Data Source incorporates the placement as part of the configuration workflow, which was previously stated. So please refer back to that information for instructions how to place 3D models that are part of a Data Connection.

If the FBX was part of a Style definition, placement the model is done through the City Furniture command.



So all set right? Well for me, I did begin wondering if there was a way to share this new style with other models. For example, could I set up my Styles to pull from a network share location so all of my designs and projects could use this model? I have found that the best method for this right now is to export a Style Catalog. That is why the previous steps created a new Style Catalog. So to share this new style with other projects, all that needs to be done is select the Style Catalog and click Export Style Catalog. InfraWorks will then prompt for a name and save location for a JSON file that contains that Style Catalog. Then in the next project, that JSON file can be imported.



Conclusion

So for me, the toughest challenge was finding a way to get an FBX out of Fusion 360. Once I figured that out, the rest is easy. Of all the Autodesk tools that can generate the FBX for InfraWorks, I personally feel the most comfortable in Fusion 360. It is an easy to learn 3D modeling package. Hopefully, you give it a try, it should make generating 3D assets for InfraWorks a lot easier.