

# Autodesk Inventor Services & Support

Share

## Support

## Documentation

## Data & Downloads

## Training

### Skill Builders

#### Simulation

#### Assemblies

#### Content Center

#### Design Accelerator

#### Drawings

#### Inventor LT

#### Inventor Tooling

#### Manage Information

#### Parts

#### Routed Systems

#### Studio

### Interactive Tutorials

### Custom Training

### Training Centers and Certification

## Community

## Consulting

## Use Custom Structural Content to Create Frames

The first section of this Skill Builder explores the steps to add a single size and type of T-Slot structural content to the Content Center library. In the second section, you use the published content to create and modify a 3D frame with Frame Generator.

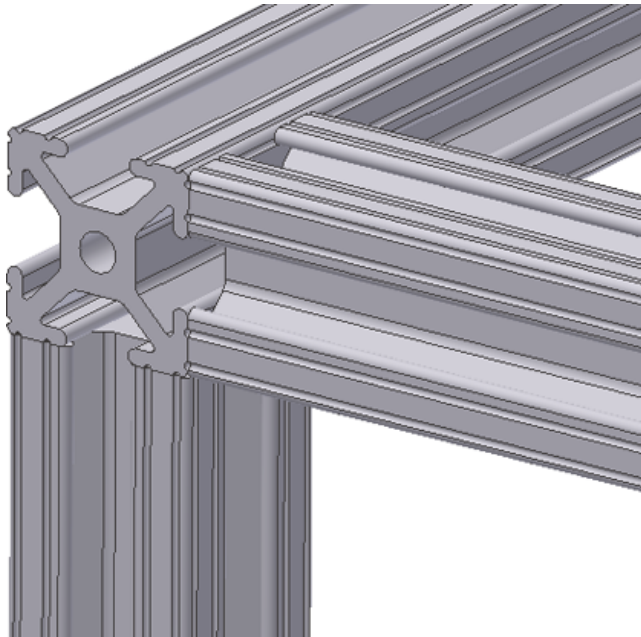
**Note:** If a part family contains multiple sizes we recommend that you create a table-driven iPart.

See these Skill builders for more details:

[iParts - The Basics](#)

[iParts - Beyond the Basics](#)

Estimated Time Required to Complete: 30 minutes



In this Skill Builder, you learn how to:

- Publish 1" x 1" tubing to a read/write library.
- Create a master part file to control the frame size.
- Create a frame with Frame Generator.
- Edit the master part file to change the frame size.

### Prerequisites

- Have Inventor 2010 with Content Center installed.
- Understand how to create a Project file.
- Understand how to open, create and save part files in your active project.
- Understand the fundamentals of solid modeling.
- Download (and unzip) the zip file containing the source file to use during this exercise to a folder in your active project.

### Download

 [1010\\_80\\_20.zip](#) (zip - 187Kb)

- The zip file contains 1010\_80\_20.ipt, a fully constrained part.

## System Settings

On the Application Options, Sketch tab enable the following settings:

- Edit dimension when created
- Autoproject edges for sketch creation and edit
- Autoproject part origin on sketch create

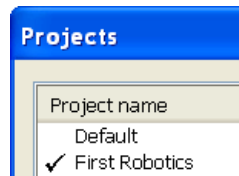
The Grid lines display is not enabled in any of the sketch environment images in this Skill Builder.

**Note:** You can specify the icon color scheme in Application Options. The appearance of the icons presented in this Skill Builder will differ if you are not using the color scheme noted in the following image.

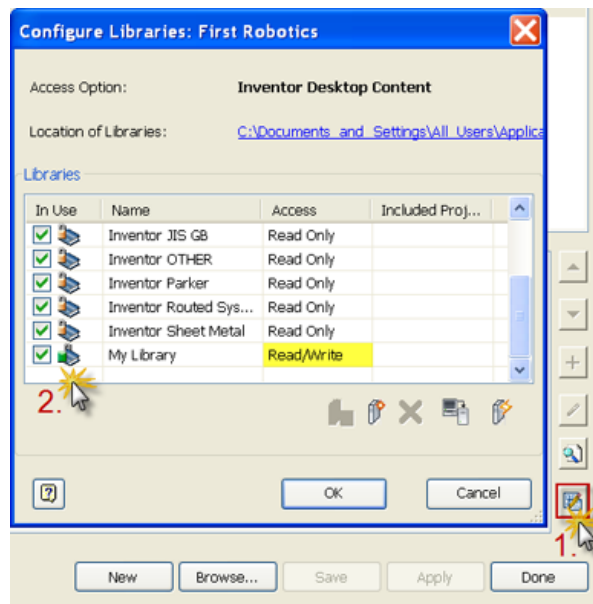


## Publish the steel shape

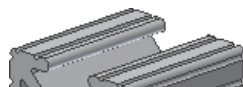
1. To begin, create and activate the required project file.

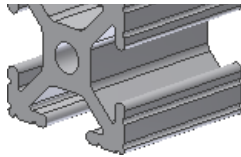


2. Click **Configure Content Center Libraries** in the Projects dialog box (1) and configure the active project to include a read/write library (2).



3. Open the file 1010\_80\_20.ipt



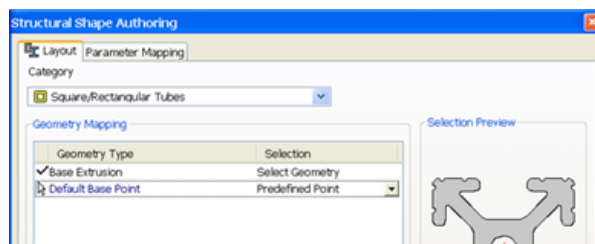


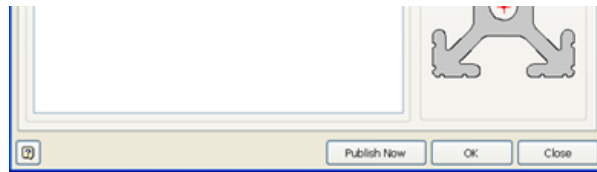
4. Right-click the top part node in the browser and select **iProperties**.
  5. Click the **Physical** tab in the iProperties dialog box. Notice that 6061 Aluminum is the assigned material and the part weighs 0.043 lbs.
- Note:** If the Mass value is not calculated, choose Update to display the value.
6. Close the iProperties dialog box.
  7. Click the **Manage** tab.
  8. Click  $\int x$  Parameters.
  9. Scroll to the bottom of the parameter names and note that Length, Width, and Height have been defined as parameters. Click **Done** to close the parameters dialog box.
  10. Select the drop-down in the **Author** panel and select the **Structural Shape** option as shown in the following image. The Structural Shape Authoring dialog box appears.



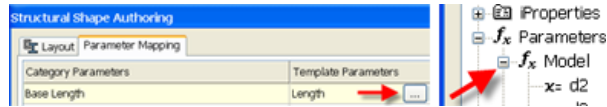
11. Specify the **Category**. Choose **Square/Rectangular Tubes** on the drop-down menu.
12. Accept the Predefined Point as the Default Base Point.

**Note:** If necessary, you can also choose the Select Geometry option to specify an insertion point.





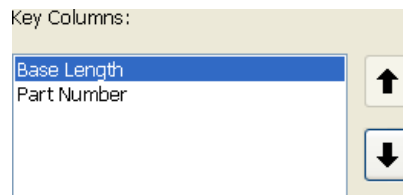
13. Click the **Parameter Mapping** tab. In the Template Parameters column, select the button in the **Base Length** row to open the part parameters. Scroll the **Model** parameter list and select the **Length** parameter to assign it to Base Length.



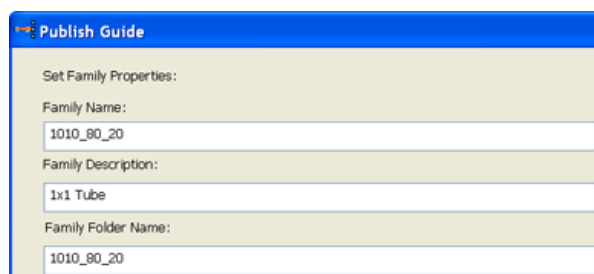
**Note:** The only required parameter for Frame Generator authoring is the base length.

14. Select **Publish Now** when the length parameter value has been assigned.
15. Click **OK** in the message box that appears indicating the part has been modified by the publish process.
16. On the Publish Guide dialog box, select the Read/Write library to publish to (My Library), specify the language (English) and then click **Next**.
17. Choose **Square/Rectangular Tubes** as the Category and then click **Next**.
18. Review the mapped *Family Columns to Category Parameters*. Verify length is assigned. Click **Next**.
19. Define Family Key Columns. In this case, Base Length and Part Number are values we want to track. Click to add them to the Key Columns panel.

To match the following image, use the arrows on the right side of the dialog box to make Base Length the first key value and then click **Next**.



20. Set the values specified in the following image and then click **Next**.

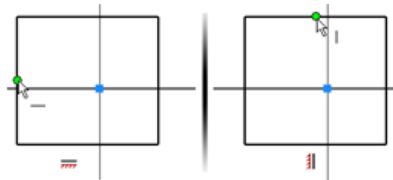


21. Select **Publish** in the final dialog box.
22. A message box appears that states Publish completed successfully. Click **OK** to close the message box.

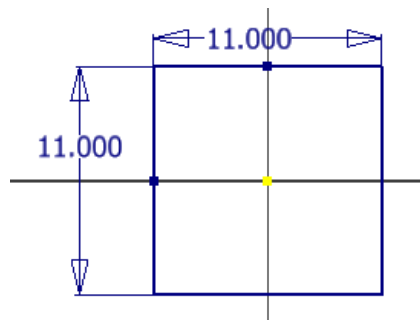
### Create a frame using the published shape

In the next section, we will create a master (skeleton) part file to specify the centerline to centerline dimensions of the frame.

1. Start a new inch part file.
2. Create a rectangle centered about 0,0,0.
3. Add Horizontal and Vertical constraints between the midpoints and the origin as shown in the following image.

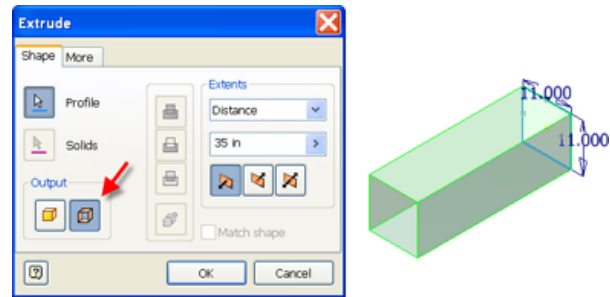


4. The required width of the finished frame is 12 inches in both directions. The default frame generator placement method is about the centerline. For this reason, we will define the master part to be 11 inches square to allow for 1/2 inch on each side.
5. Dimension the part 11 inches in each direction as shown in the following image.



6. Finish the sketch.
7. On the Model tab, Create panel, choose **Extrude**.
8. Select the Surface option on the dialog box. A surface is used because it has no mass or volume and does not affect the frame weight calculation. Set the extrude distance to 25 in to create a 25 inch finished frame.

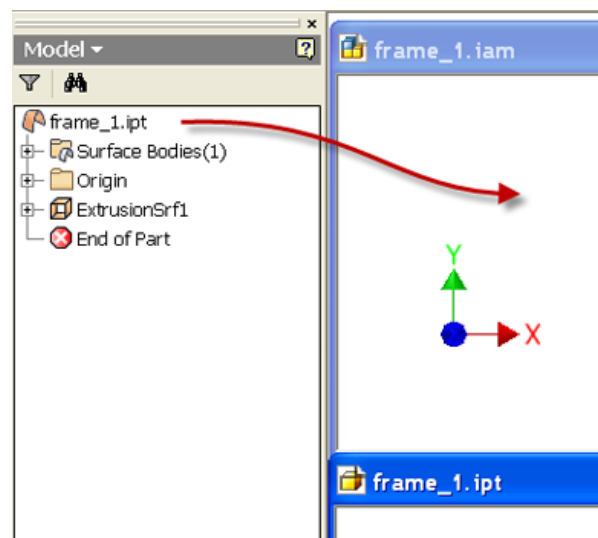
distance to **35 in** to create a 36 inch finished frame size.




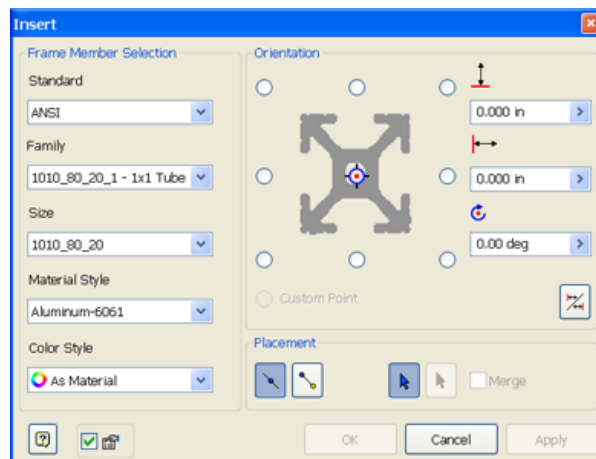
9. Click **OK**.
10. Save the part as **frame\_1.ipt**.
11. Start a new assembly file.
12. Save the file as **frame\_1.iam**.
13. Insert the part file **frame\_1.ipt** into the assembly file.

**Tip:** You can use the Place component command or the drag and drop method to insert the part in the assembly. To drag the part into the assembly:

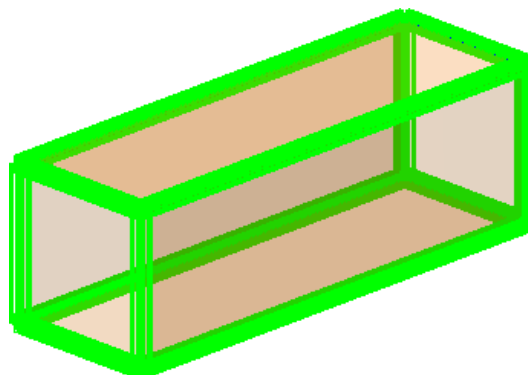
- Use the Arrange button on the bottom of the screen to tile all open files in a single window.
- Activate the part file window, highlight the top node in the browser, and then drag the part into the assembly window to insert as shown in the following image.



14. After you place the part in the assembly, maximize the assembly window.
15. Click the **Design** tab, and then click  **Insert Frame** in the Frame panel.
16. In the Insert dialog box, set the following values:
  - Standard = ANSI
  - Family = 1010\_80\_20 – 1x1 Tube
  - Size = 1010\_80\_20
  - Material Style = Aluminum-6061



17. Select all edges of the rectangle as shown in the following image.




18. Click **OK** to close the Insert dialog box.
19. Click **OK** in the Create New Frame dialog box to accept the defaults.

20. Click **OK** in the Frame Member Naming dialog box to accept the defaults and create the parts.

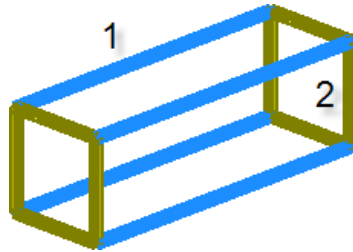
Notice that all parts overlap.

21. The original skeleton surface part is still visible. Right-click the part in the browser and select **Visibility** to set the part status to not visible.

22. In the Design tab, Frame panel, start the  Trim To Frame command.

23. For the trim operation:

- Choose the long frame members for the first selection (labeled 1 and colored blue in the following image)
- Choose the short frame members for the second selection (labeled 2 and colored yellow in the following image)
- Click **Apply** and then repeat the trim operation until all members are trimmed to the intersection.



**Tip:** A suggested order is to trim the top of the frame first. The bottom of the frame second, and the ends last.

24. Click **OK** for the last trim operation or **Cancel** when all members have been trimmed.




25. Right-click the top node in the assembly file and click **iProperties**.
26. Click the physical tab. Click **Update** to recalculate the Mass.
27. Notice the frame weight.
28. Click **Close**.

### Modify the frame

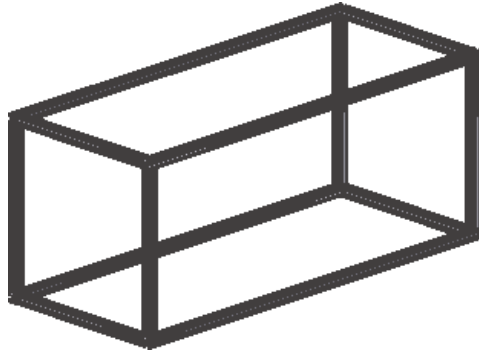
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1. Right-click the surface part file in the browser and choose **Open**. The surface part file opens in a new window.
2. Right-click **Sketch1** in the browser and choose **Edit Sketch**.
3. Change both 11-inch dimensions to 17- inches to create a frame that is 18 inches wide.
4. Finish the sketch.



5. Right-click the surface extrusion in the browser and choose **Edit Feature**.
6. Change the extrusion distance to 41 in to create a frame that is 42 inches long.
7. Save the part file.
8. Return to the assembly file window.
9. On the top menu, click  **Local Update**.
10. The frame is modified to the new dimensions.
11. Save and close the file.

Congratulations, you have completed the *Using custom structural content to create frames* Skill Builder.



Let's review your accomplishments...

### Summary

In this Skill Builder you:

- Configured a read/write library.
- Published a custom structural shape to the content center.
- Created a master (skeleton) part to control the frame dimensions.
- Created a frame using the master part to define the size and the published content to define the structural members.
- Trimmed the frame members.
- Calculated the frame weight.
- Edited the master part to modify the frame size.

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