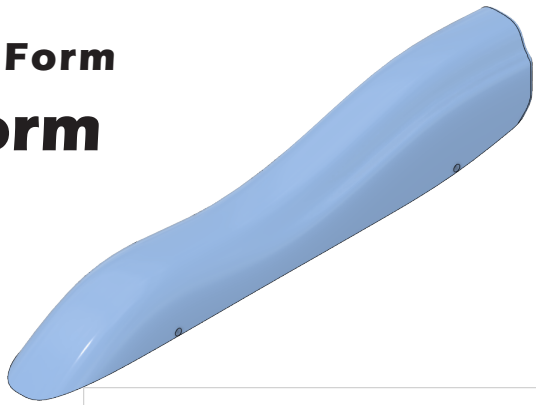
Chapter 3

CO2 Rail Car Form

Body Form



A. Save as "BODY RAIL FORM.

Step 1. Open your **BLANK** file.

Step 2. Click File Menu > Save As.

Step 3. In the Save As dialog box:
Key-in **BODY RAIL FORM** for filename, **Fig. 1**
Confirm **folder is RAIL FORM**
click Save.

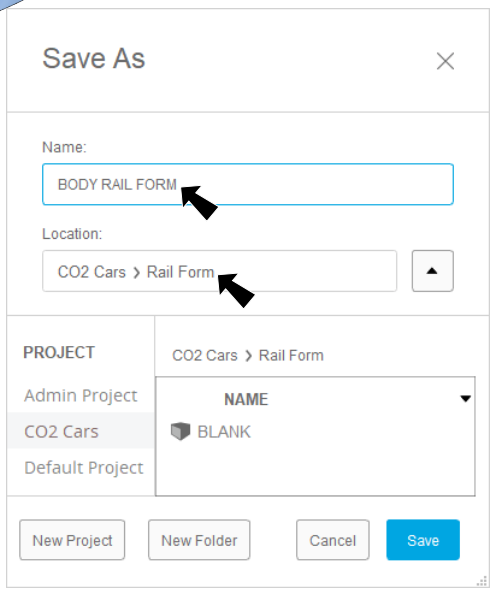


Fig. 1

B. Appearance Blue Paint.

Step 1. Display the Appearance panel, use **A** key.

Step 2. In the Appearance Panel:
under Library, **Fig. 2**
scroll down to Paint and expand Glossy
drag Glossy Blue onto body in canvas, **Fig. 3**.

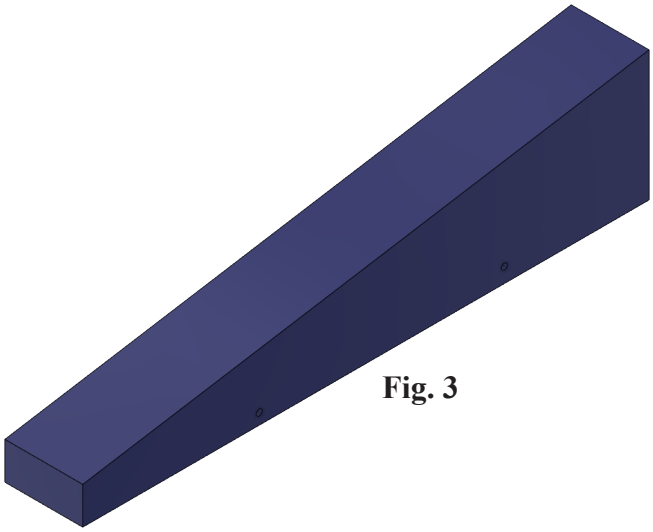


Fig. 3

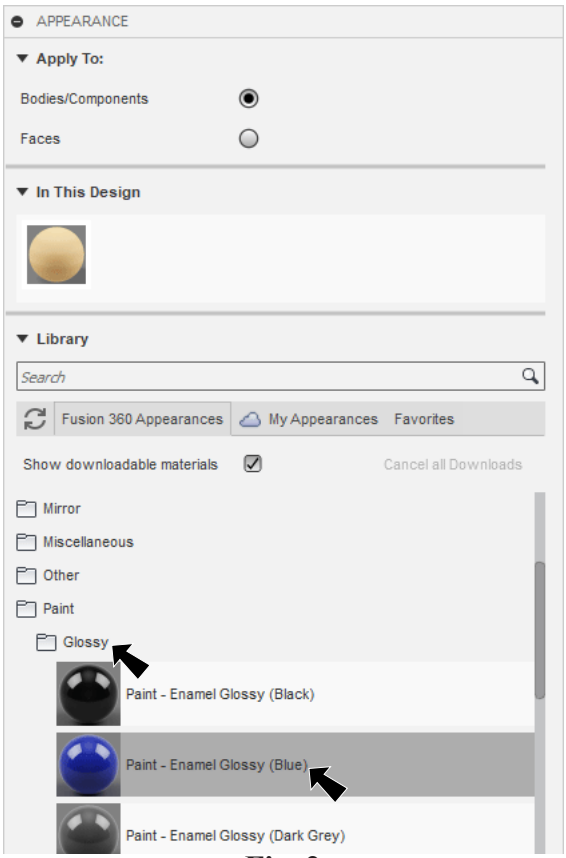


Fig. 2

Step 3. In the Appearance Properties panel:
under In This Design, **Fig. 4**.
double click the **Blue swatch**.

Step 4. In the Material Editor:
Rename **Glossy Light Blue**, **Fig. 5**.
set **RGB values:**
R 152
G 193
B 255
click **Done.**

Step 5. In the Appearance Panel:
click **Close**.

Step 6. Save. Use **Ctrl-S**
and press ENTER.

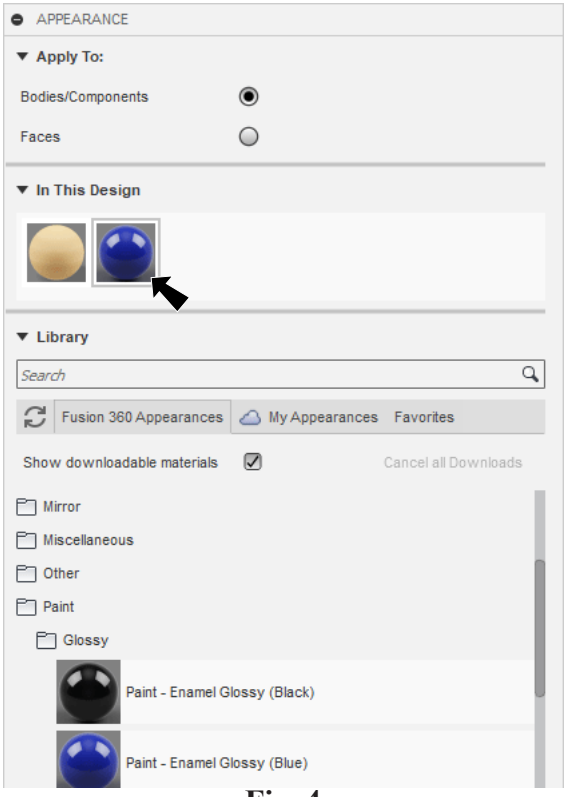


Fig. 4

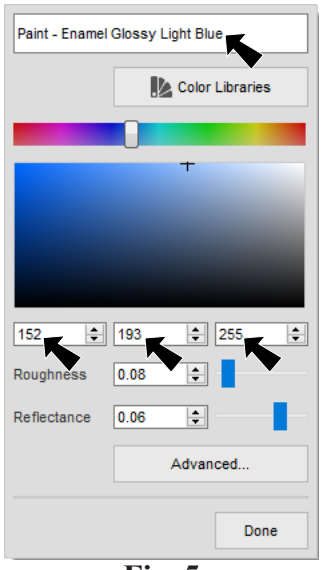


Fig. 5

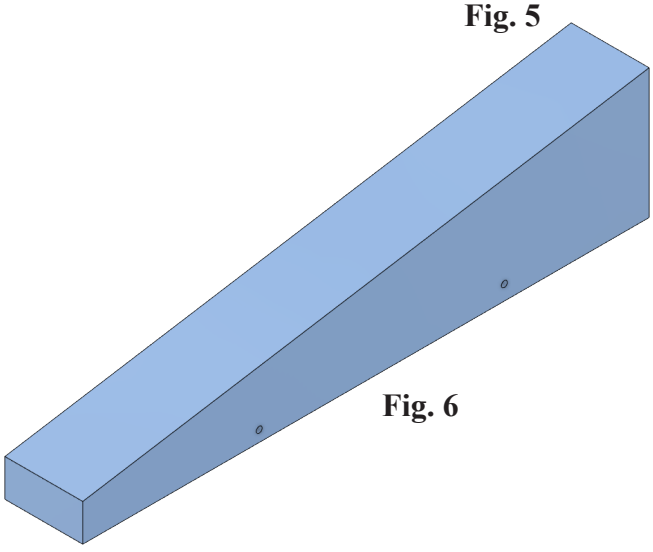


Fig. 6

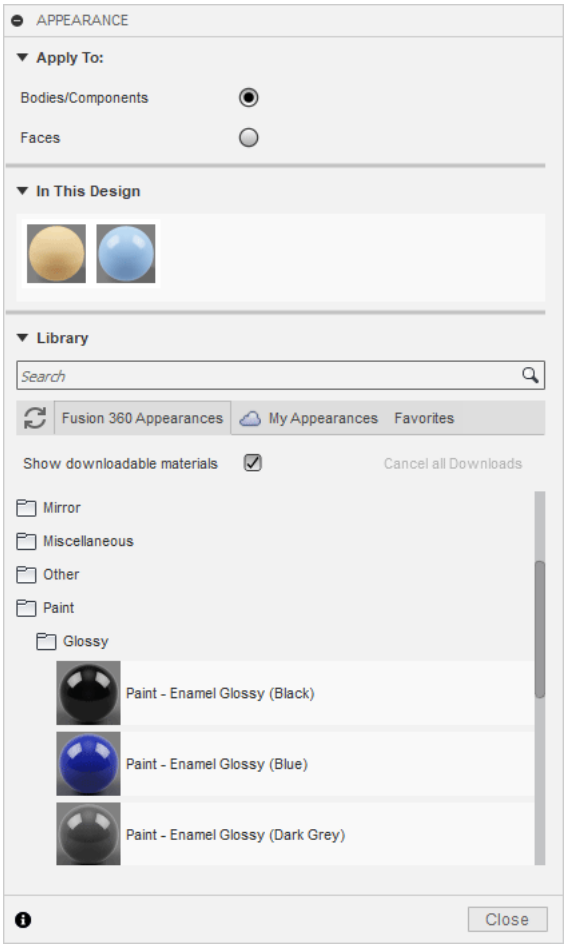


Fig. 7

C. Create Form Top.

Step 1. On the Solids tab SOLID click **Create Form** .

Step 2. On the Form tab FORM click **Plane** in the Create area of toolbar.

Step 3. In the Plane panel set, **Fig. 8**
Rectangle Type **2-Point**
click **top face** of body, **Fig. 9**
Drag a **plane from rear corner across to opposite edge of top face of body**.

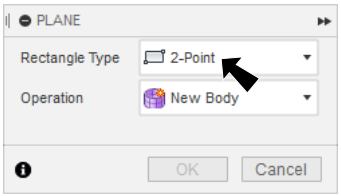


Fig. 8

Step 4. In the Plane panel set, **Fig. 10**
Length **260**
Length Faces **5**
Width Faces **4**
Symmetry **Mirror**
check **Width Symmetry**
click OK.

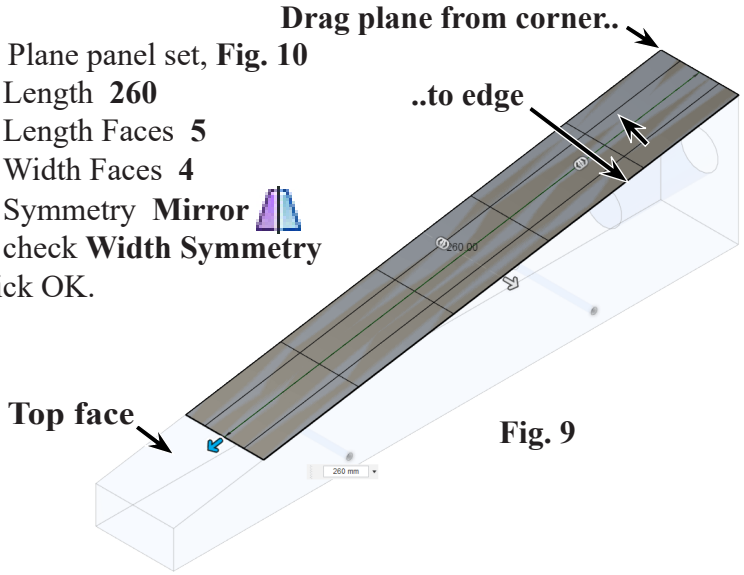


Fig. 9

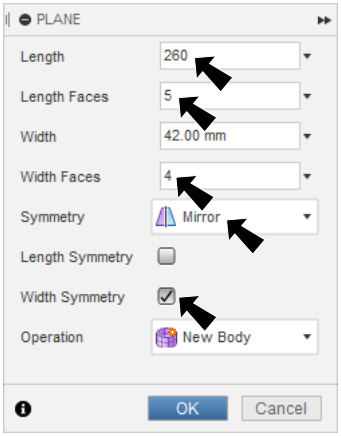


Fig. 10

D. Edit Form.

Step 1. Enable **Multiple Viewports** (**Shift- 1**). To enable Multiple Viewport, click the Viewports pull-down in the Navigation Bar at the bottom of the canvas and select **Multiple Views**, **Fig. 11**.

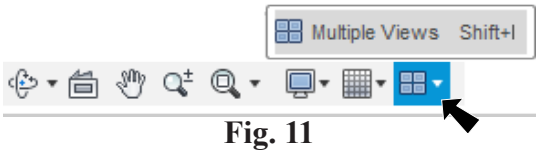


Fig. 11

Step 2. Use **F6** to **Fit** in both **Front Viewport** and Right **Side Viewport**.

Tip: Use **Shift-1** to switch between Multiple and Single Viewports.

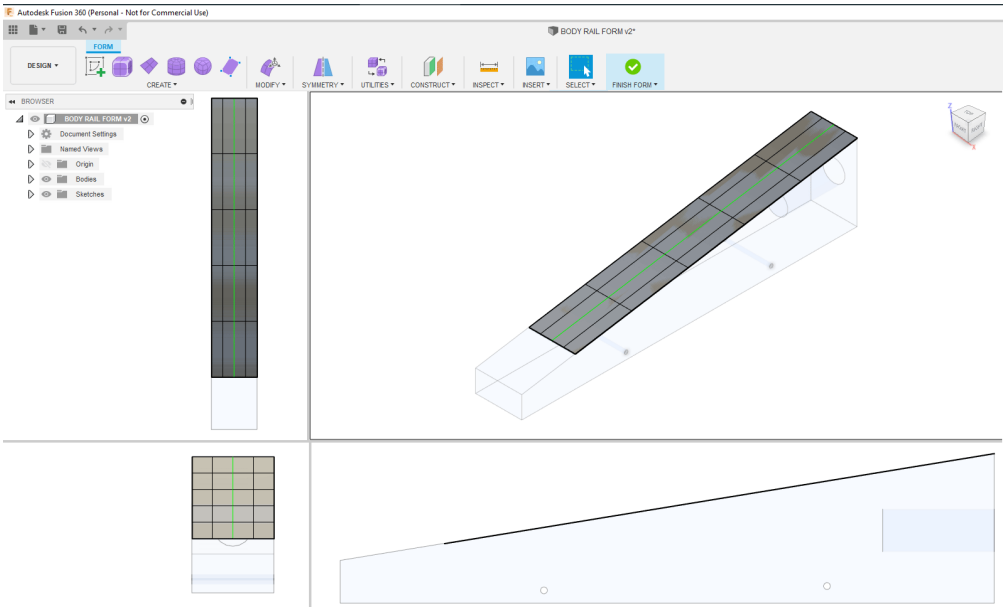


Fig. 12

Step 3. On the Form tab FORM click **Edit Form** in the Modify area of toolbar.

Step 4. **Double click top rear edge of T-spline** to select rear edge, **Fig. 13**.

Tip: Easier to double click edge in Front Viewport, **Fig. 14**.

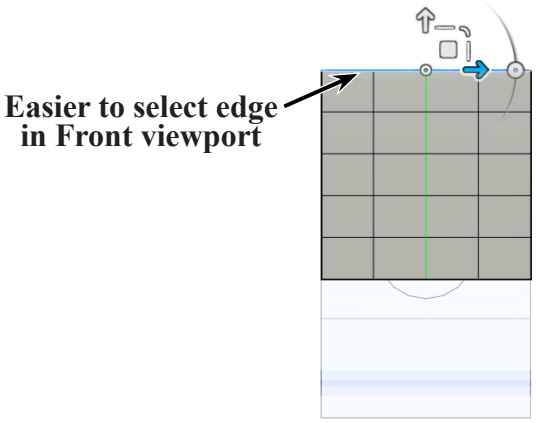


Fig. 14

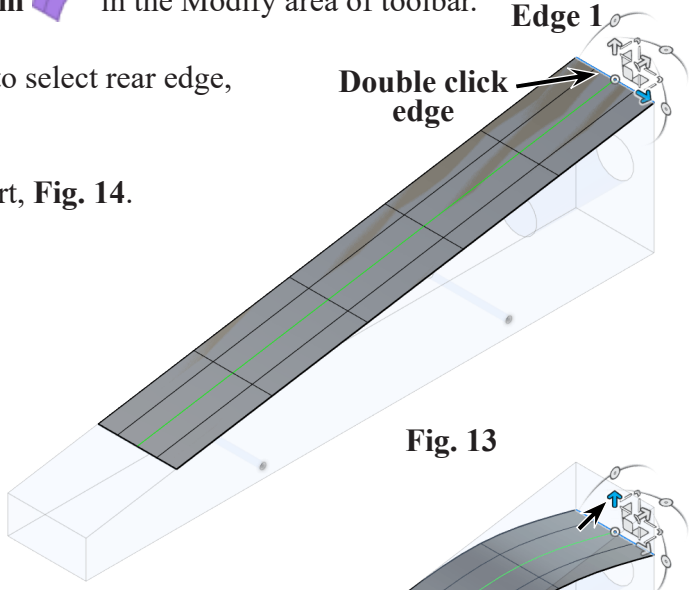


Fig. 13

Step 5. Click the **Single Axis Vertical Manipulator**.
Key-in **-22** in box, **Fig. 15**.

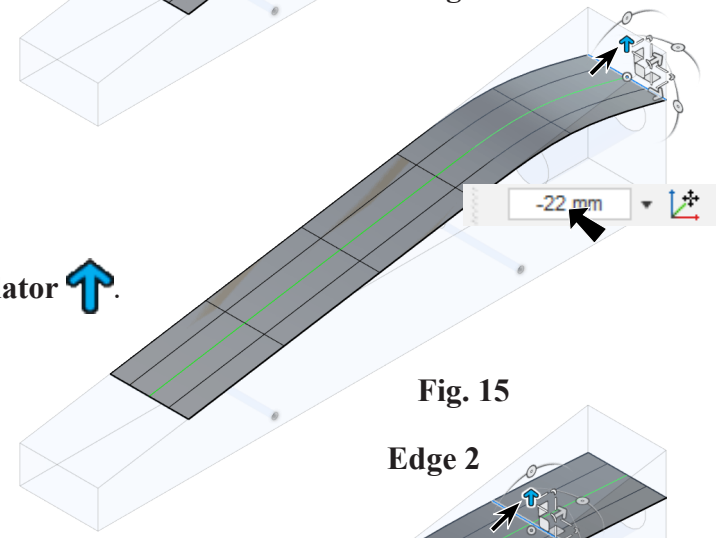


Fig. 15

Step 6. **Double click edge 2**, **Fig. 16**. Grab the **Single Axis Vertical Manipulator**
Pull down **-10**.

Step 7. **Double click edge 3**, **Fig. 17**.
Pull down **V Manipulator** **-20**.

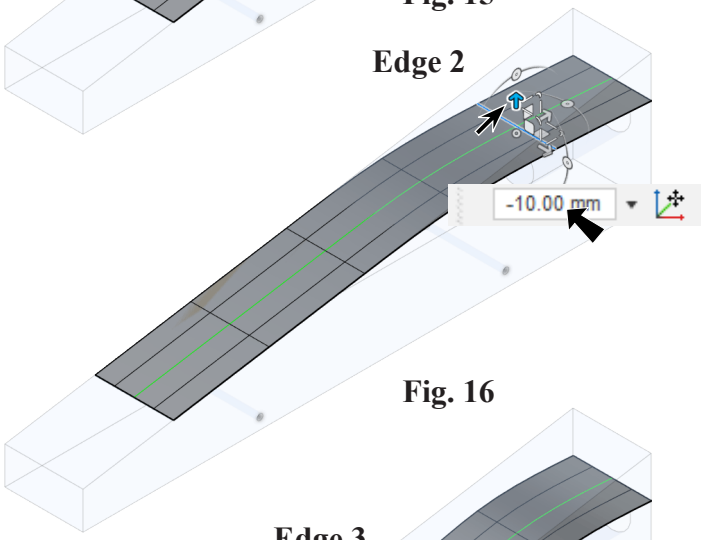


Fig. 16

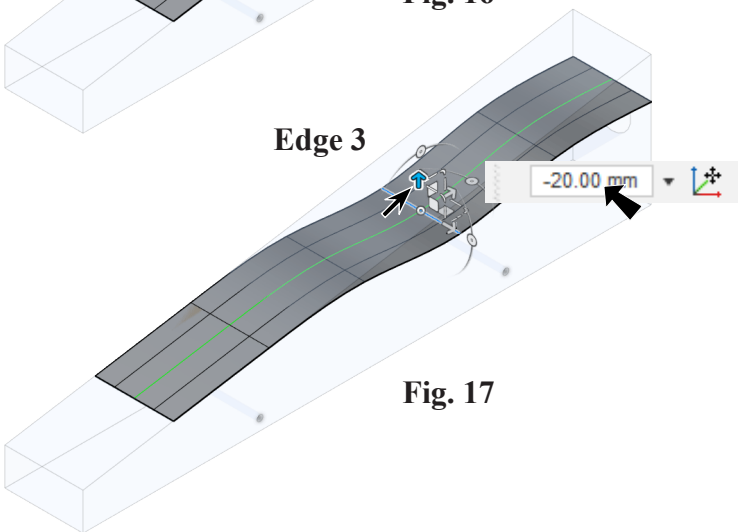


Fig. 17

Step 8. **Edge 4** and pull down **V Manipulator** **-20**, **Fig. 18**.

Step 9. **Edge 6** and pull down **V Manipulator** **-30**, **Fig. 19**.

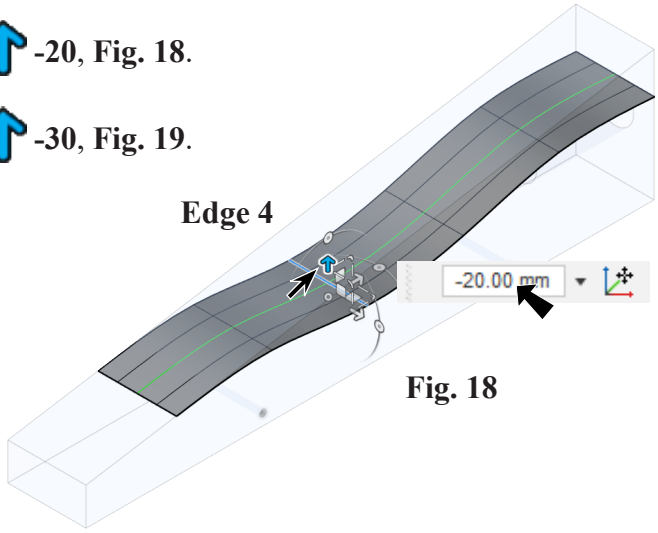


Fig. 18

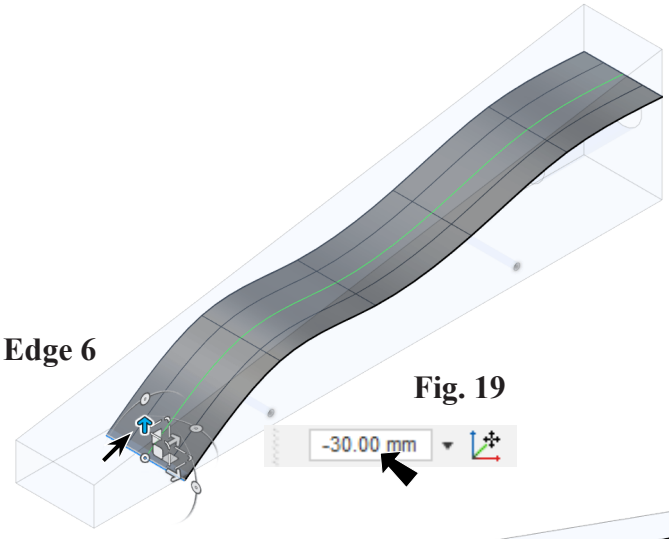


Fig. 19

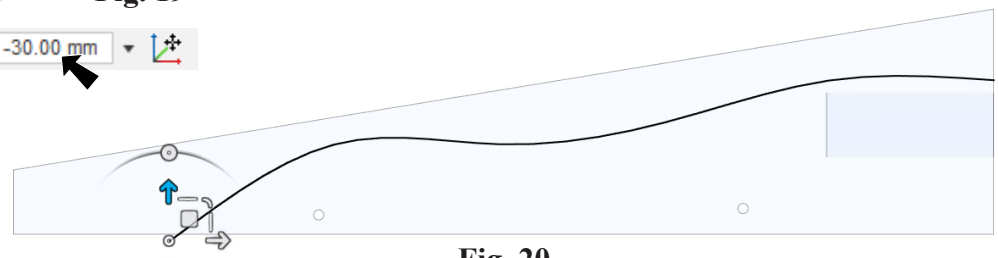


Fig. 20

Step 10. **Double click left edge of T-spline to select complete edge**, **Fig. 21**.
Pull down **V Manipulator** **-10**.

Step 11. Note in Front Viewport T-spline is aligned with Blank body, **Fig. 22**.

Step 12. Click the **H Manipulator**.
Key-in **-1.5** in box, **Fig. 23**.

Step 13. Note in Back Viewport T-spline is now **inside** Blank body, **Fig. 24**.

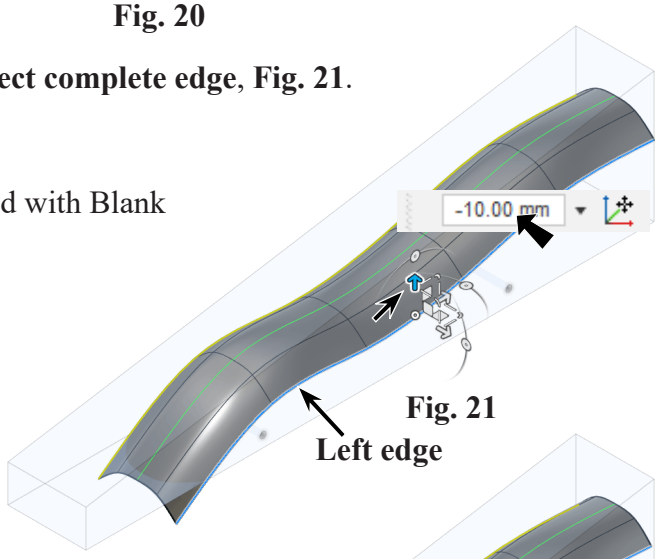


Fig. 21

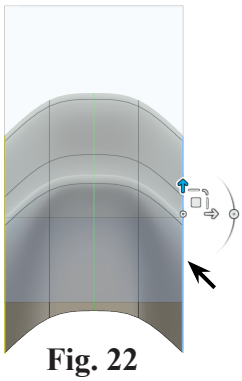


Fig. 22

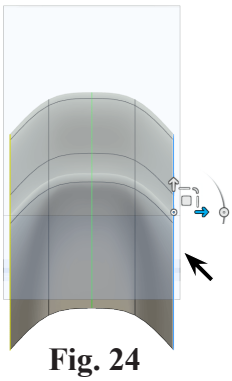


Fig. 24

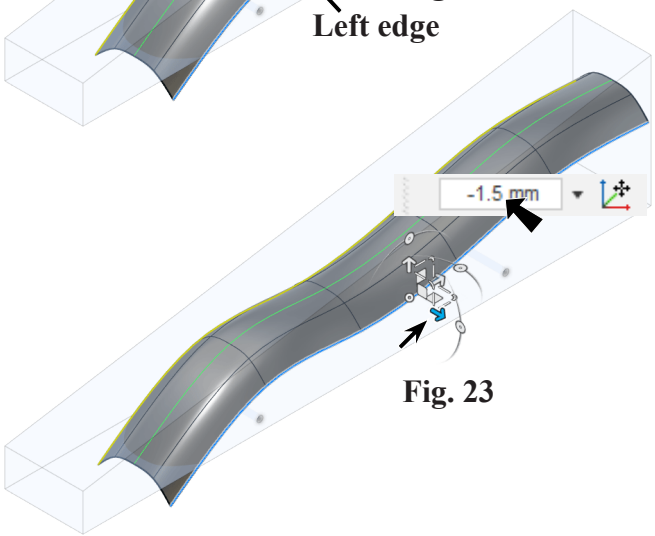


Fig. 23

Step 14. **Alt-drag V Manipulator** down **-30**, **Fig. 25**. Alt-drag lengthens the T-spline.

Step 15. Click **Finish Form** on the toolbar.

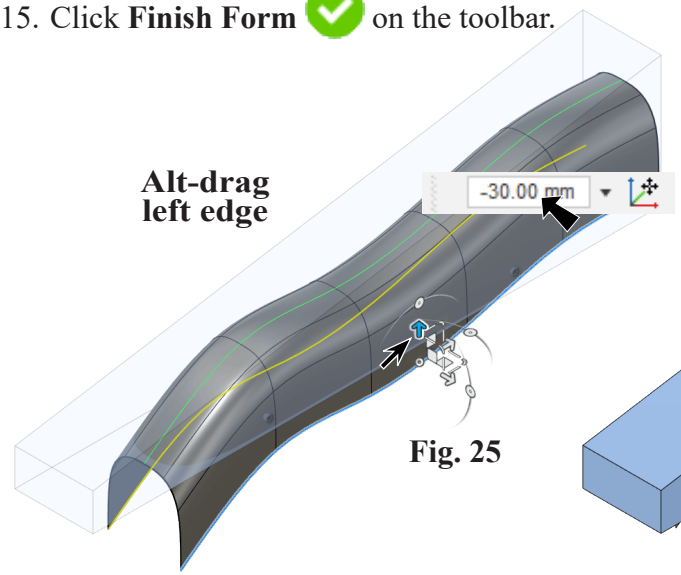


Fig. 25

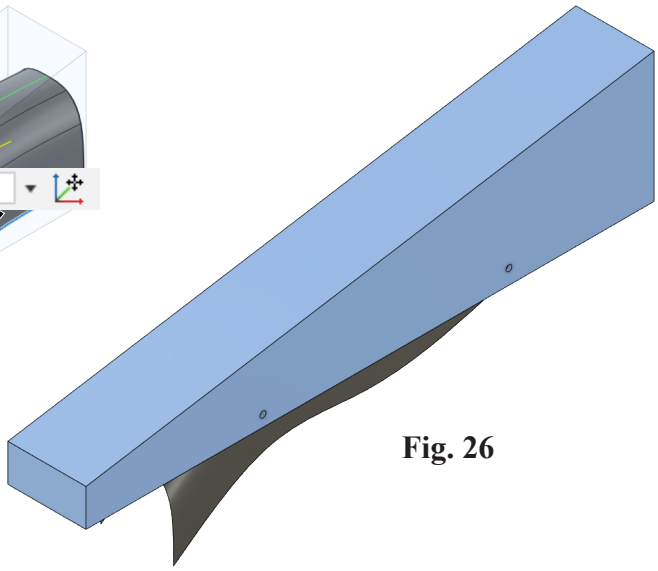


Fig. 26

E. Split Body.

Step 1. On the Solids tab SOLID click **Split Body** in the Modify area of toolbar.

Step 2. In the Split Body panel set, **Fig. 27**
Body to Split click **Blank body**, **Fig. 28**
Splitting Tool **click T-spline**
check **Extend Splitting Tool**
click OK.

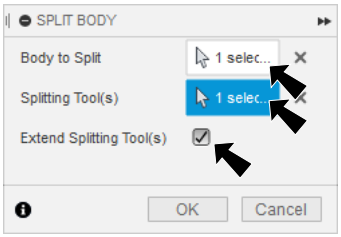


Fig. 27

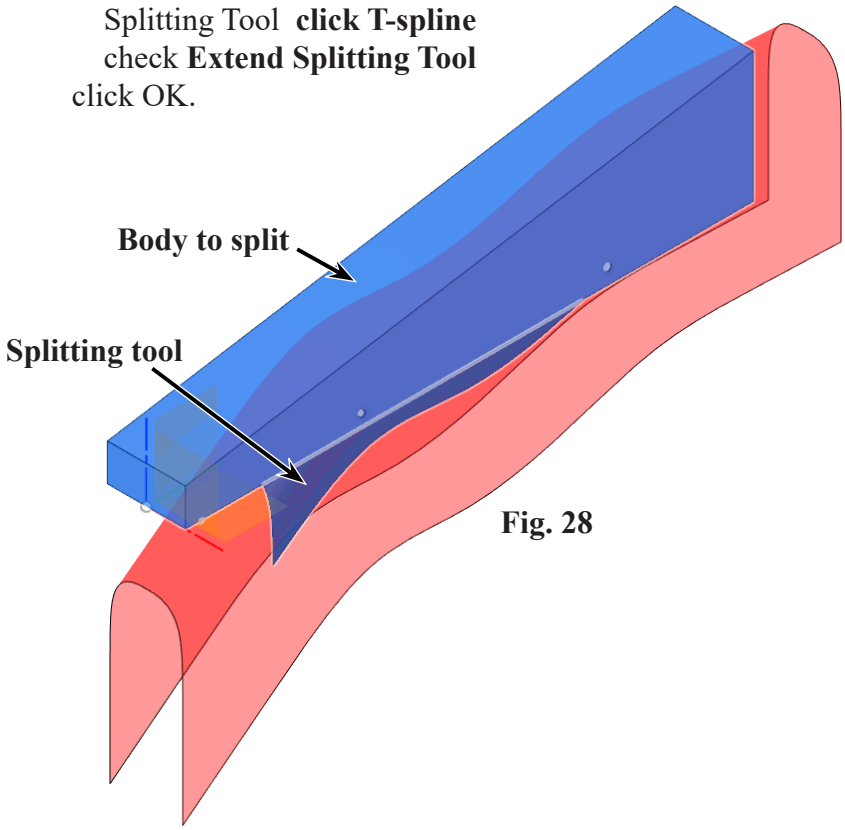


Fig. 28

F. Hide Bodies.

Step 1. Expand **Bodies** in the Browser and **Hide** **Body 2 and Body 3**, **Fig. 29**.

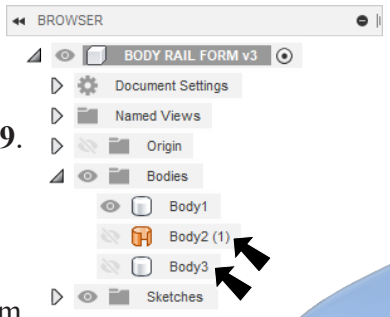


Fig. 29

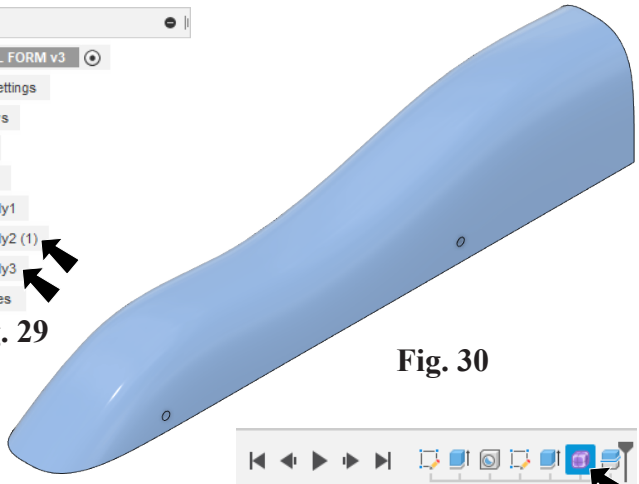


Fig. 30

G. Edit Form - Insert Edges.

Step 1. In the Timeline at the bottom of the canvas, **double click** **Form1** feature to edit, **Fig. 31**.

Fig. 31

Step 2. On the Form tab FORM click Modify Menu > Insert Edge.

Step 3. In the Insert Edge panel set, **Fig. 32**
Click **left two edges above cartridge hole**, **Fig. 33**
Insert Location **.3**
click OK.

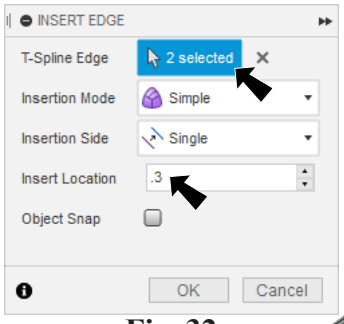


Fig. 32

Fig. 33

Step 4. On the Form tab FORM click **Edit Form** in the Modify area of toolbar.

Step 5. **Ctrl click the two new edges**, **Fig. 34**
Pull down **V Manipulator** **-10**.

Step 6. Click **Finish Form** on the toolbar.

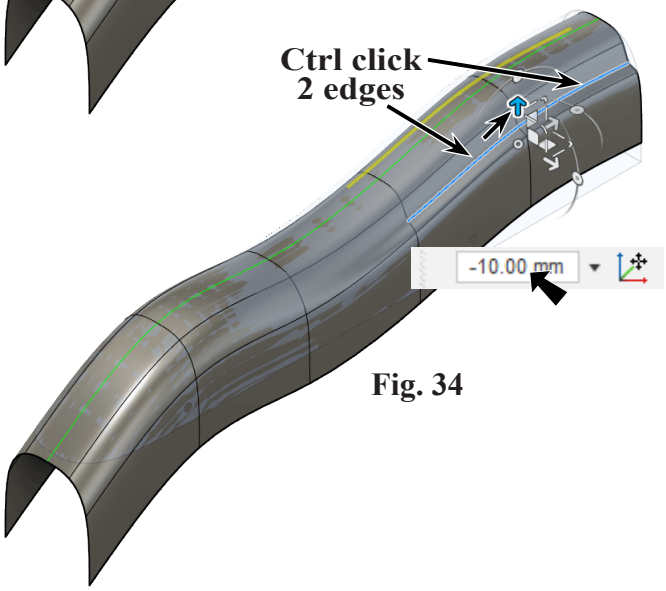


Fig. 34

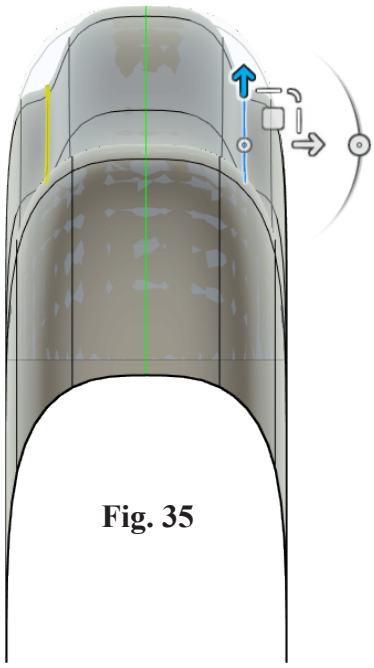


Fig. 35

H. Edit Axle Holes Sketch.

Step 1. Move Axles holes to end of Timeline. To move, in the Timeline at the bottom of the canvas **Ctrl-click Axle sketch** and **Extrude** **(cut) to select both**, **Fig. 36** and **drag to end** of TImeline, **Fig. 37**.

Ctrl-click and drag..

Fig. 36

..to end

Fig. 37

Step 2. Edit Axle sketch. To edit, **double click Axle Sketch** in the Timeline, **Fig. 38**.

Double click to edit

Fig. 38

Step 3. Change dimensions, **Fig. 39**.

Step 4. Click **Finish Sketch** on the toolbar.

Step 5. Save. Use **Ctrl-S** and press ENTER.

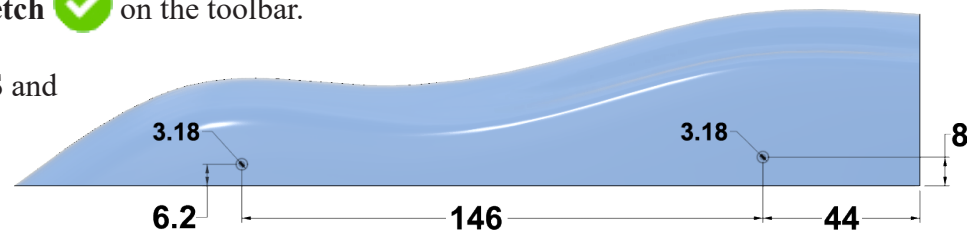


Fig. 39

I. Create Form Bottom.

Step 1. On the Solids tab SOLID click **Create Form** .

Step 2. On the Form tab FORM click **Plane** in the Create area of toolbar.

Step 3. In the Plane panel set, **Fig. 40**
Rectangle Type **2-Point**
click **bottom face** of body, **Fig. 41**

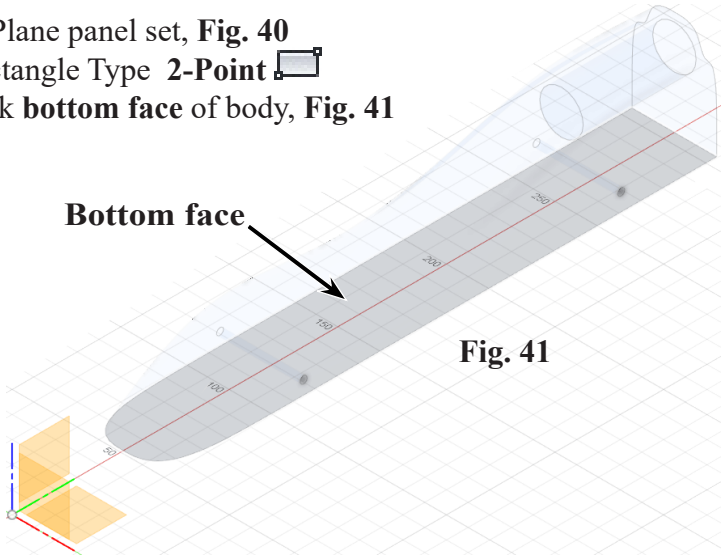


Fig. 41

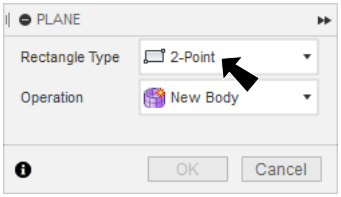


Fig. 40

Step 4. Drag a **plane from rear corner across to opposite edge of bottom face of body**, **Fig. 42**.

Step 5. In the Plane panel set, **Fig. 42**
Length **-260**
Length Faces **6**
Width Faces **4**
Symmetry **Mirror**
check **Width Symmetry**
click OK.

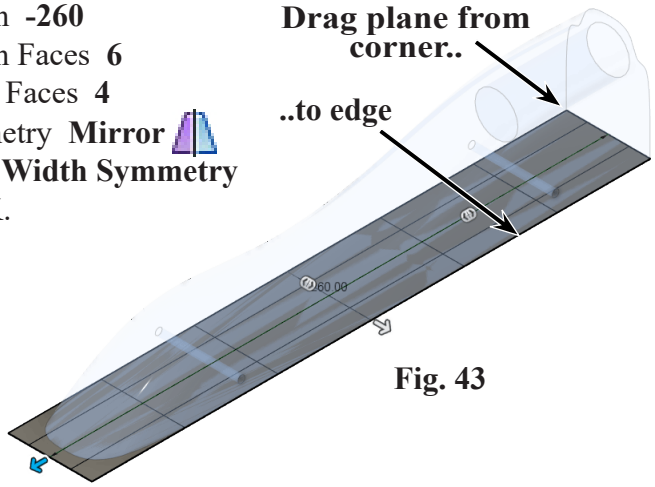


Fig. 43

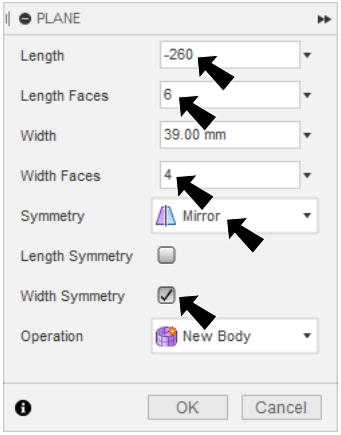


Fig. 42

J. Edit Form Bottom.

Step 1. On the Form tab FORM click **Edit Form** in the Modify area of toolbar.

Step 2. **Double click left edge of T-spline to select complete edge, Fig. 44.**
Click the **V Manipulator**.
Key-in **5** in box.

Step 3. Click the **H Manipulator** **Alt-drag H Manipulator** out, **Fig. 45.**
Key-in **5** in box.
Alt-drag lengthens the T-spline.

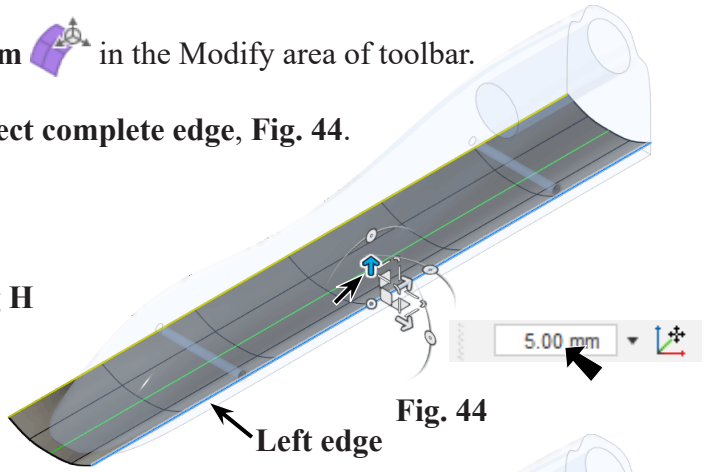


Fig. 44

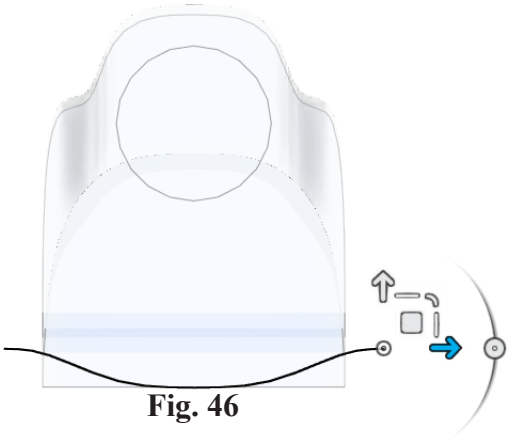


Fig. 46

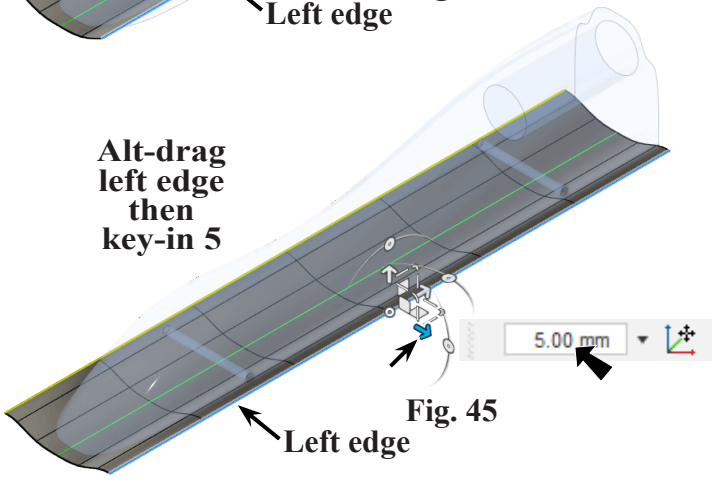


Fig. 45

Step 4. **Double click rear edge of T-spline** to select rear edge, **Fig. 47.**
Drag the **V Manipulator** up **10**.

Step 5. Click **Finish Form** on the toolbar.

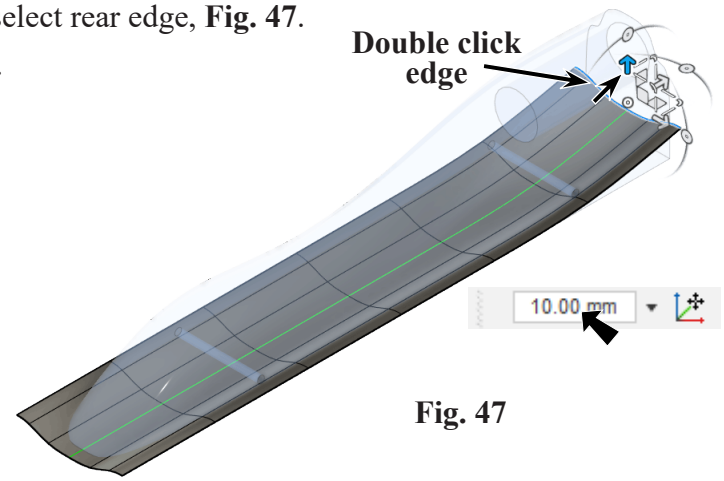


Fig. 47

K. Split Body 2.

Step 1. On the Solids tab SOLID click **Split Body** in the Modify area of toolbar.

Step 2. In the Split Body panel set, **Fig. 48**
Body to Split click **car body**, **Fig. 49**
Splitting Tool **click T-spline**
click OK.

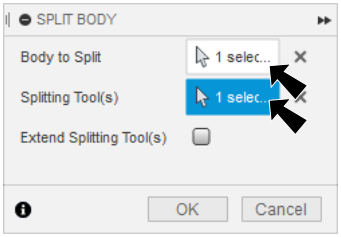


Fig. 48

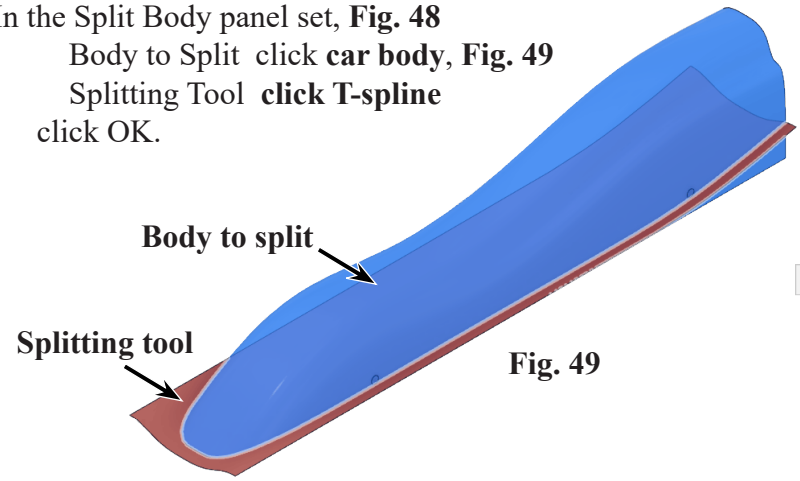


Fig. 49

L. Hide Bodies 4 and 5.

Step 1. Expand **Bodies** in the Browser and
Hide **Body 4 and Body 5**, **Fig. 50**.

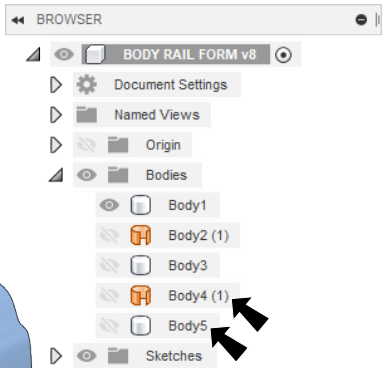


Fig. 50

Step 2. Save. Use **Ctrl-S** and press ENTER.

Tip: Adjust Viewports to large Iso and Right. Zoom in, **Fig. 52**.

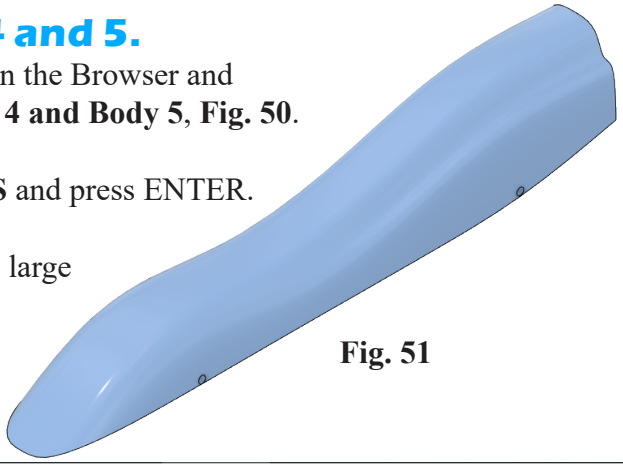


Fig. 51

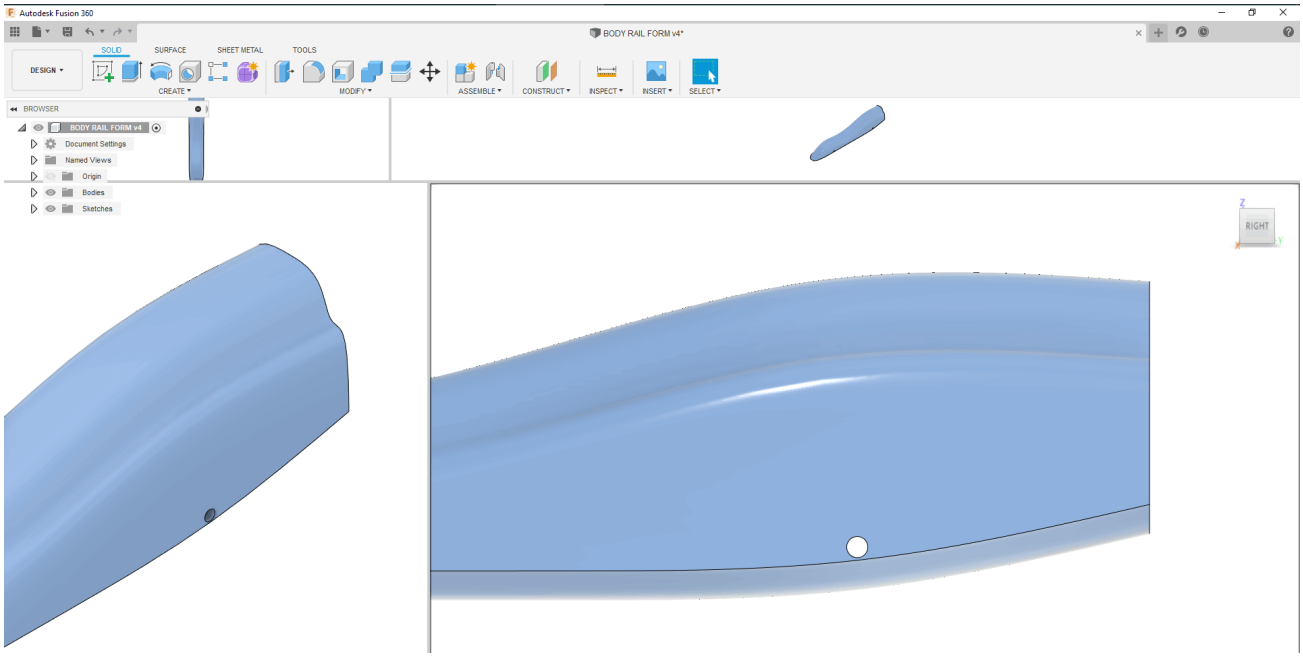


Fig. 52

M. Create Form Back.

Step 1. On the Solids tab SOLID click **Create Form** .

Step 2. On the Form tab FORM click **Plane** in the Create area of toolbar.

Step 3. In the Plane panel set, **Fig. 53**
Rectangle Type **Center**
click **back face** of body, **Fig. 54**

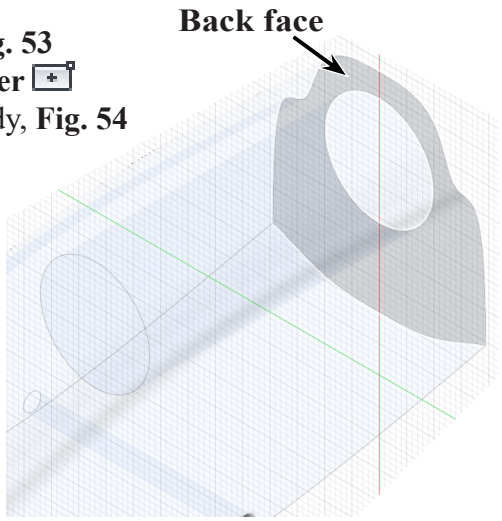


Fig. 54

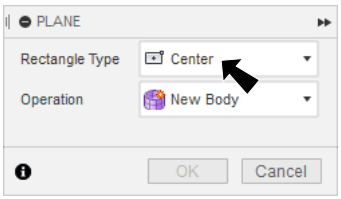


Fig. 53

Step 4. Drag a **plane from centerpoint of cartridge hole towards side of body**, **Fig. 55**.

Step 5. In the Plane panel set, **Fig. 56**
Length **50**
Length Faces **7**
Width **40**
Width Faces **9**
Symmetry **Mirror**
check **Width Symmetry**
click OK.

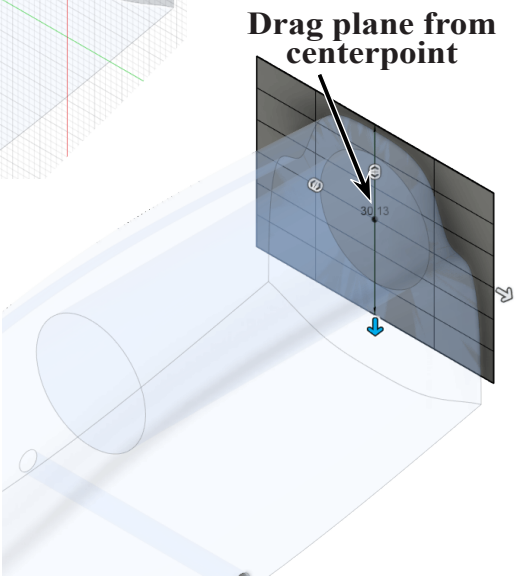


Fig. 55

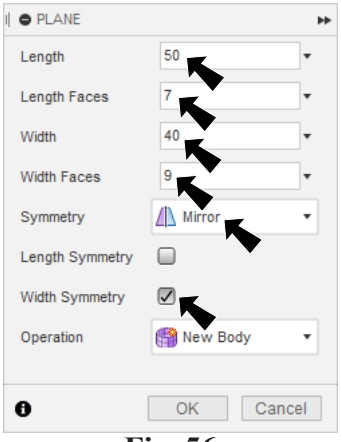


Fig. 56

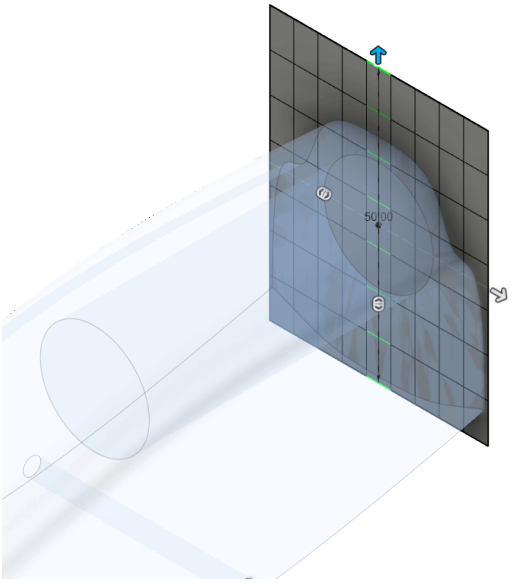


Fig. 57

N. Edit Form Back.

Step 1. On the Form tab FORM click **Edit Form** in the Modify area of toolbar.

Step 2. **Double click left edge of T-spline to select complete edge, Fig. 58.**
Click the **H Manipulator**.
Key-in **-5** in box.

Step 3. **Double click bottom edge of T-spline to select complete edge, Fig. 59.**
In the Right Viewport
Click the **V Manipulator**.
Key-in **-6** in box, **Fig. 60.**

Click the **H Manipulator**.
Key-in **-16** in box, **Fig. 61,**

Step 4. Click **Finish Form** on the toolbar.

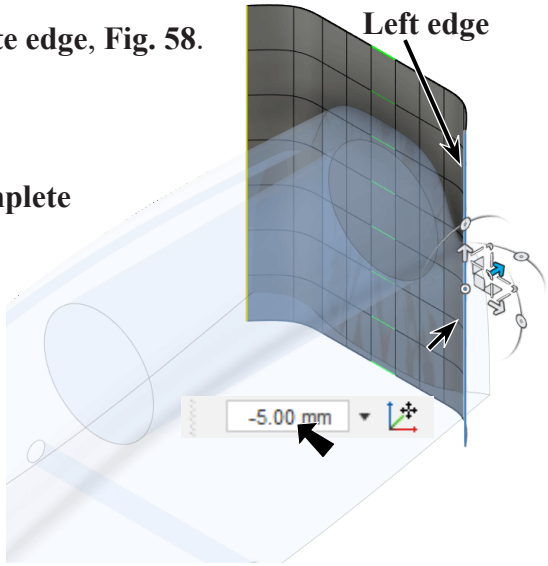


Fig. 58

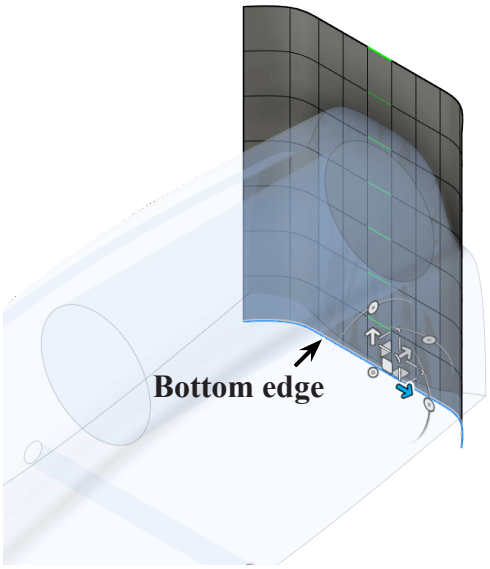


Fig. 59

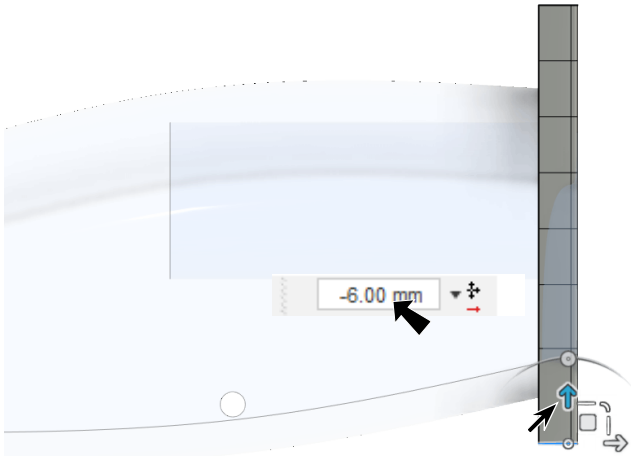


Fig. 60

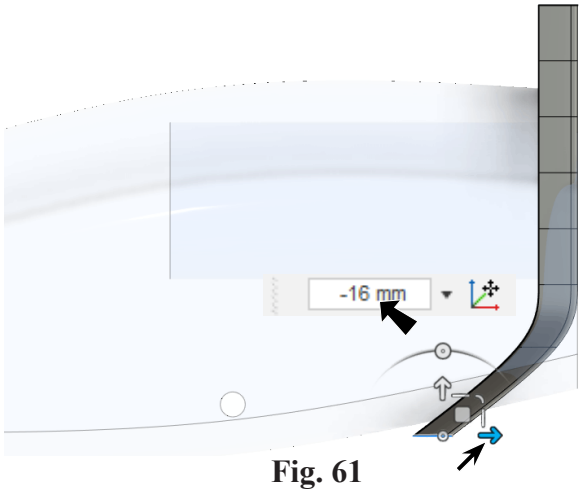


Fig. 61

O. Split Body 3.

Step 1. On the Solids tab SOLID click **Split Body** in the Modify area of toolbar.

Step 2. In the Split Body panel set, **Fig. 62**
Body to Split click **car body**, **Fig. 63**
Splitting Tool **click T-spline**
click OK.

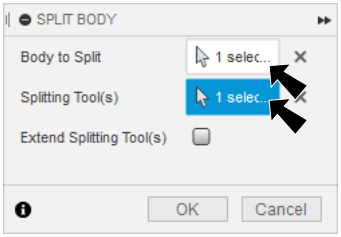


Fig. 62

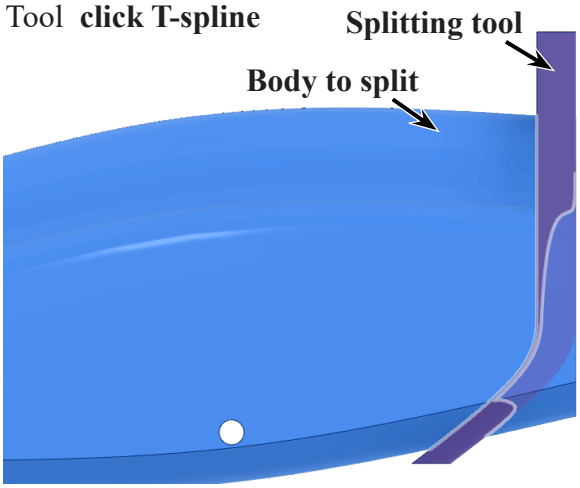


Fig. 63

P. Hide Bodies 6 and 7.

Step 1. Expand **Bodies** in the Browser and **Hide** **Body 6 and Body 7**, **Fig. 64**.

Step 2. Save. Use **Ctrl-S** and press ENTER.

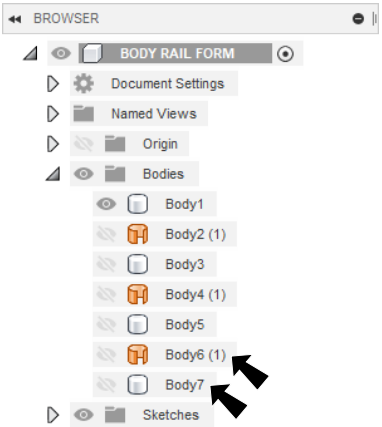


Fig. 64

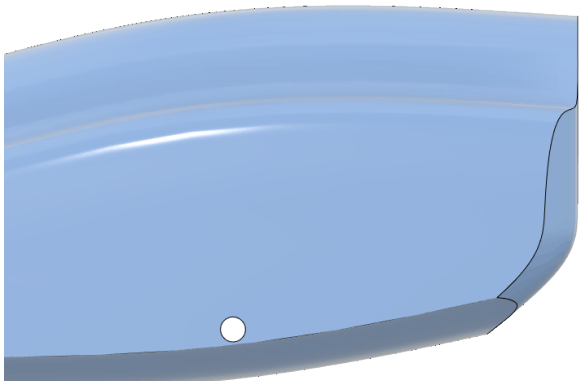


Fig. 65

Q. Fillet Edges.

Step 1. Rotate view to view **rear of body**, **Fig. 67**. Hold down middle mouse button (wheel) and drag to rotate view

Step 2. On the Solid tab SOLID click **Fillet** (**F**) in the Modify area of toolbar.

Step 3. In the Fillet panel set, **Fig. 66**
click **upper rear edge** of body, **Fig. 67**
Radius 2
click **Add new selection** +.

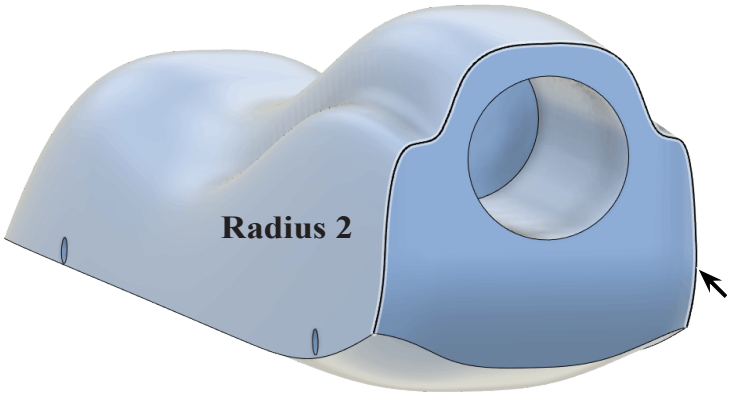


Fig. 67

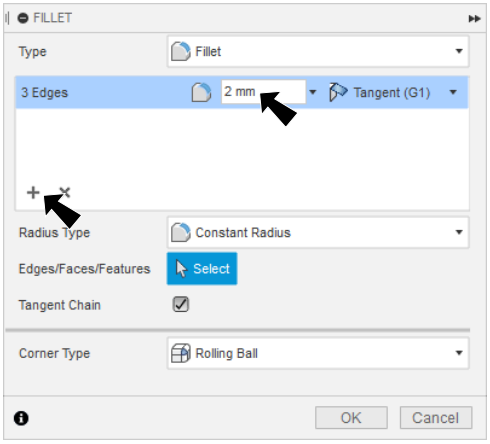


Fig. 66

Step 4. In the Fillet panel set, **Fig. 69**
click **bottom rear edge** of body, **Fig. 70**
Radius 10
click OK.

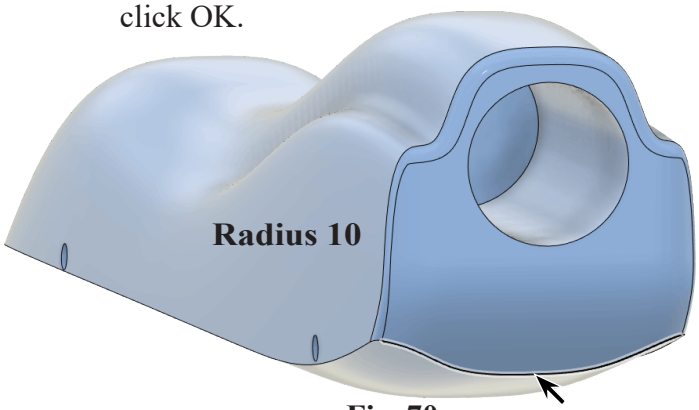


Fig. 70

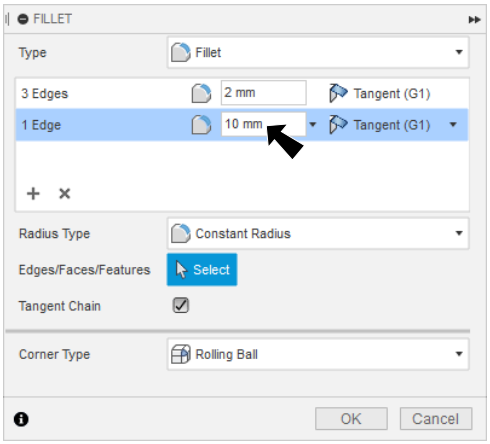


Fig. 69

Step 5. Save. Use **Ctrl-S** and press ENTER.

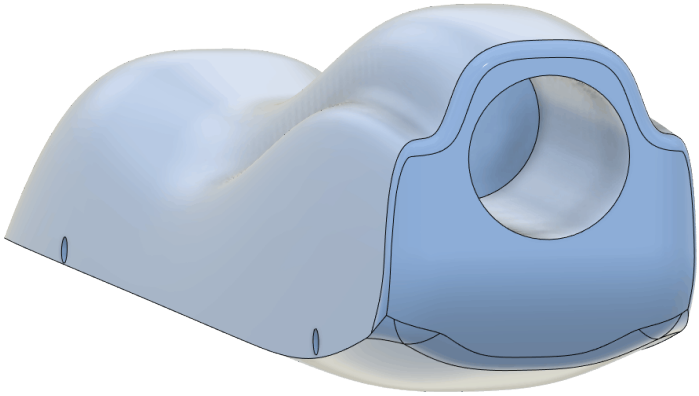


Fig. 71