Chapter 2

CO_2 Rail Car
Body

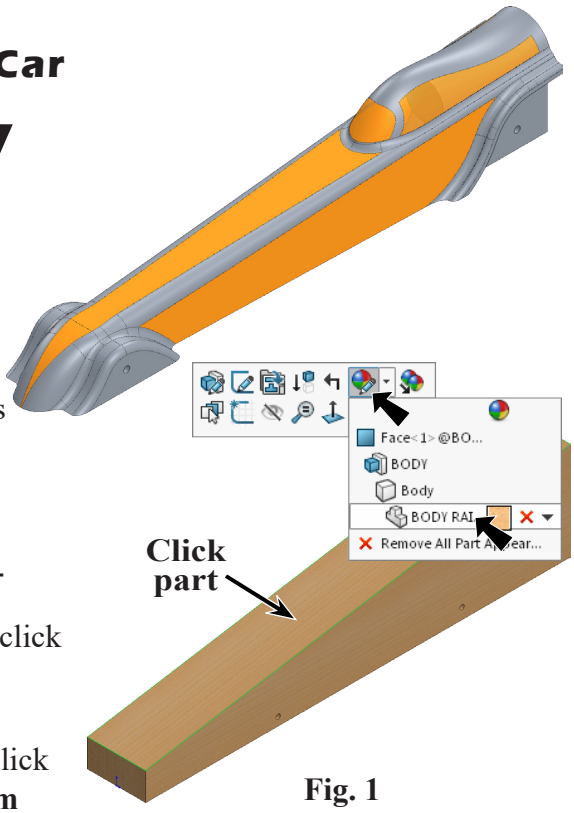

Fig. 1

A. Save as "BODY RAIL".

Step 1. If necessary, open your **BLANK** file.

Step 2. Click File Menu > Save As.

Step 3. Key-in **BODY RAIL** for the filename and press ENTER.

B. Appearance.

Step 1. Click the Body to select the part, click **Appearances Callout** on the context toolbar and click **BODY RAIL**, **Fig. 1**.

Step 2. In the Appearances Task pane, expand **Metal**, click **Chrome** and in the lower pane select **chromium plate**, **Fig. 2**.

Step 3. In the Appearances Property Manager set:
under Color, **Fig. 3**
RGB values:
R 138
G 146
B 157
click OK .

Step 4. Save. Use **Ctrl-S**.

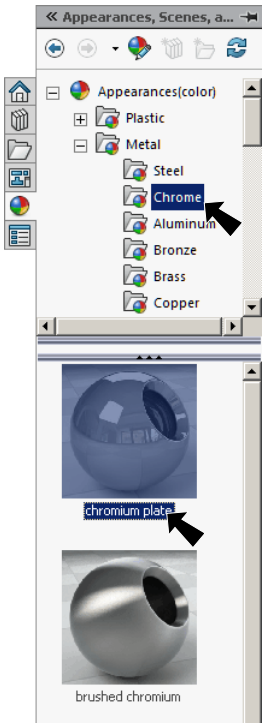

Fig. 2

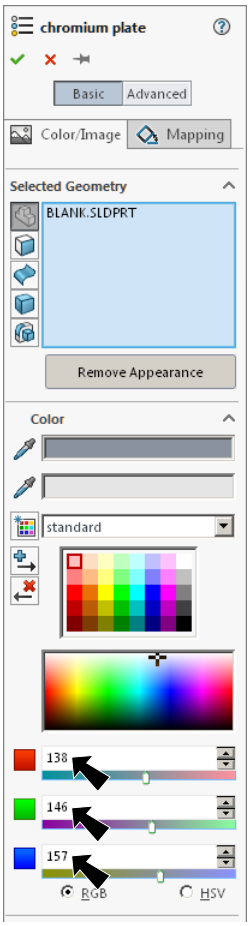

Fig. 3

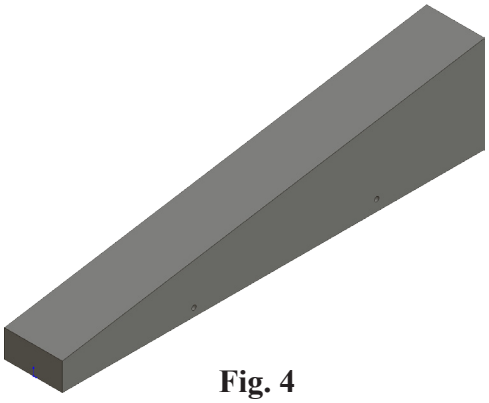

Fig. 4

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C. Side Cut.

Step 1. Click **Right Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 5**.

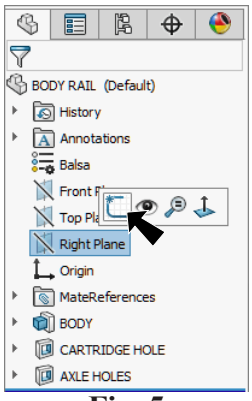


Fig. 5

Step 2. Click **Normal To** on the Standard Views toolbar. **(Ctrl-8)**

Step 3. Click **Line** **(L)** on the Sketch toolbar.

Step 4. Sketch a line from back edge at a slight downward angle toward the front, **Fig. 6**.

Step 5. Click **Style Spline** in the **Spline flyout** on the Sketch toolbar.

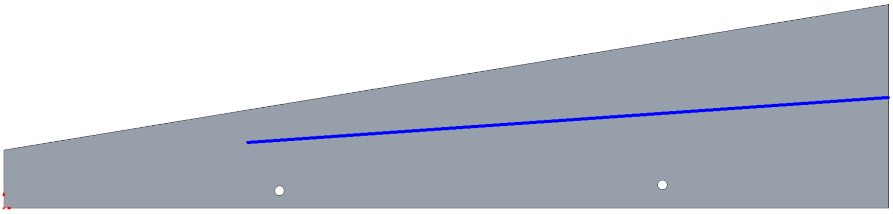


Fig. 6

Step 6. Sketch a **3 control vertex point Spline** between left endpoint of line and bottom edge of part, **Fig. 7**. Start at left endpoint of centerline for 1st control vertex point. Sketch 2nd control vertex point directly to right. Click edge bottom of part for 3rd control vertex point. Press Escape to end spline.

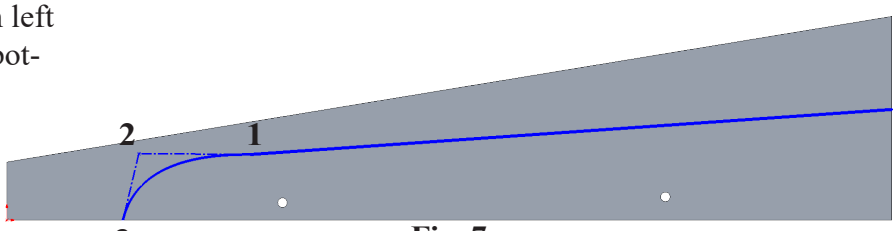


Fig. 7

Step 7. **Ctrl click line and spline** to select both. Release Ctrl key and click **Make Tangent** on the context toolbar, **Fig. 8**.

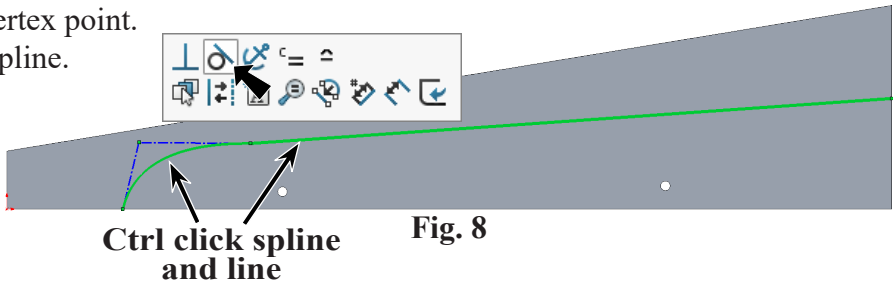


Fig. 8

Step 8. Click **Smart Dimension** **(S)** on the Sketch toolbar.

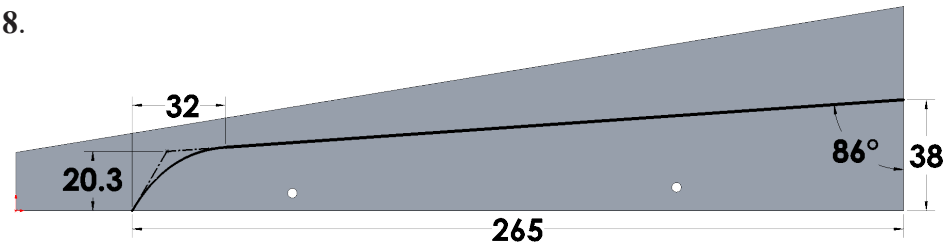


Fig. 9

Step 9. Add dimensions, **Fig. 9**. The 20.3 is from control vertex spline point to body edge.

Step 10. Click **Features** Features on the Command Manager toolbar.

Step 11. Click **Extruded Cut** Extruded Cut on the Features toolbar.

Step 12. In the Cut-Extrude Property Manager set:

under Direction 1, **Fig. 10**

End Condition **Through All**

The Direction arrow should point towards area to be cut away, Fig. 11. If arrow is pointing in wrong direction, click **Flip side to cut**.

Click OK .

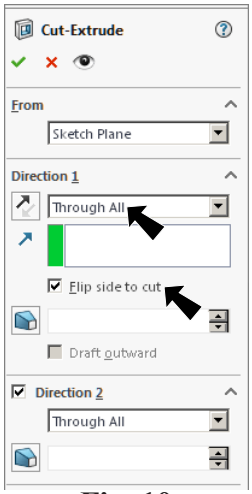


Fig. 10

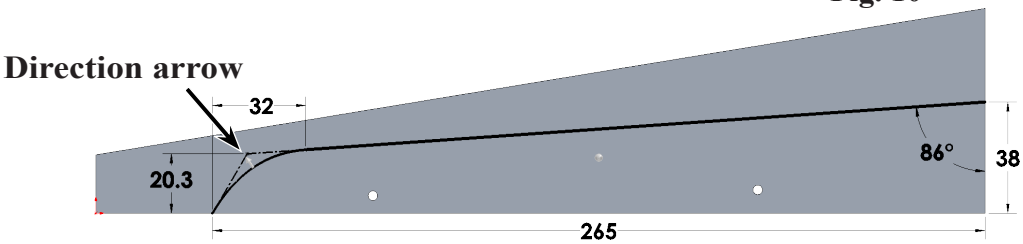


Fig. 11

Fig. 12

D. Rename Cut-Extrude1 SIDE CUT.

Step 1. **Rename Cut-Extrude1** to **SIDE CUT** in the Feature Manager, **Fig. 13**. To rename, click **Cut-Extrude1** name in Feature Manager and press **F2** on keyboard. Key-in **SIDE CUT**.

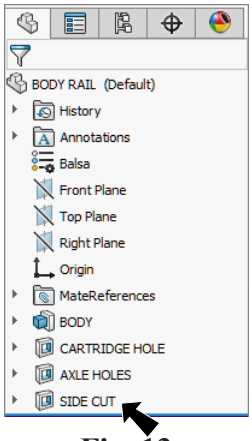


Fig. 13

E. Bottom Cut.

Step 1. Click **Bottom** on the Standard Views toolbar. (**Ctrl-6**)

Step 2. Click the **bottom face** of the body and click **Sketch** on the context toolbar, **Fig. 14**.

Step 3. Click **Centerline** (**S**) in the **Line flyout** on the Sketch toolbar.

Step 4. Sketch a centerline from the midpoint on the bottom edge up through the sketch, **Fig. 15**.

Step 5. Click **Line** (**L**) on the Sketch toolbar.

Step 6. Starting at the bottom endpoint of the centerline, sketch a horizontal line across bottom edge almost to the corner, **Fig. 16**. **Do not** connect the line to the corner. Sketch a non-vertical line from this new line up to the top edge. Keep the endpoint away from centerline and corner.

Step 7. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 8. Add dimensions, **Fig. 17**. Dimension **double distance** 34. To double distance dimension, click centerline and then bottom endpoint of angled line, move the cursor below and click. Key-in 34 in the Modify box and press ENTER.

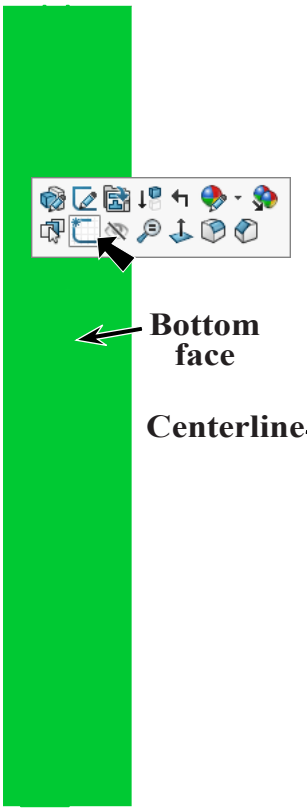


Fig. 14

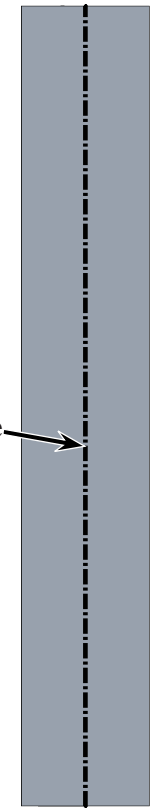


Fig. 15

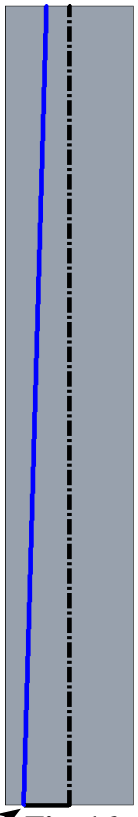


Fig. 16

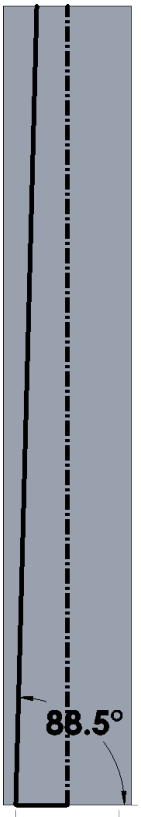


Fig. 17

Step 9. **Right click graphics area and click Select** from menu to unselect Smart Dimension.

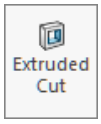
Step 10. **Drag a "trend to left - more liberal" selection across** all geometry, **Fig. 18**.

Step 11. Click **Mirror Entities** 

on the Sketch toolbar, **Fig. 19**.

Step 12. Click **Features** 

on the Command Manager toolbar.

Step 13. Click **Extruded Cut** 

on the Features toolbar.

Step 14. In the Cut-Extrude Property Manager set:
under Direction 1, **Fig. 20**
End Condition
Through All
The Direction arrow should point towards area to be cut away, Fig. 21. If arrow is pointing in wrong direction, click **Flip side to cut**.
Click OK  .

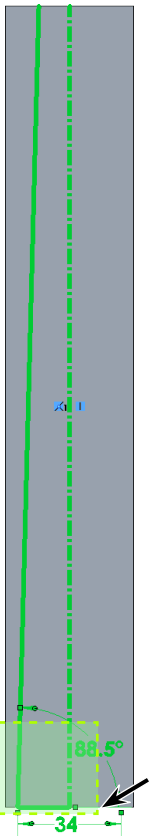


Fig. 18

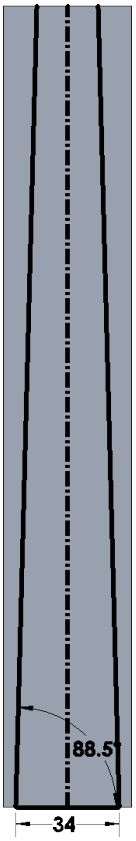


Fig. 19

F. Rename Cut-Extrude1 BOTTOM CUT.

Step 1. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

Step 2. **Rename Cut-Extrude1** to **BOTTOM CUT** in the Feature Manager, **Fig. 23**. To rename, click **Cut-Extrude1** name in Feature Manager and press **F2** on keyboard. Key-in **BOTTOM CUT**.

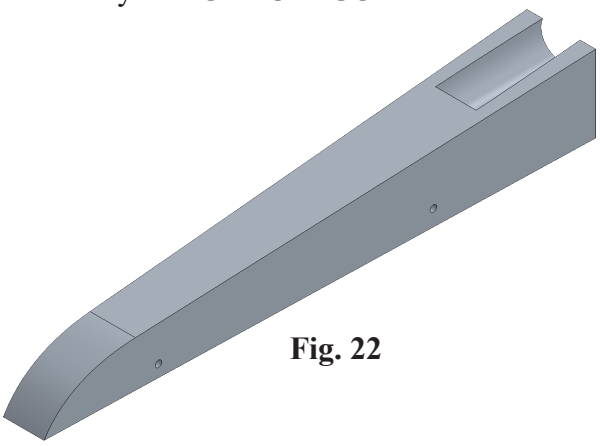


Fig. 22

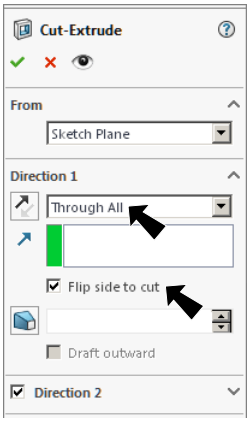


Fig. 20

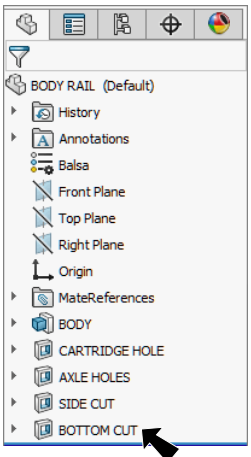


Fig. 23

Fig. 21

G. Cockpit Loft Rear Profile Sketch.

Step 1. Click **CARTRIDGE HOLE** feature in the Feature Manager and click **Suppress** in the context toolbar, **Fig. 24**.

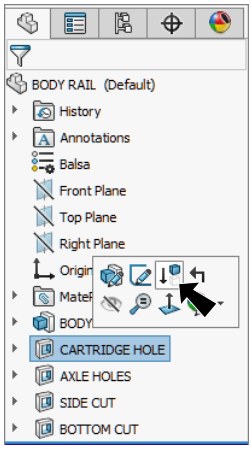


Fig. 24

Step 2. Click **Back** on the Standard Views toolbar. (**Ctrl-2**)

Step 3. Click **rear face** and click **Sketch** on the context toolbar, **Fig. 25**.

Step 4. Click **Line** (**L**) on the Sketch toolbar.

Step 5. Sketch a horizontal line, **Fig. 26**.

Step 6. **Right click graphics area and click Select** from menu to unselect Line tool.

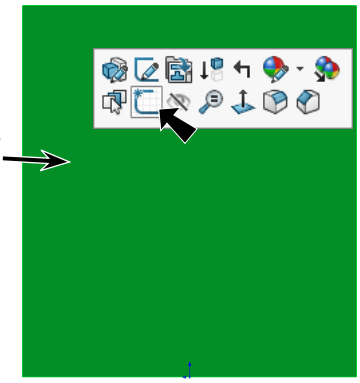


Fig. 25

Step 7. **Ctrl click midpoint of line** and **Origin** to select both. Release Ctrl key and click **Make Vertical** on the context toolbar, **Fig. 27**.

Step 8. Click **Centerpoint Arc** (S) in the **Arc flyout** on the Sketch toolbar.

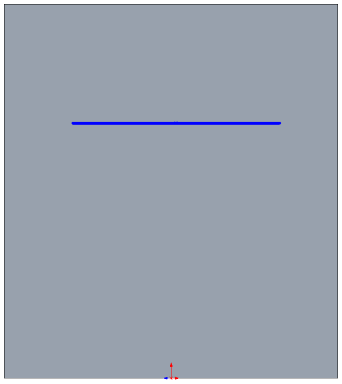


Fig. 26

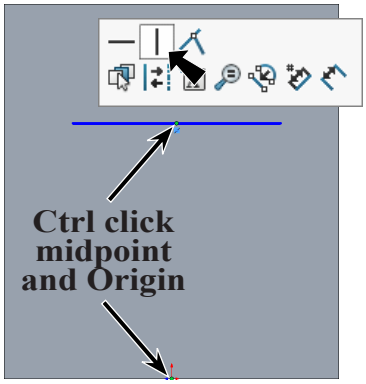


Fig. 27

Step 9. Sketch a centerpoint arc across line on top side of line. Start centerpoint of arc at mid-point, **Fig. 28**.

Step 10. Click **Smart Dimension** (**S**) on the Sketch toolbar.

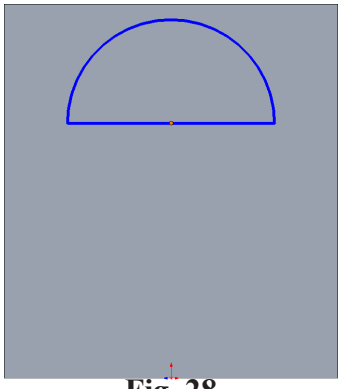


Fig. 28

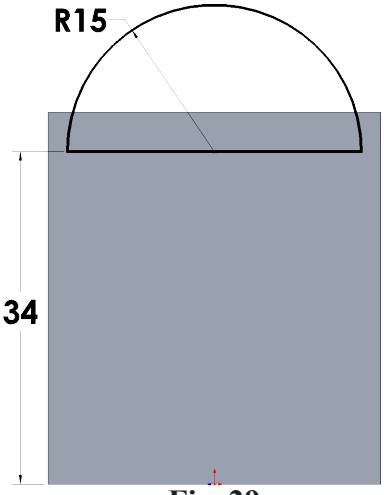


Fig. 29

Step 11. Dimension **arc radius 15** and the **34**, **Fig. 29**.

Step 12. Click **Exit Sketch** on the Sketch toolbar.

H. Cockpit Loft RIGHT Guide Curve.

Step 1. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 2. Click the **top face** of body and click **Sketch** on the context toolbar, **Fig. 30**.

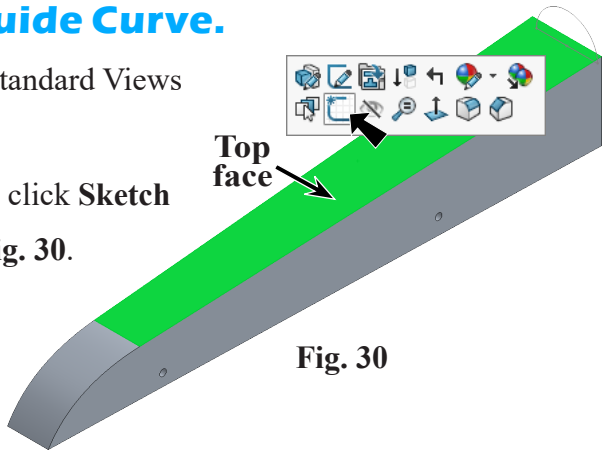


Fig. 30

Step 3. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 4. Zoom in around **rear edge of body**, **Fig. 31**. To zoom, place the cursor over rear of body and spin the wheel on mouse back. While spinning the wheel keep cursor on the area.

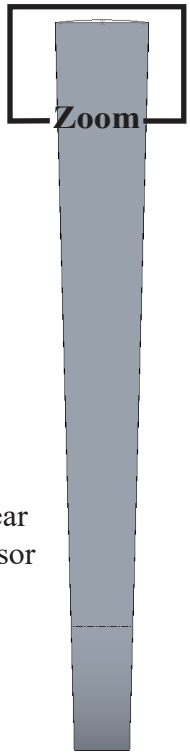


Fig. 31

Step 5. Click **Centerline** (**S**) in the **Line flyout** on the Sketch toolbar.

Step 6. Starting from midpoint of rear edge, sketch a vertical centerline down into the body, **Fig. 32**.

Step 7. Click **Line** (**L**) on the Sketch toolbar.

Step 8. Sketch a line at angle to the left body edge away from any geometry, **Fig. 33**.

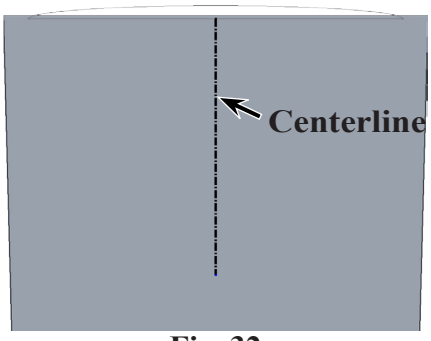


Fig. 32

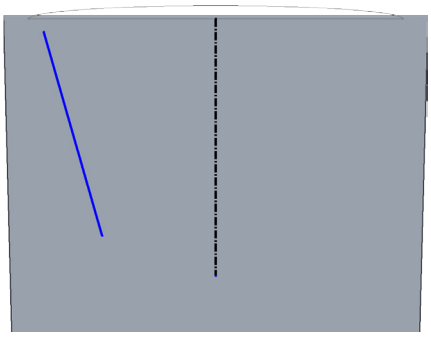


Fig. 33

Step 9. **Right click sketching and click Select** from menu to unselect Line Tool.

Step 10. **Ctrl click top endpoint of line** and **arc in loft rear sketch** to select both. Release Ctrl key and click **Make Pierce** on the context toolbar, **Fig. 34**. Make Pierce adds a Pierce relation between line and rear sketch.

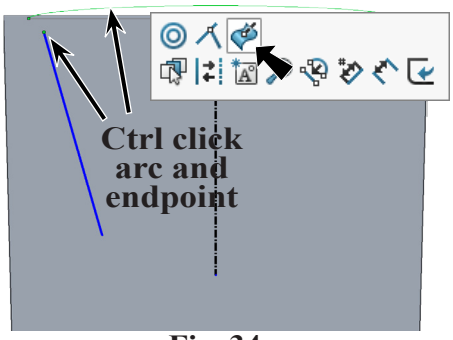


Fig. 34

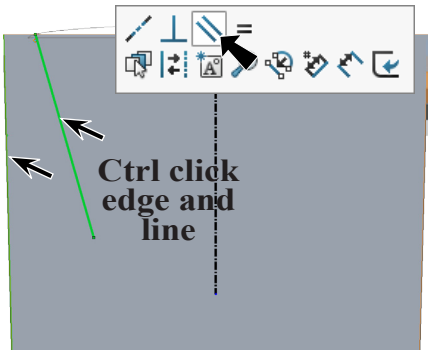


Fig. 35

Step 11. **Click line and left edge of body** to select both. Release Ctrl key and click **Make Parallel** on the context toolbar, **Fig. 35**.

Step 12. Click **Smart Dimension** 

(S) on the Sketch toolbar.

Step 13. Dimension **line 62** and **centerline 90**, **Fig. 36**.

Step 14. **Right click sketching and click Select** from menu to unselect Smart Dimension.

Step 15. Click the centerline and click **Zoom to Selection**  **(Q)** on the View toolbar to zoom to sketch.

Step 16. Click **Style Spline**  in the **Spline flyout**  on the Sketch toolbar.

Step 17. Sketch a **3 control vertex point Spline** between bottom endpoint of line and bottom endpoint of centerline, **Fig. 37**. Press Escape to end spline.

Step 18. **Ctrl click line and spline** to select both. Release Ctrl key and click **Make Tangent**  on the context toolbar, **Fig. 38**.

Step 19. Click **Smart Dimension** 

(S) on the Sketch toolbar.

Step 20. Dimension control vertex point, **Fig. 39**.

Step 21. Click **Exit Sketch** 

on the Sketch toolbar.

Step 22. Save. Use **Ctrl-S**.

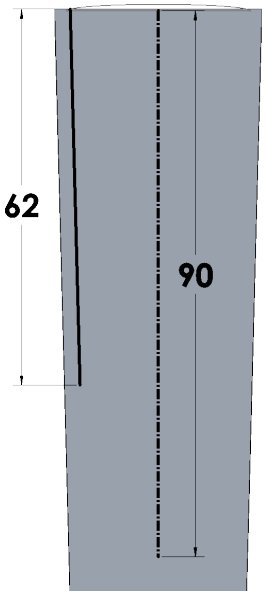


Fig. 36

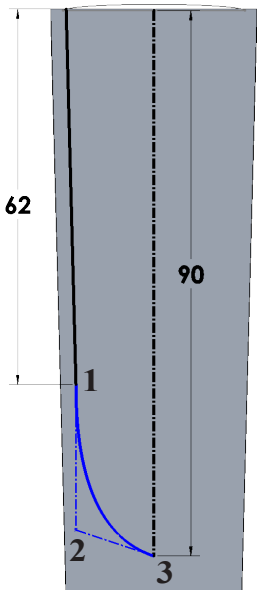


Fig. 37

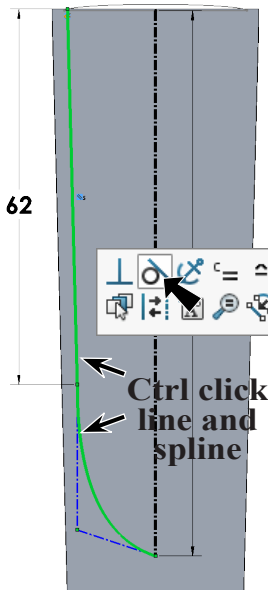


Fig. 38

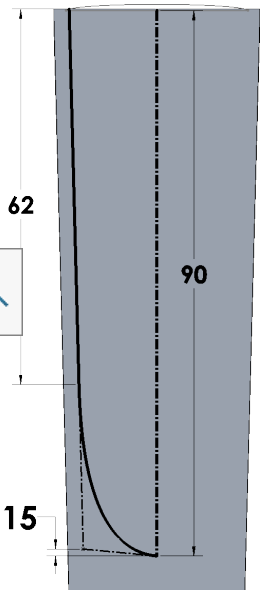


Fig. 39

I. Cockpit Loft LEFT Guide Curve.

Step 1. Click the **top face** and click **Sketch** on the context toolbar, **Fig. 40**.

Step 2. Click **Convert Entities** on the Sketch toolbar.

Step 3. In the Convert Entities Property Manager:
under Entities to Convert, **Fig. 41**
click **geometry in previous sketch, centerline, line and spline**, **Fig. 42**
click OK ✔ .

Step 4. Click **converted centerline** and click **Construction Geometry** on the context toolbar, **Fig. 43**.

Step 5. Click **Mirror Entities** on the Sketch toolbar.

Step 6. In the Mirror Property Manager:
under Entities to mirror, **Fig. 44**
click **line and spline**, **Fig. 45**
check **Copy**
click in the Mirror about box
click **centerline**
click OK ✔ .

Step 7. **Ctrl click top endpoint of converted line** and **arc in loft rear sketch** to select both. Release Ctrl key and click **Make Pierce** on the context toolbar, **Fig. 46**.

Step 8. Click **Exit Sketch** on the Sketch toolbar.

Step 9. Save. Use **Ctrl-S**.

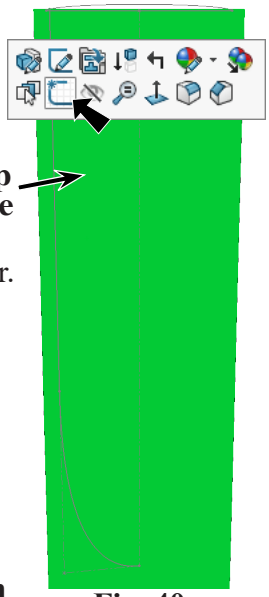


Fig. 40

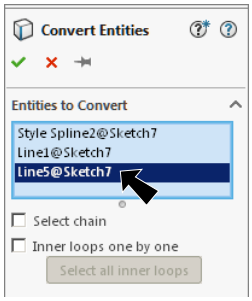


Fig. 41

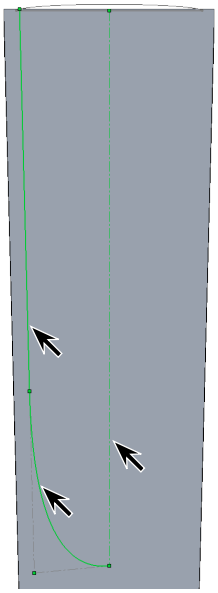


Fig. 42

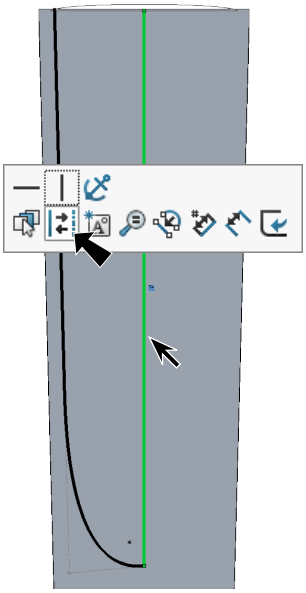


Fig. 43

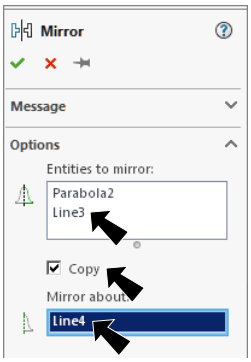


Fig. 44

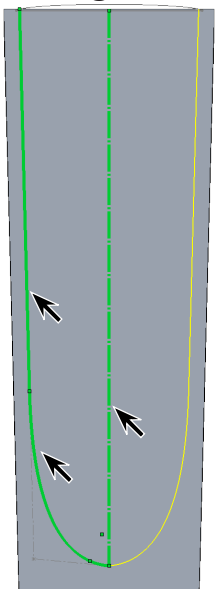


Fig. 45

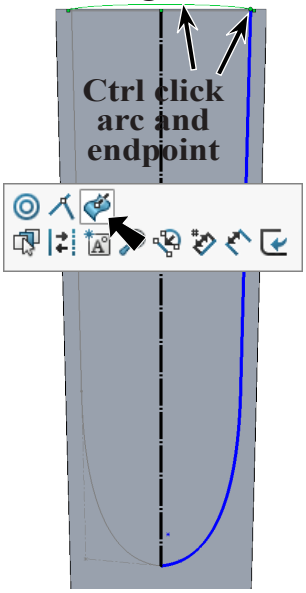


Fig. 46

J. Cockpit Loft SIDE Guide Curve.

Step 1. Click **Right Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 47**.

Step 2. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 3. Zoom in around **loft sketches at rear**, **Fig. 48**. To zoom, place the cursor over the sketches area and spin the wheel on mouse back. While spinning the wheel keep cursor on the area.

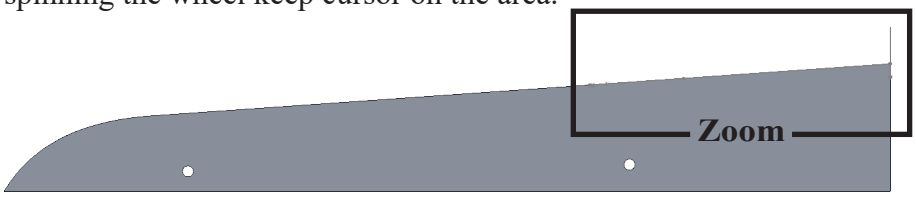


Fig. 48

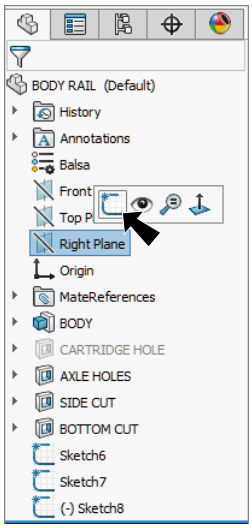


Fig. 47

Step 4. Click **Style Spline** in the **Spline flyout** on the Sketch toolbar.

Step 5. Sketch a **4 control vertex point Spline** above the body, **Fig. 49**. Keep spline endpoint away from any geometry. Press Escape to end spline.

Step 6. Use **Down arrow key** one time to slightly rotate view, **Fig. 50**.

Step 7. **Ctrl click left endpoint of spline** and **guide curve sketch** to select both. Release Ctrl key and click **Make Pierce** on the context toolbar, **Fig. 50**.

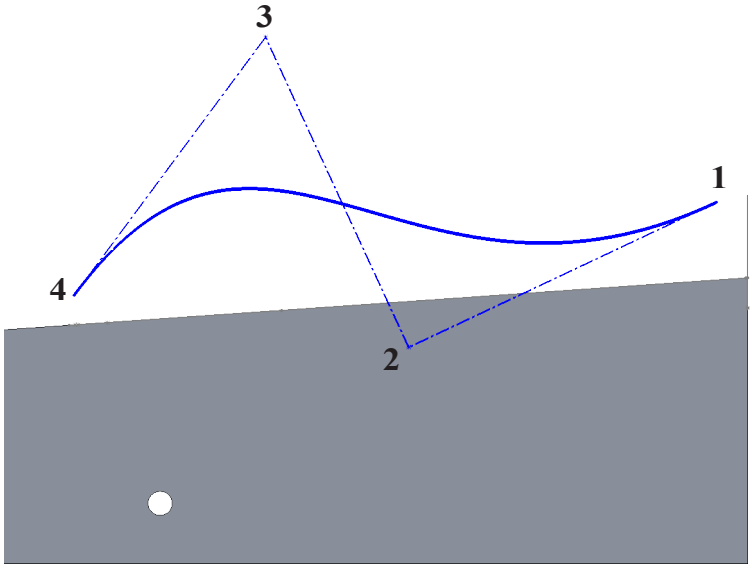


Fig. 49

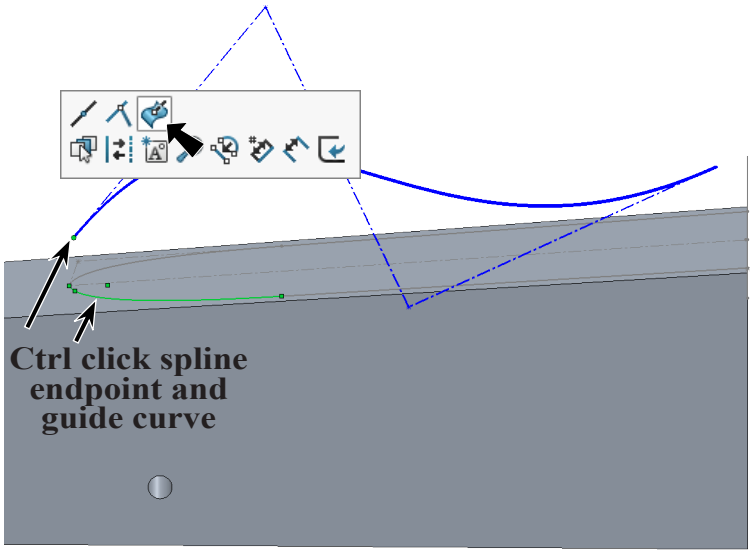


Fig. 50

Step 8. **Ctrl click right endpoint of spline** and **arc in rear profile sketch** to select both. Release Ctrl key and click **Make Pierce**  on the context toolbar, **Fig. 51**.

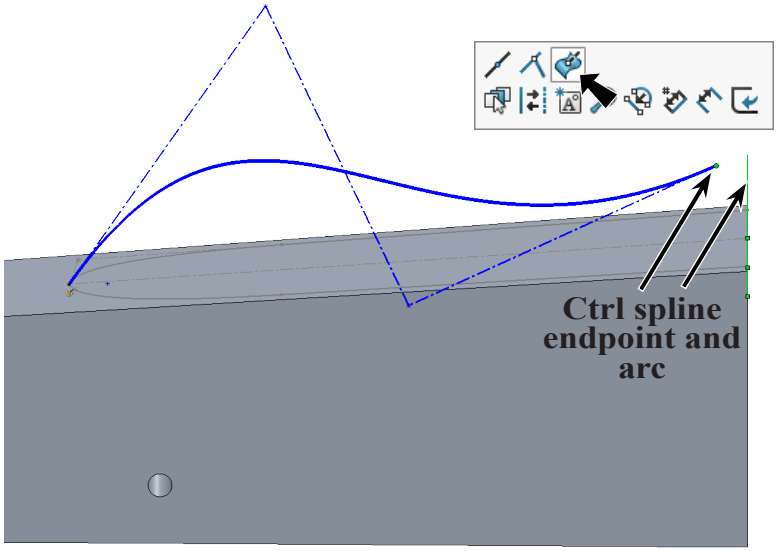


Fig. 51

Step 9. Use **Previous View**  on the Standard Views toolbar. (**Ctrl-Shift-Z**) or **Up arrow** key to return to previous view.

Step 10. Click **Smart Dimension** 

(**S**) on the Sketch toolbar.

Step 11. Dimension control vertex points, **Fig. 52**.

Step 12. Click **Exit Sketch** 

on the Sketch toolbar.

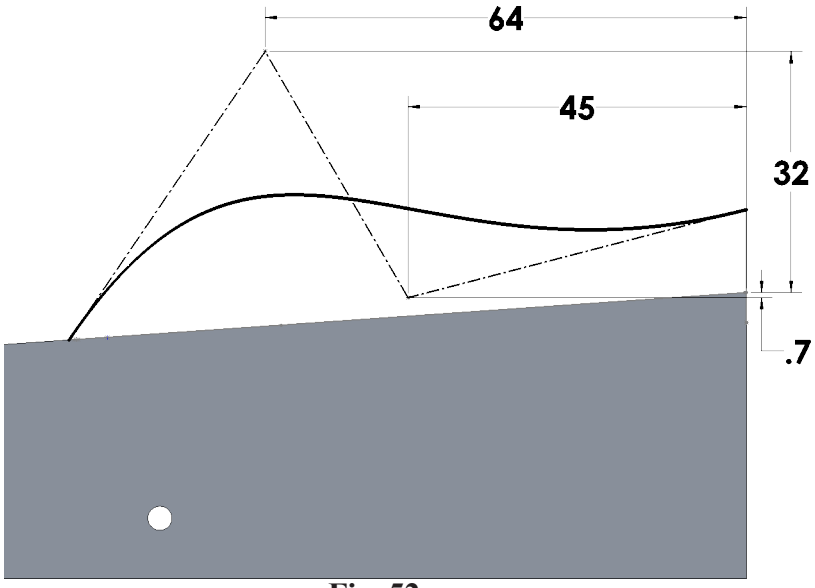


Fig. 52

K. Cockpit Loft Front Profile Point Sketch.

Step 1. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 2. Click the **top face** and click **Sketch** on the context toolbar, **Fig. 53**.

Step 3. Zoom in on **Loft sketches**, **Fig. 53**. To zoom, place the cursor over the sketches area and spin the wheel on mouse back. While spinning the wheel keep cursor on the area.

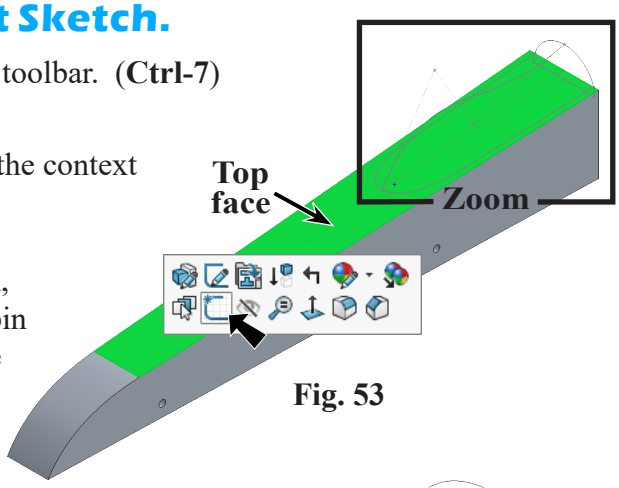


Fig. 53

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

Step 5. Sketch **one point at front intersection** of Loft sketches, **Fig. 54**. Be very careful to sketch only one point, it is easy to accidently click extra points.

Step 6. Click **Exit Sketch** on the Sketch toolbar.

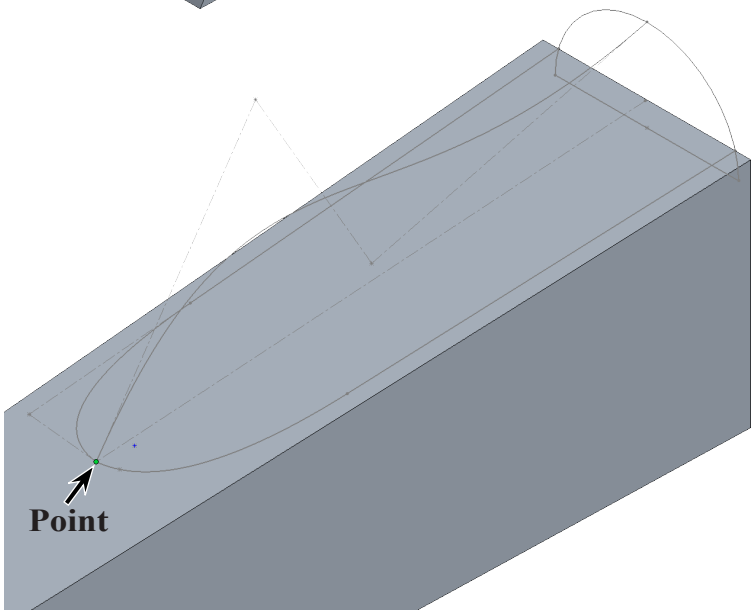


Fig. 54

L. Loft Boss/Base.

Step 1. **Ctrl click both Profiles sketches**, **Sketch6** (arc) and **Sketch10** (point) in the Feature Manager to select both, **Fig. 55**. Select **Sketch6** (arc) first.

Step 2. Click **Features** Features on the Command Manager toolbar.

Step 3. Click **Lofted Boss/Base** Lofted Boss/Base on the Features toolbar.

Step 4. In the Loft Property Manager set:

under Profiles, **Fig. 56**

Sketch6 and Sketch10 were preselected, **Sketch6 has to be first**

under Guide Curves, click in Guide Curves box and

click **Sketch7**, **Fig. 57**

Sketch9

Sketch8

set Guide curves influence **Global**

under Options

check **Merge results**

click OK .

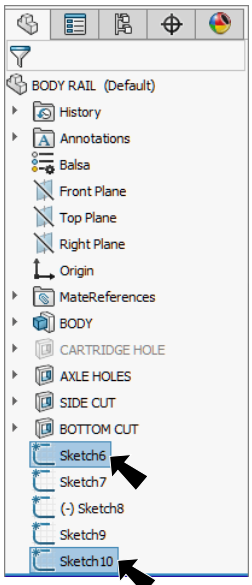


Fig. 55

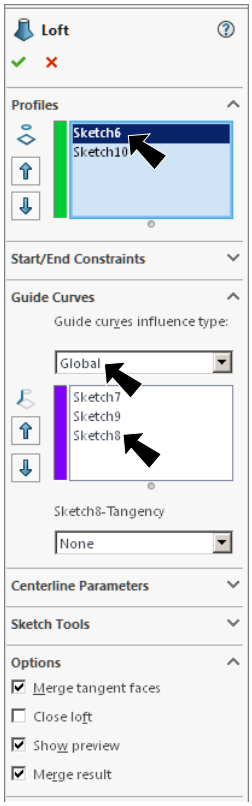


Fig. 56

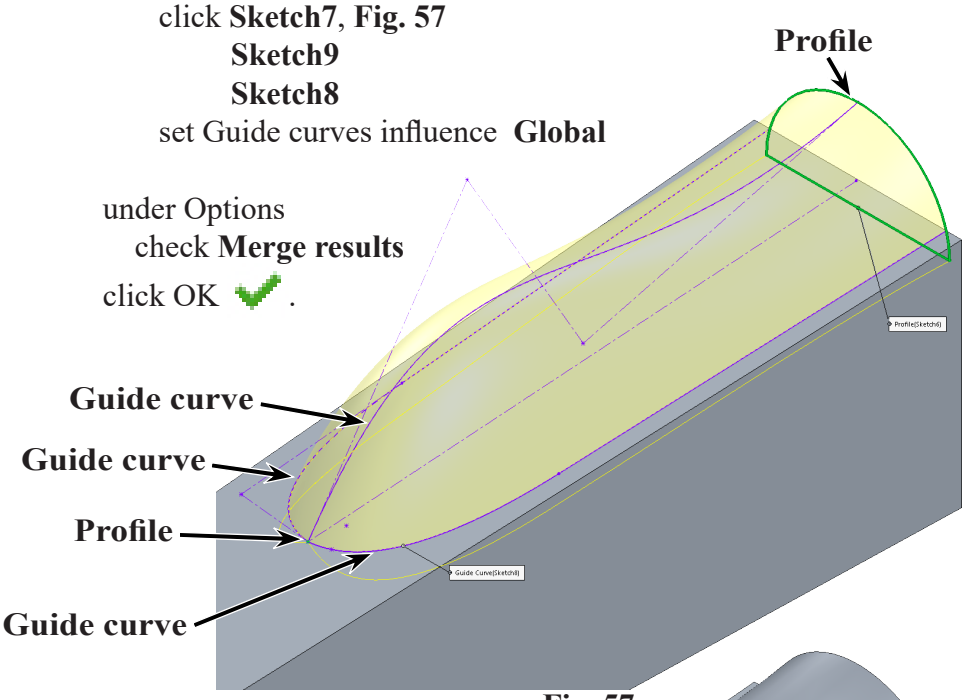


Fig. 57

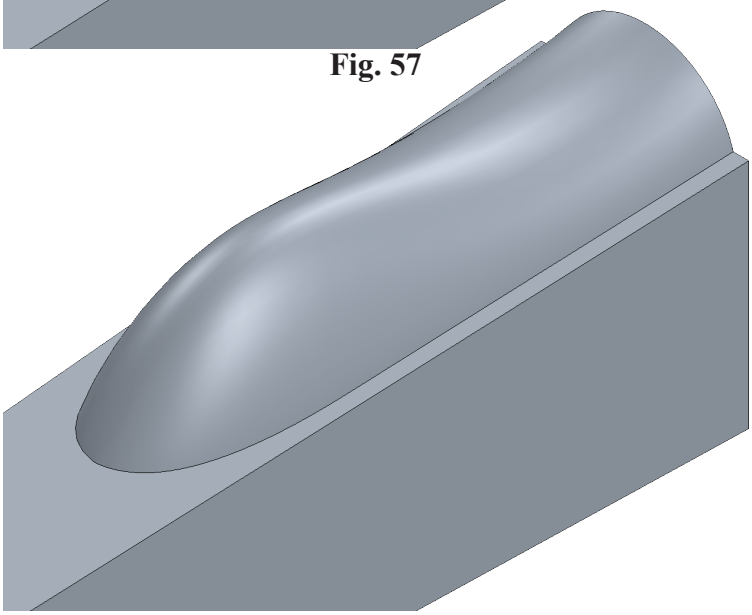


Fig. 58

M. Edit Axle Hole Sketch.

Step 1. In the Feature Manager move the suppressed **CARTRIDGE HOLE** below Loft1 feature, **Fig. 59**. To move the feature, drag **CARTRIDGE HOLE** down, when the cursor is over Loft1 - release.

Step 2. Click the suppressed **CARTRIDGE HOLE** and click **Unsuppress** in the context toolbar, **Fig. 60**.

Step 3. Move **AXLE HOLES** below **CARTRIDGE HOLE** feature, **Fig. 61**. To move the feature, drag **AXLE HOLES** down, when the cursor is over **CARTRIDGE HOLE -** release. **Ignore the What's Wrong warning**.

Step 4. Click **AXLE HOLES** and click **Edit Sketch** on the context toolbar, **Fig. 62**.

Step 5. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 6. **Delete all dimensions except 3.18 mm** axle hole diameters, **Fig. 63**.

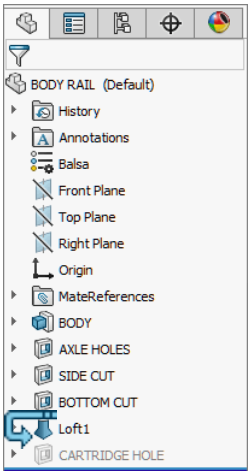


Fig. 59

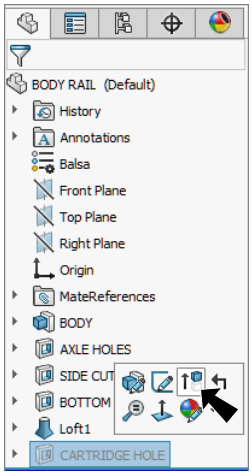


Fig. 60

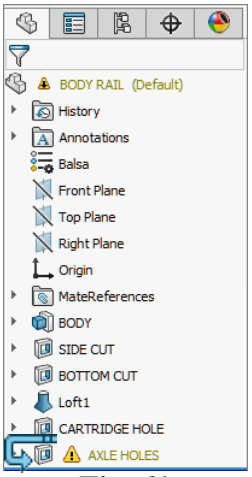


Fig. 61

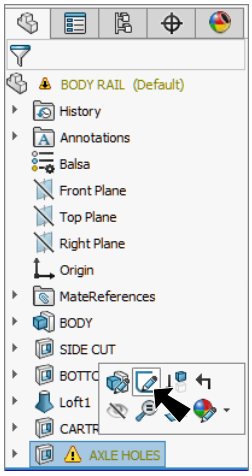


Fig. 62

Step 7. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 8. Add dimensions, **Fig. 64**.

Step 9. Click **Exit Sketch** on the Sketch toolbar.

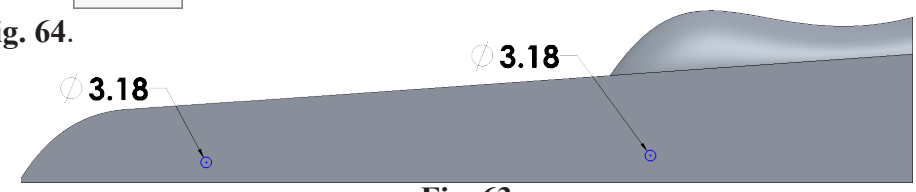


Fig. 63

Step 10. Save. Use **Ctrl-S**.

Fig. 64

N. Front Wheel Standoff.

Step 1. Click **Right Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 65**.

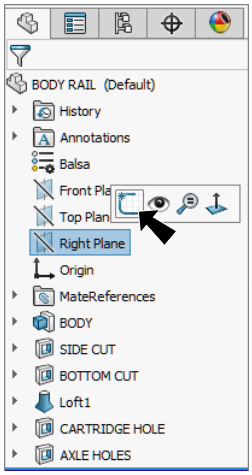


Fig. 65

Step 2. Zoom in around **front axle hole**, **Fig. 66**. To zoom, place the cursor over the front axle hole area and spin the wheel on mouse back. While spinning the wheel keep cursor on the area.

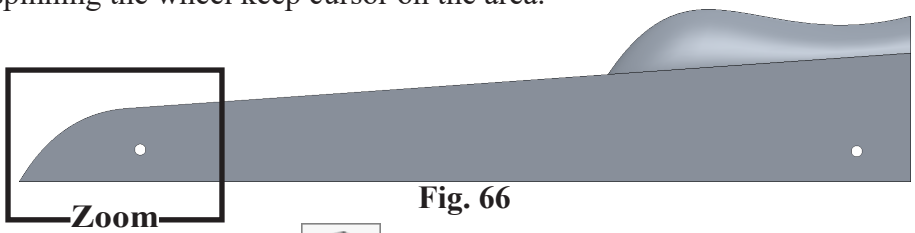


Fig. 66

Step 3. Click **Convert Entities** on the Sketch toolbar.

Step 4. In the Convert Entities Property Manager:
under Entities to Convert, **Fig. 67**
click **edge of front axle hole in sketch**, **Fig. 68**
click OK .

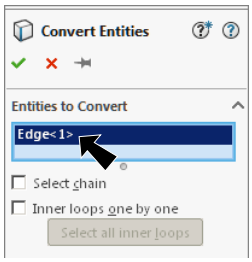


Fig. 67

Step 5. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 6. Sketch a **vertical centerline coincident with the center** of **converted circle**, **Fig. 69**.

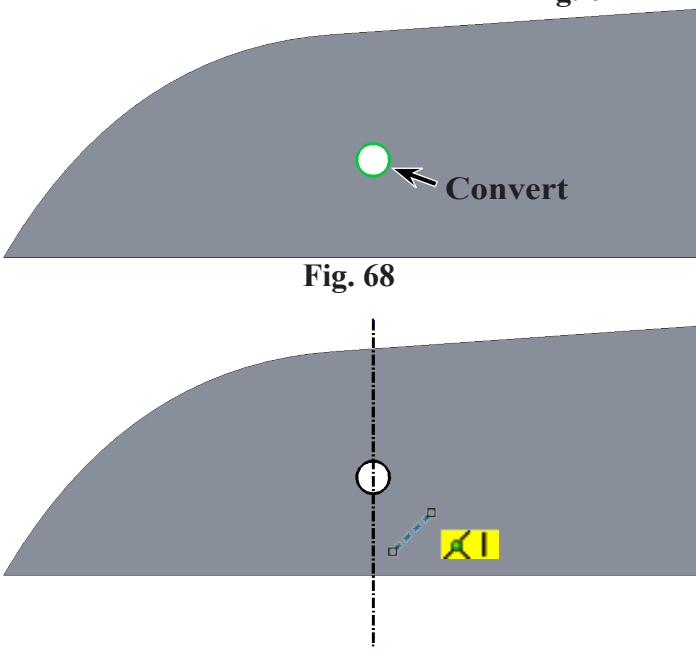


Fig. 68

Step 7. Click **Style Spline** in the **Spline flyout** on the Sketch toolbar.

Fig. 69

Step 8. Sketch a **4 control vertex point Spline** between bottom edge of body in front of axle hole and centerline above axle hole, **Fig. 70**. Press Escape to end spline.

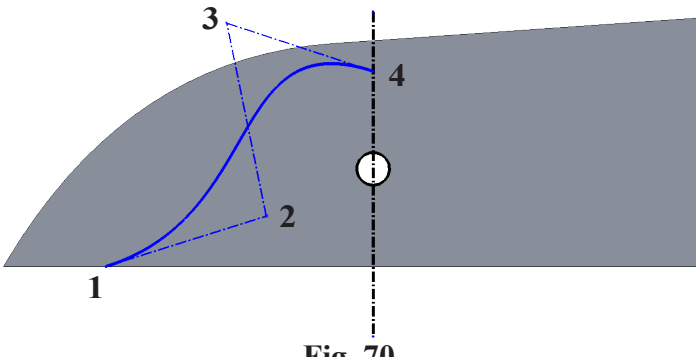


Fig. 70

Step 9. Click **Style Spline** in the **Spline flyout** on the Sketch toolbar.

Step 10. Sketch a **3 control vertex point Spline** top endpoint of style spline (at centerline) and edge of body on rear side of axle hole, **Fig. 71**. Press Escape to end spline.

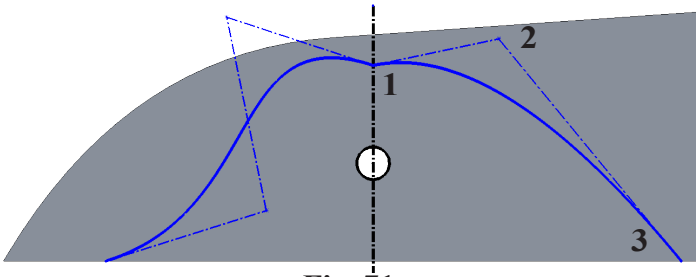


Fig. 71

Step 11. Click **top control polygon segment** of first style spline and click **Make Horizontal** on the context toolbar, **Fig. 72**.

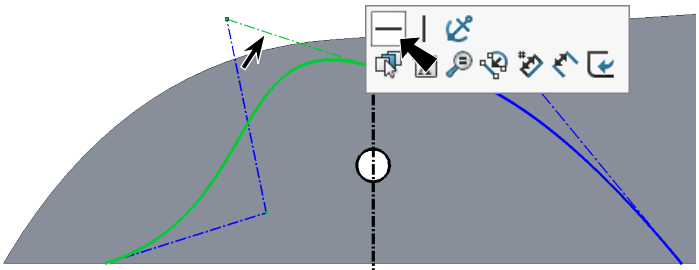


Fig. 72

Step 12. Click **top control polygon segment** of second style spline and click **Make Horizontal** on the context toolbar, **Fig. 73**.

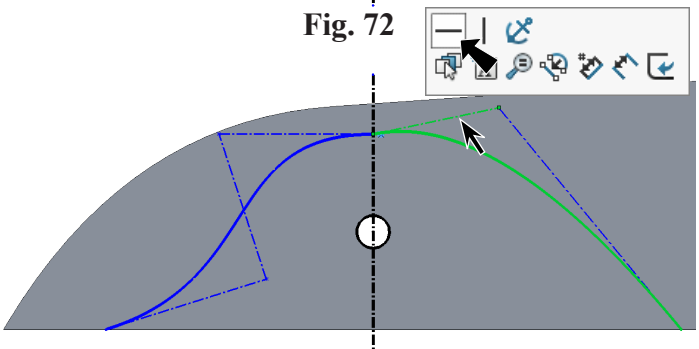


Fig. 73

Step 13. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 14. Add dimensions, **Fig. 74**.

Step 15. Click **Line** (**L**) on the Sketch toolbar.

Step 16. Sketch a line across between bottom endpoints of splines to close the sketch, **Fig. 75**.

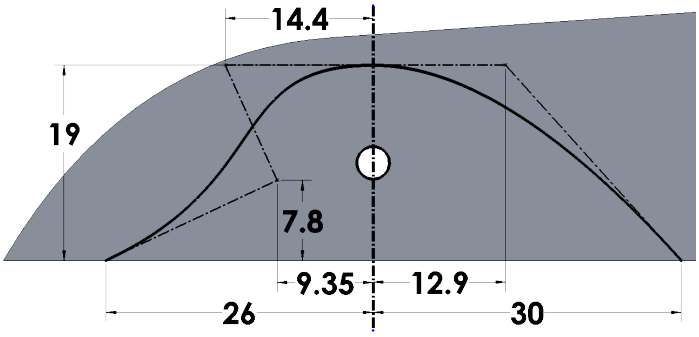


Fig. 74

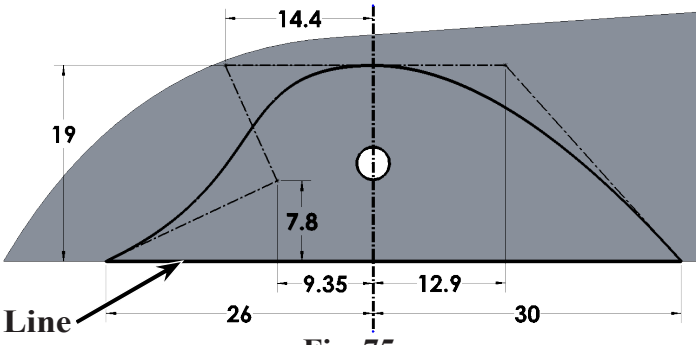


Fig. 75

Step 17. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 18. Click **Features** Features on the Command Manager toolbar.

Step 19. Click **Extruded Boss/Base** Extruded Boss/Base on the Features toolbar.

Step 20. In the Property Manager set:
under Direction 1, **Fig. 76**
End Condition **Mid Plane**
Depth D1 **40**
click OK .

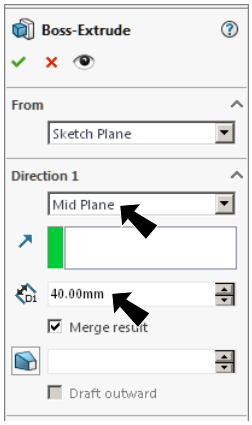


Fig. 76

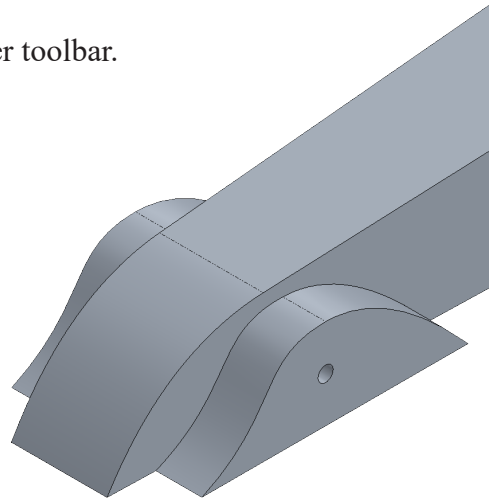


Fig. 77

O. Rename Boss-Extrude1 FRONT WHEEL STANDOFF.

Step 1. **Rename Boss-Extrude1** to **FRONT WHEEL STANDOFF** in the Feature Manager, **Fig. 78**. To rename, click **Boss-Extrude1** name in Feature Manager and press **F2** on keyboard. Key-in **FRONT WHEEL STANDOFF**.

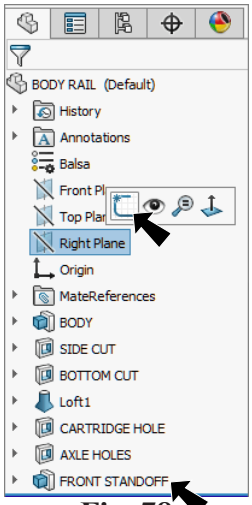


Fig. 78

P. Rear Fender.

Step 1. Click **Right Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 78**.

Step 2. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 3. Zoom in around **rear axle hole**, **Fig. 79**. To zoom, place the cursor over the rear axle hole area and spin the wheel on mouse back. While spinning the wheel keep cursor on the area.

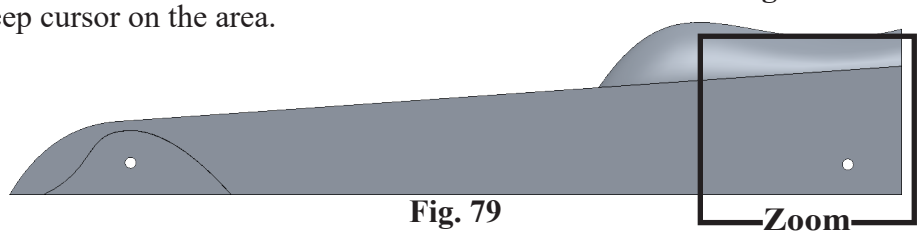


Fig. 79

Step 4. Click **Centerpoint Arc** (**S**) in the **Arc flyout** on the Sketch toolbar.

Step 5. Click the centerpoint of rear axle hole to start the arc and move the cursor to the upper right. Click to place the first endpoint of arc, then move cursor counterclockwise. Click to place the second endpoint, **Fig. 80**.

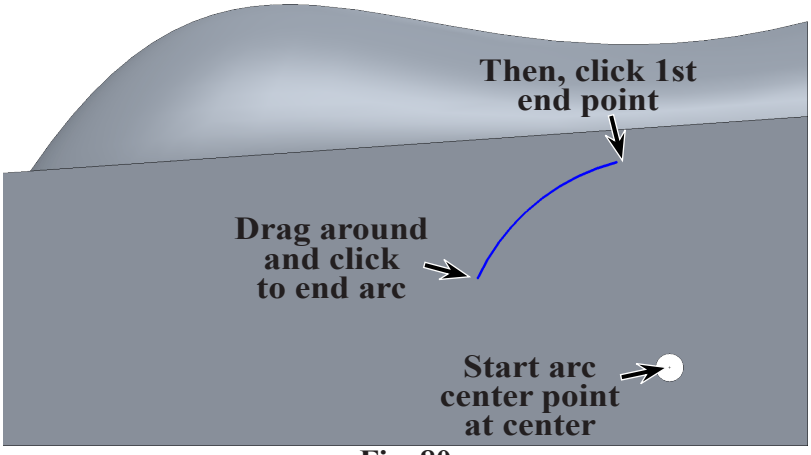


Fig. 80

Step 6. Click **Tangent Arc** in the **Arc flyout** on the Sketch toolbar.

Step 7. Sketch **tangent arc** between bottom endpoint of arc and bottom edge of body, **Fig. 81**.

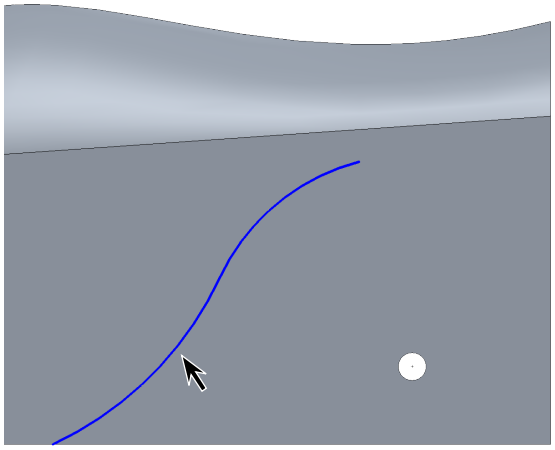


Fig. 81

Step 8. Click **Line** (**L**) on the Sketch toolbar.

Step 9. Sketch line from top endpoint of centerpoint arc to back edge of body at a slight angle, **Fig. 82**.

Step 10. **Right click sketching and click Select from menu** to unselect Line tool.

Step 11. Drag a **selection to left around ends of centerpoint arc and line** to select both. Release Ctrl key and click **Make Tangent** on the context toolbar, **Fig. 83**.

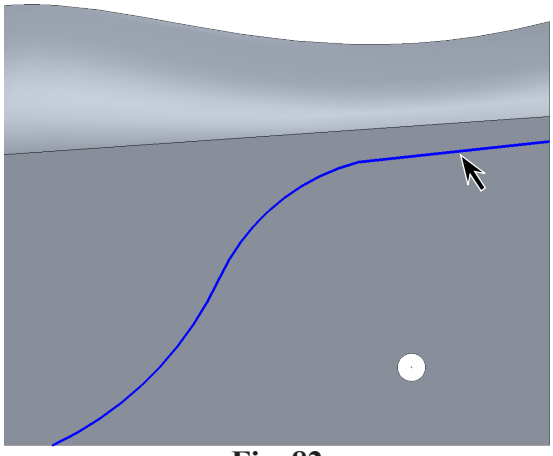


Fig. 82

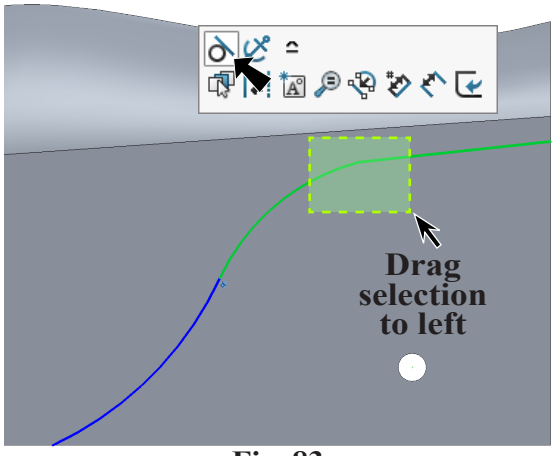


Fig. 83

Step 12. **Ctrl click line** and **top edge of body** to select both. Release Ctrl key and click **Make Parallel** on the context toolbar, **Fig. 84**.

Step 13. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 14. Add dimension, **Fig. 85**.

Step 15. Click **Offset Entities** on the Sketch toolbar.

Step 16. In the Offset Entities Property Manager set:
under Parameters, **Fig. 86**

Distance **4**
check **Reverse**
check **Select chain**

Click **any geometry of sketch**, **Fig. 87**. The yellow offset should be below the original green geometry. If it is not, unclick Reverse.

click OK .

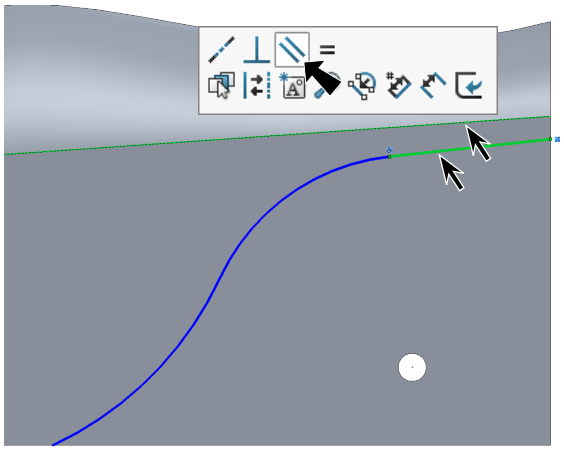


Fig. 84

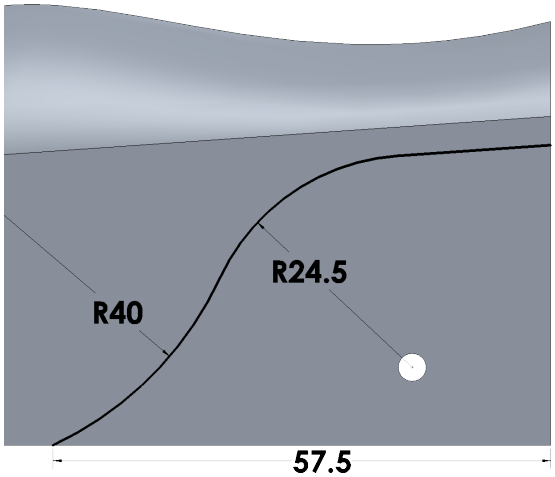


Fig. 85

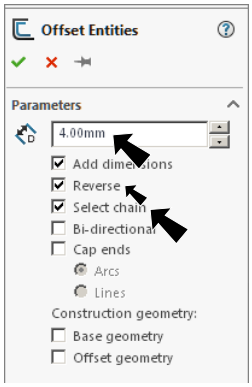


Fig. 86

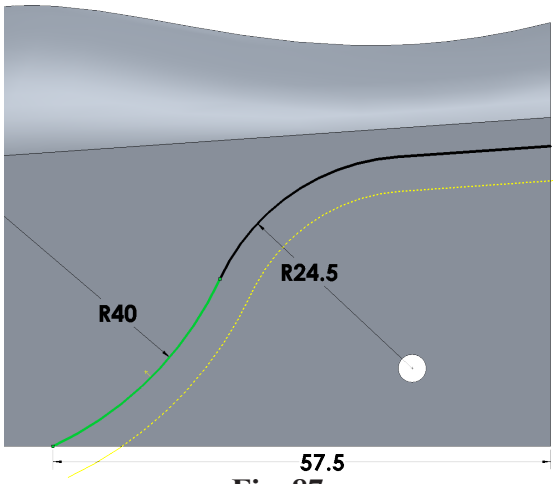


Fig. 87

Step 17. Click **Convert Entities** 

on the Sketch toolbar.

Step 18. In the Convert Entities Property Manager:
under Entities to Convert, **Fig. 88**
click **rear and bottom edges of body**, **Fig. 89**
click OK ✔ **twice**.

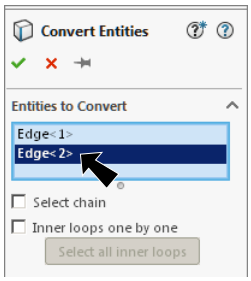
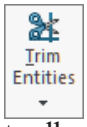


Fig. 88

Step 19. Click **Trim Entities** 

(S) on the Sketch toolbar.

Step 20. In the Property Manger select:

Trim to closest  . **Fig. 90**
Trim the converted lines to cap fender, **Fig. 91**.
Click segments to trim.
Results shown in **Fig. 92**.

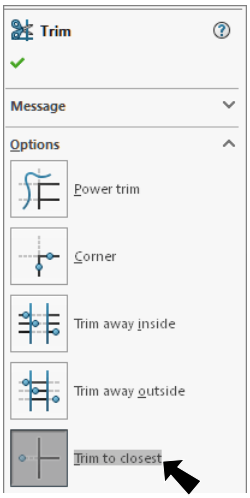


Fig. 90

Step 21. If necessary, zoom in around **rear edge of fender**, **Fig. 92**.

Step 22. Trim the small piece of line that extends out from body, **Fig. 93**.
Results shown in **Fig. 94**.

Step 23. Click OK ✔ in Trim Property Manager.

Step 24. Save. Use **Ctrl-S**.

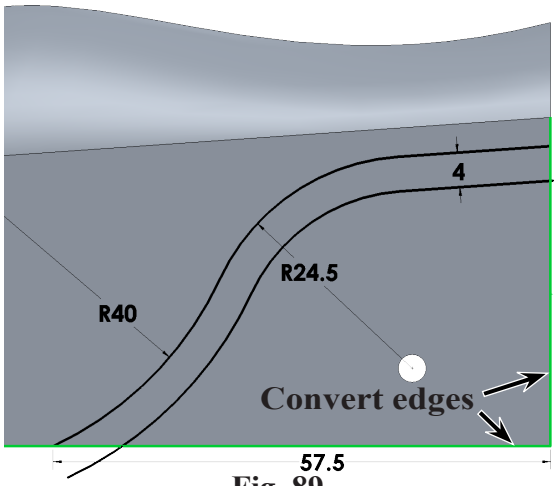


Fig. 89

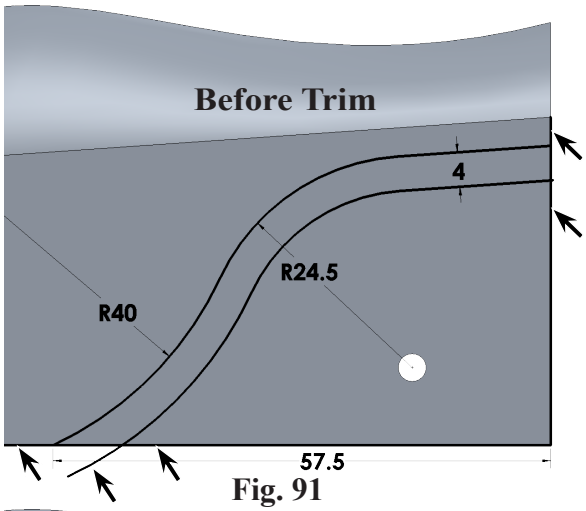


Fig. 91

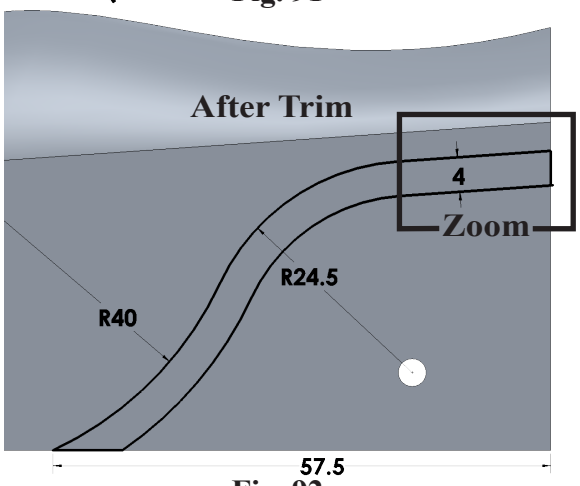


Fig. 92

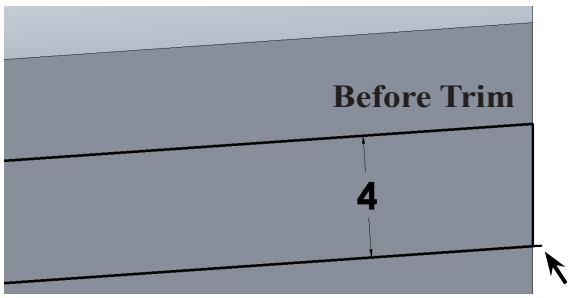


Fig. 93

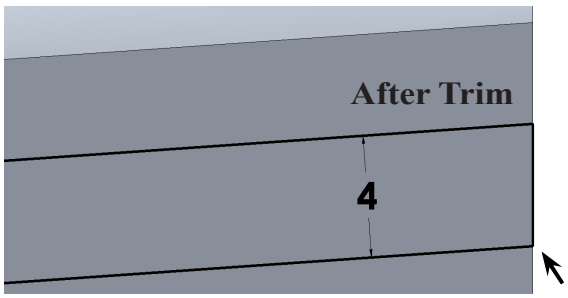


Fig. 94

Q. Extrude Fender.

Step 1. Rotate view slightly to view **rear and side of body**, hold down middle mouse button (wheel) and drag to rotate view, **Fig. 95**.

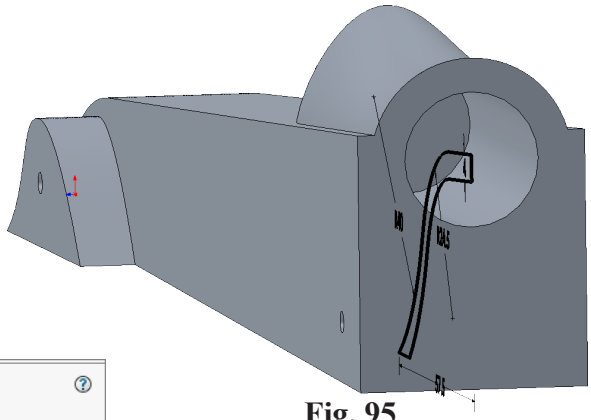


Fig. 95

Step 2. Click **Features** Features on the Command Manager toolbar.

Step 3. Click **Extruded Boss/Base** Extruded Boss/Base on the Features toolbar.

Step 4. In the Property Manager set:
under Direction 1, **Fig. 96**
End Condition **Mid Plane**
Depth D1 **42**
click OK ✔.

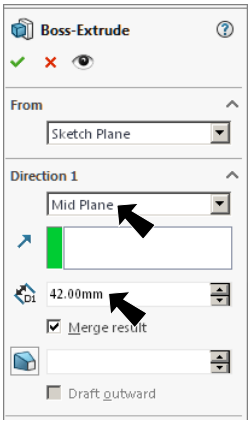


Fig. 96

Step 5. Save. Use **Ctrl-S**.

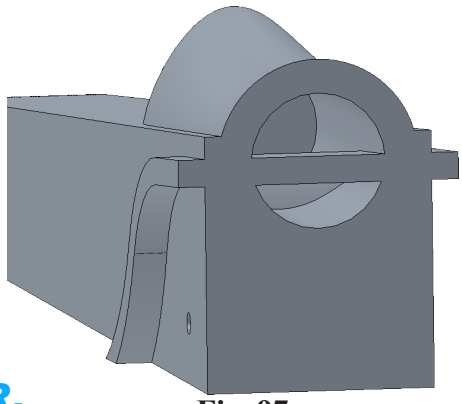


Fig. 97

R. Rename Boss-Extrude1 REAR FENDER.

Step 1. **Rename Boss-Extrude1** to **REAR FENDER** in the Feature Manager, **Fig. 98**. To rename, use **F2** on keyboard.

Step 2. In the Feature Manager drag the **CARTRIDGE HOLE** below REAR FENDER feature, **Fig. 99** and **Fig. 100**.

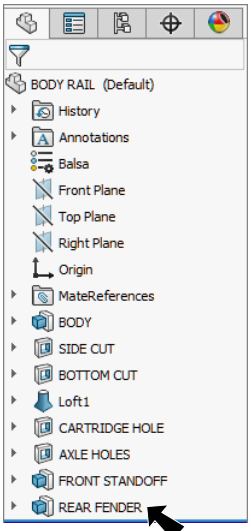


Fig. 98

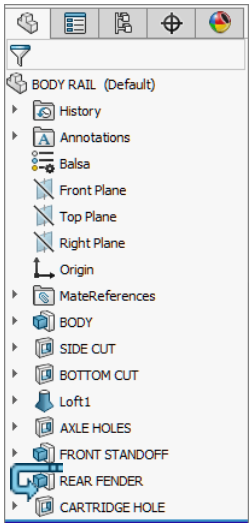


Fig. 99

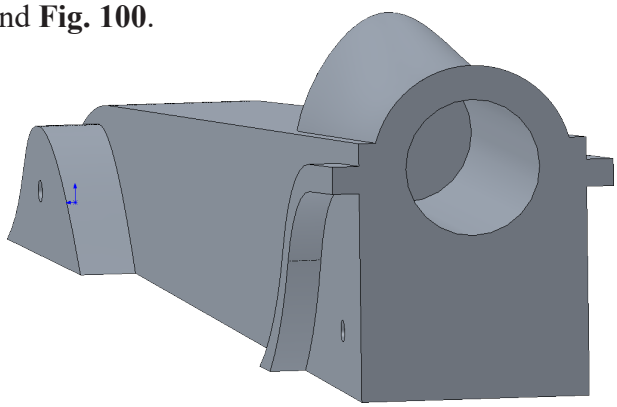


Fig. 100

S. Extrude Cut Wheel Wells.

Step 1. Click **Right Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 101**.

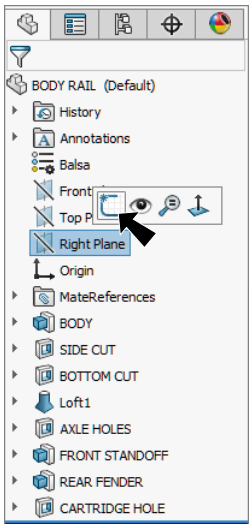


Fig. 101

Step 2. Click **Convert Entities** on the Sketch toolbar.

Step 3. In the Convert Entities Property Manager:
under Entities to Convert, **Fig. 102**
click **side face under the fender**, **Fig. 103**
click OK **twice**.

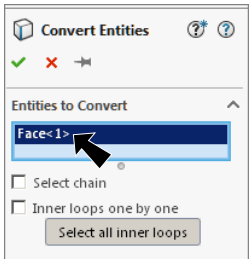


Fig. 102

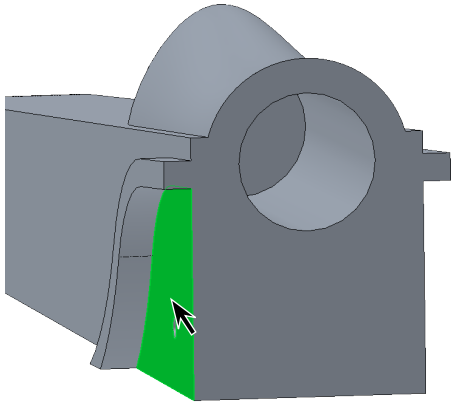


Fig. 103

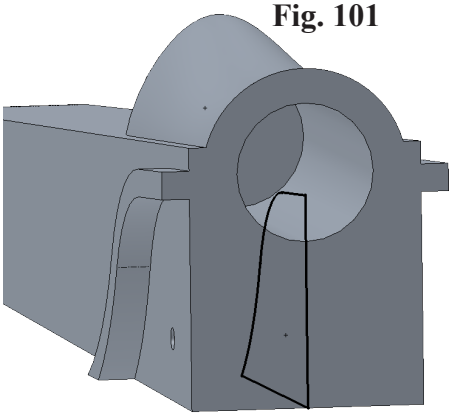


Fig. 104

Step 4. Click **Features** on the Command Manager toolbar.

Step 5. Click **Extruded Cut** on the Features toolbar.

Step 6. In the Property Manager set:
under From, **Fig. 105**
Start Condition **Offset**
Offset Value 17
under Direction 1
Depth **4**
click OK .

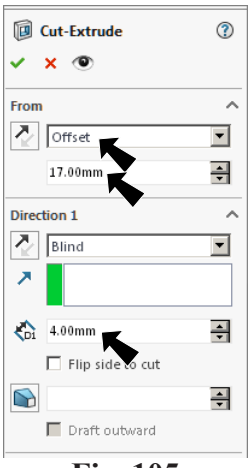


Fig. 105

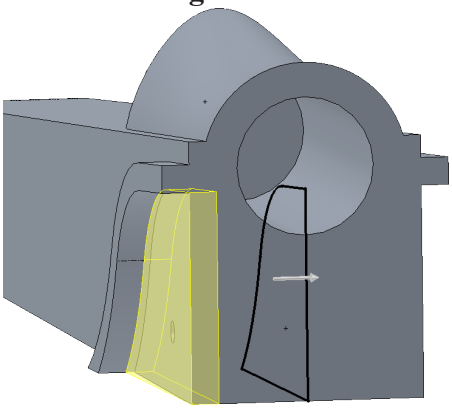


Fig. 106

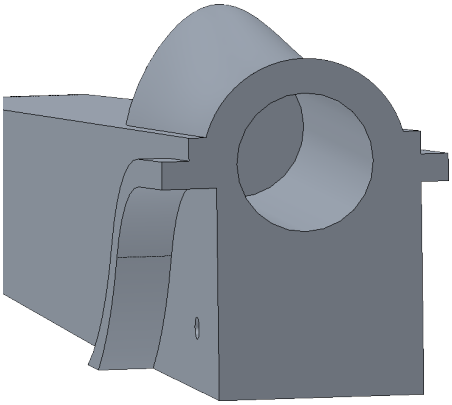


Fig. 107

T. Rename Cut-Extrude1 REAR WHEEL CUT.

Step 1. **Rename Cut-Extrude1** to **REAR WHEEL CUT** in the Feature Manager, **Fig. 108**. To rename, use **F2** on keyboard.

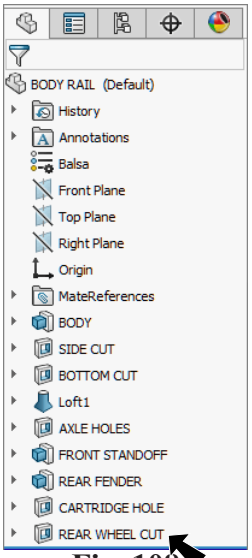


Fig. 108

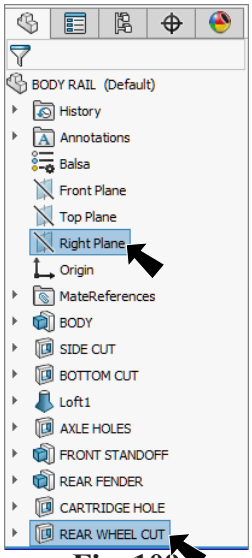


Fig. 109

U. Mirror Extrude Cut Wheel Wells.

Step 1. **Ctrl click Right Plane** and **REAR WHEEL CUT** feature to select both, **Fig. 109**.

Step 2. Click **Mirror** Mirror on the Features toolbar.

Step 3. In the Mirror Property Manager click OK , **Fig. 110**.

Step 4. Save. Use **Ctrl-S**.

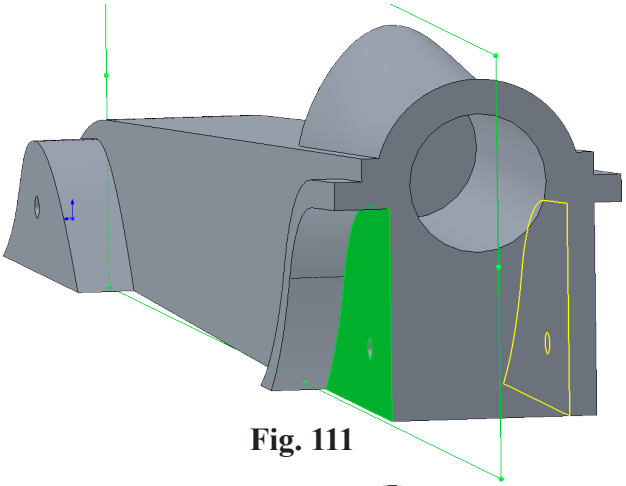


Fig. 111

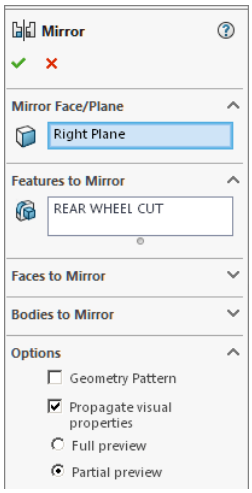


Fig. 110

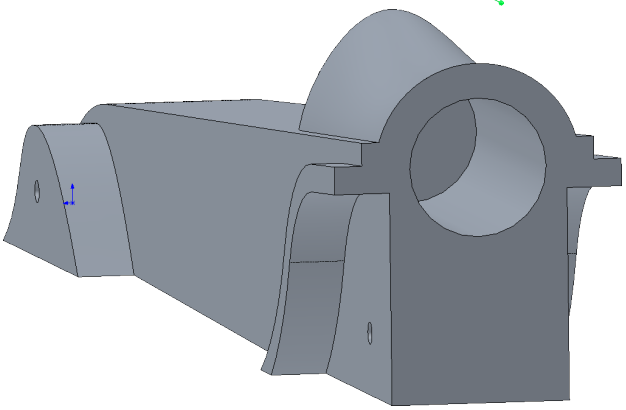


Fig. 112

V. Variable Fillet Top Edges.

Step 1. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Fig. 113

Step 2. Click **Filter Edges** (**E**) on the **Selection Filter toolbar** at the bottom of the display, **Fig. 113**. If necessary, use **F5** key to display the toolbar.

Step 3. Click **Fillet** on the Features toolbar.

Step 4. In the Fillet Property Manager:

select **Manual**, **Fig. 114**

under Fillet type

select **Variable Size Fillet**

select **Full preview**.

Click the **two top edges on both sides of the body**, **Fig. 115**.

Set Unsigned Variable. To set radius, click Unassigned and key-in radius.

radius 3 in rear

radius 6 at front wheel standoff

radius 10 in front

Click OK .

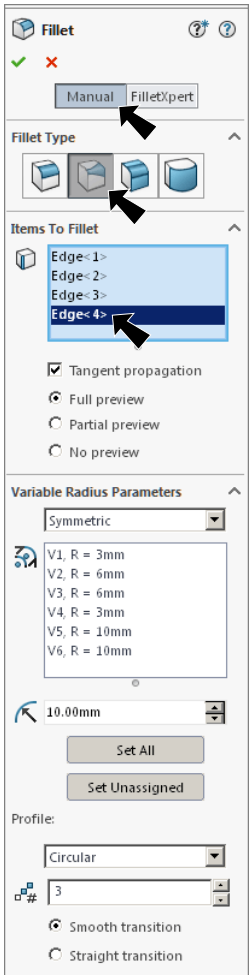


Fig. 114

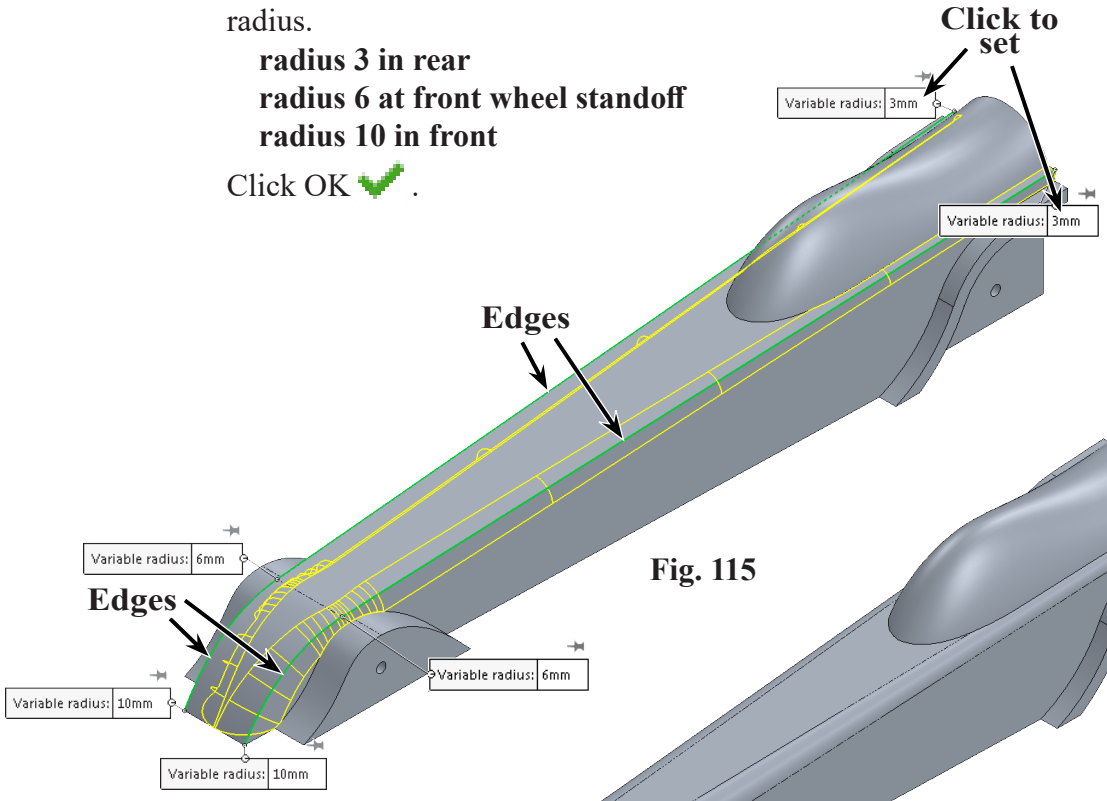


Fig. 115

Fig. 116

W. Fillet Edges.

Step 1. Click **Fillet** 

on the Features toolbar.

Step 2. In the Fillet Property Manager set:

select **FilletXpert**, **Fig. 117**

Radius **3**

select **Full preview**

click the **two top edges** of front wheel standoff on both sides, **Fig. 118**

click **Apply**

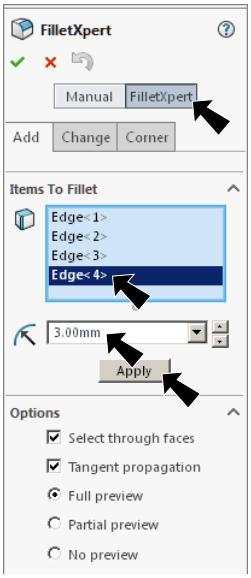


Fig. 117

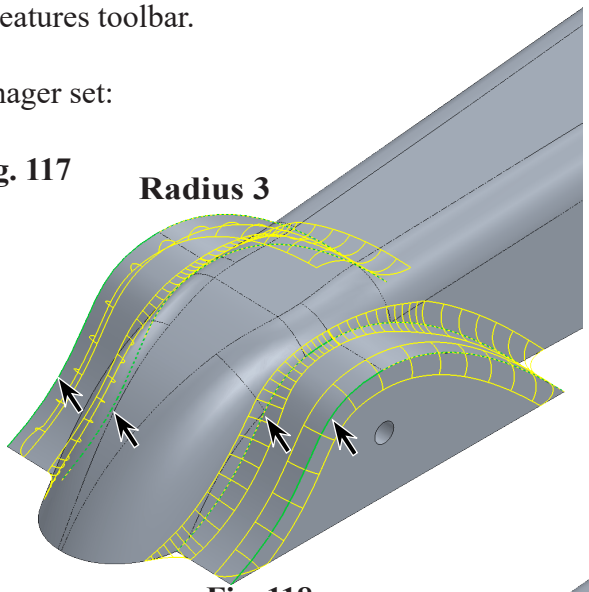


Fig. 118

Step 3. Set **Radius** **3**

click the **top inside edge of fender on both sides**, **Fig. 120**

click **Apply**

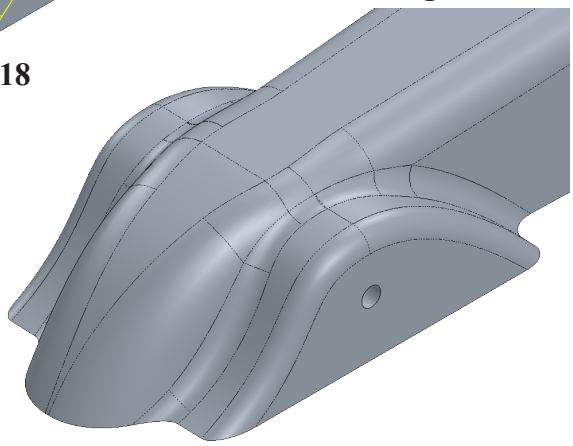


Fig. 118

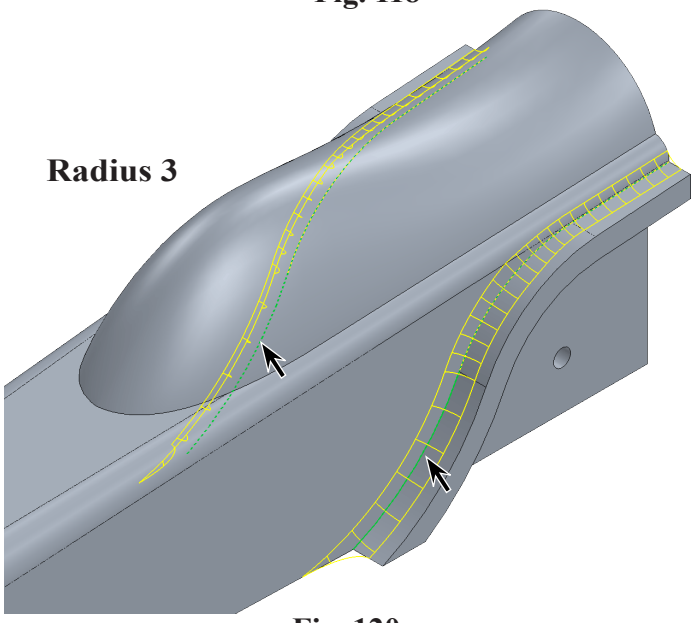


Fig. 120

Step 4. Set **Radius**  **2**

click the **top outside edge of fender on both sides**, **Fig. 121**

click **Apply**

Step 5. Set **Radius**  **4**

click **edge of cockpit at body**, **Fig. 122**

click OK  .

Step 6. Save. Use **Ctrl-S**.

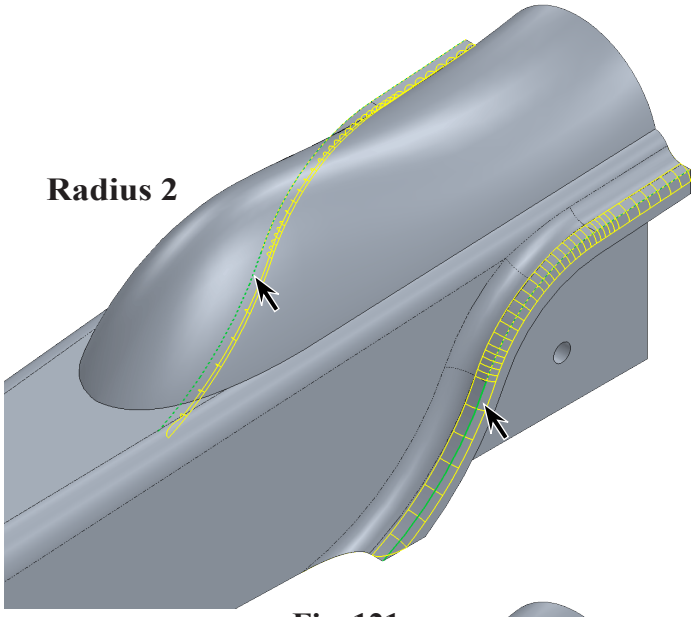


Fig. 121

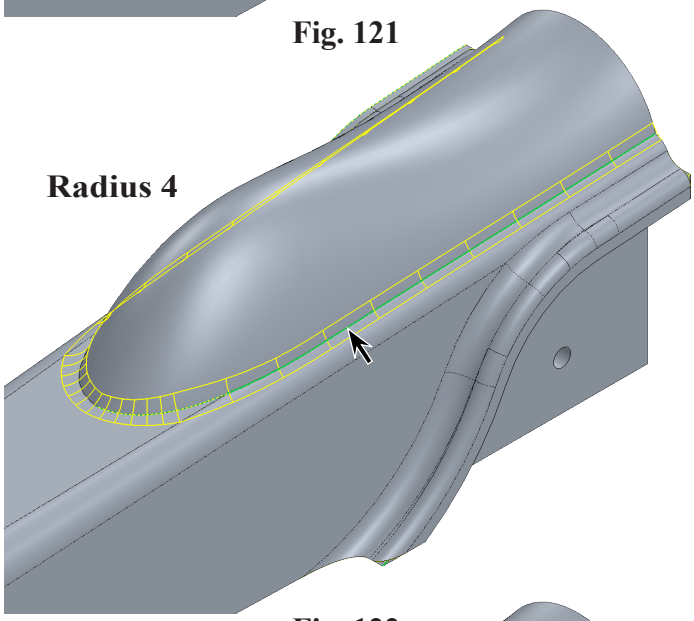


Fig. 122

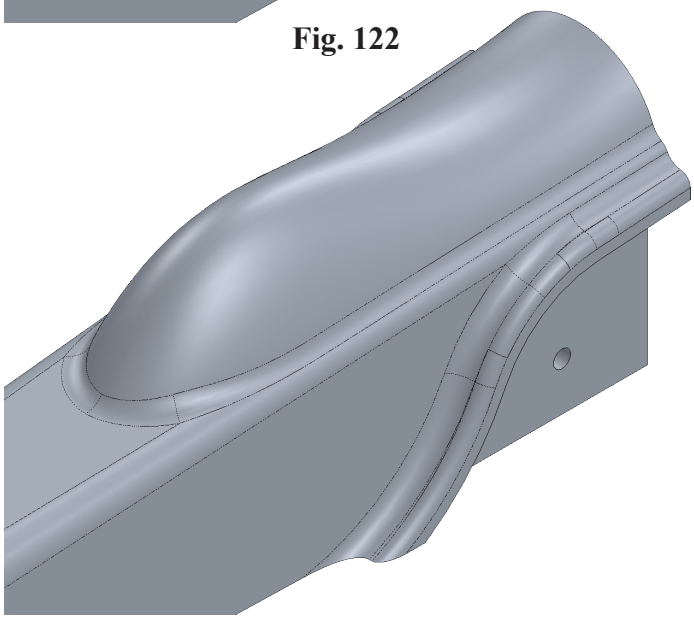


Fig. 123

X. Front Split Line.

Step 1. Click **Filter Off** (**F6**) on the **Selection Filter toolbar** at the bottom of the display, **Fig. 124**. If necessary use **F5** key to display the toolbar.


Fig. 124

Step 2. Click **Front Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 125**.

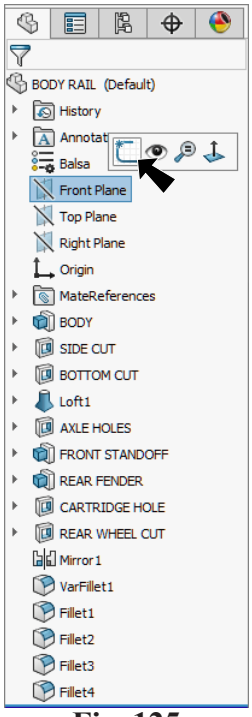


Fig. 125

Step 3. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 4. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 5. Starting from the Origin at the bottom of the body, sketch a vertical line up through the body and extend the centerline out past body, **Fig. 126**.

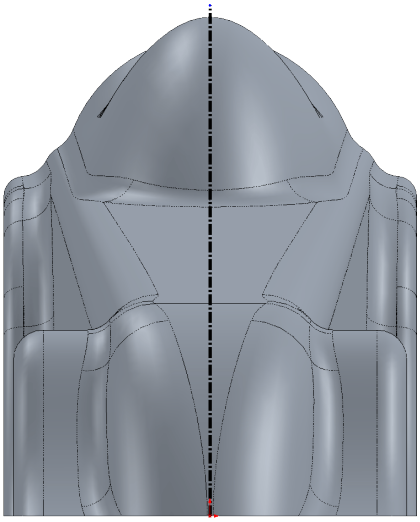


Fig. 126

Step 6. Click **3 Point Arc** (**S**) in the **Arc flyout** on the Sketch toolbar.

Step 7. Sketch **3 point arc** from centerline out into the cockpit area, **Fig. 127**.

Step 8. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 9. Add dimensions, **Fig. 128**.

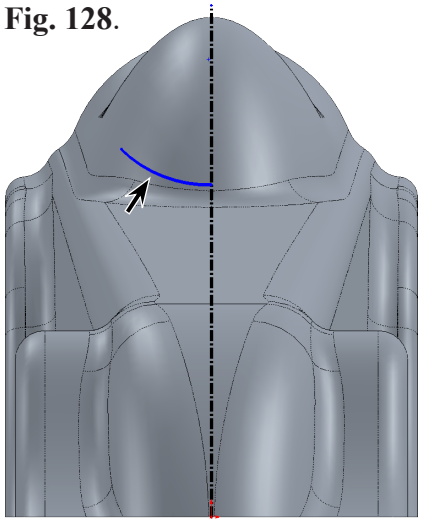


Fig. 127

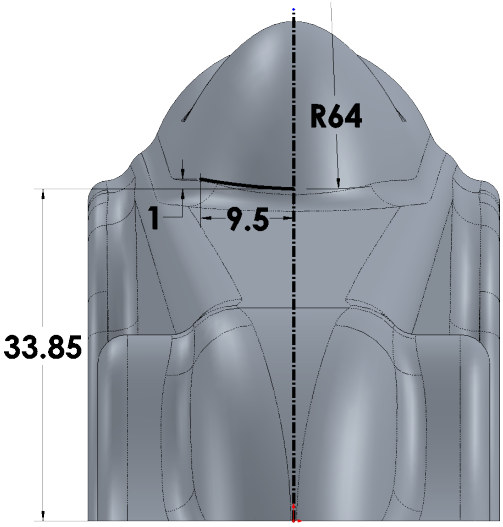


Fig. 128

Step 10. Click **Style Spline** in the **Spline flyout** on the Sketch toolbar.

Step 11. Sketch a **3 control vertex point Spline** between centerline and left endpoint of arc, **Fig. 129**.

Step 12. Click **top control polygon segment** of style spline and click **Make Horizontal** on the context toolbar, **Fig. 130**.

Step 13. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 14. Add dimensions, **Fig. 131**.

Step 15. **Right click graphics area and click Select** from menu to unselect Smart Dimension.

Step 16. **Drag a "trend to left - more liberal" selection across** all geometry, **Fig. 132**.

Step 17. Click **Mirror Entities** on the Sketch toolbar, **Fig. 133**.

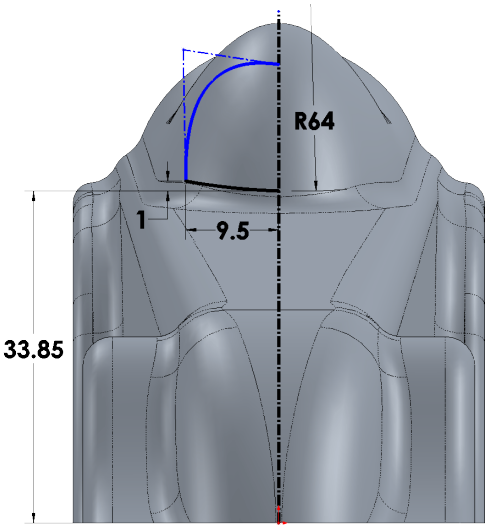


Fig. 129

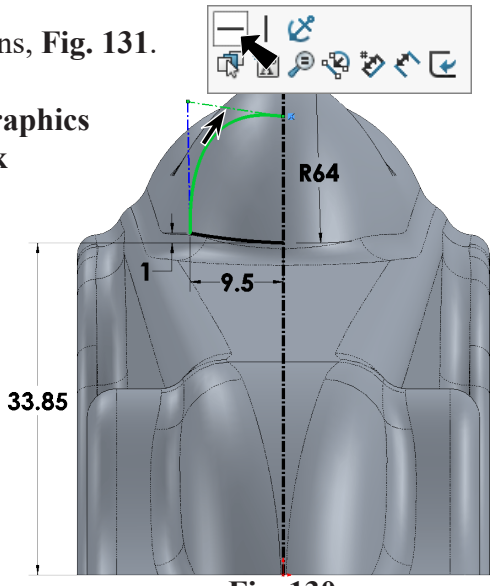


Fig. 130

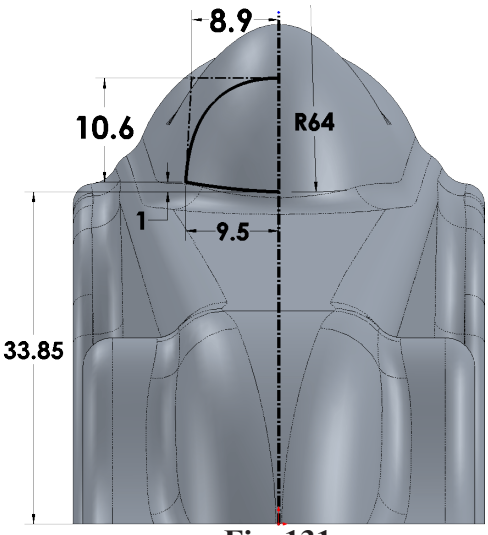


Fig. 131

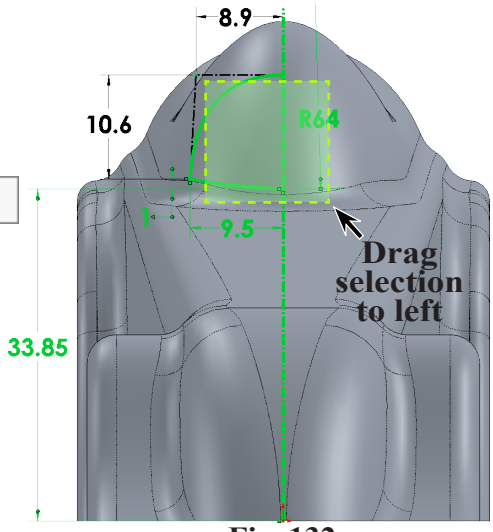


Fig. 132

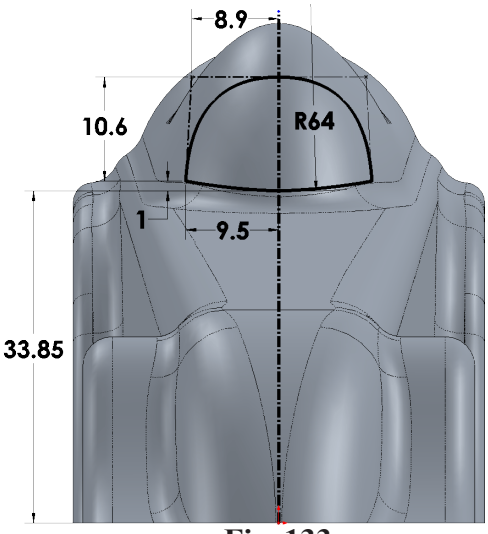


Fig. 133

Step 18. Click Insert Menu > Curve > Split Line.

Step 19. In the Split Line Property Manager:
under Type of Split, **Fig. 134**
select **Projection**
under Selections
current Sketch should be selected
in Faces to Split box
click **cockpit loft**, **Fig. 135**
click OK .

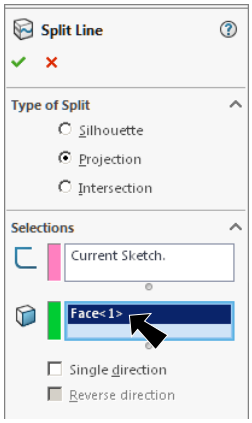


Fig. 134

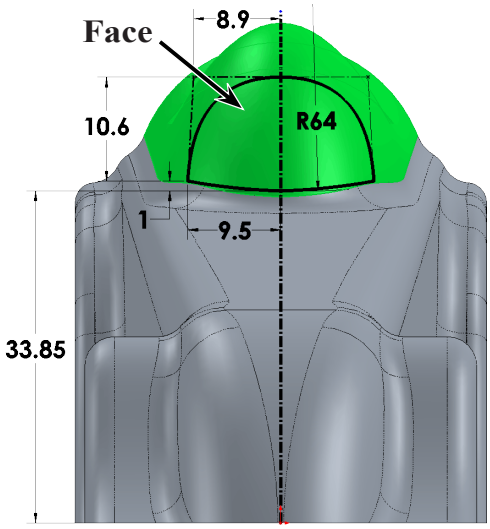


Fig. 135

Step 20. Click the split face to confirm Split Line, **Fig. 136**.

Step 21. Save. Use **Ctrl-S**.

Y. Side Split Line.

Step 1. Click **Right Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 137**.

Step 2. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 3. Zoom in around **cockpit**, **Fig. 138**. To zoom, place the cursor over the cockpit area and spin the wheel on mouse back. While spinning the wheel keep cursor on the area.

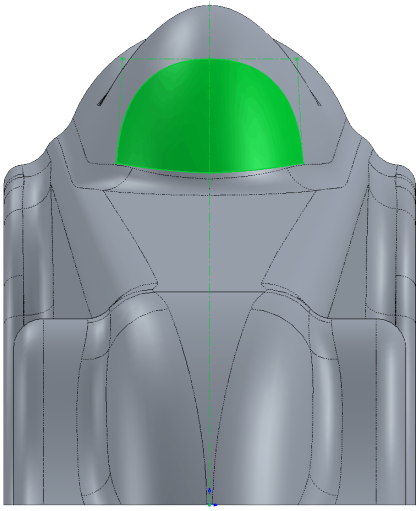


Fig. 136

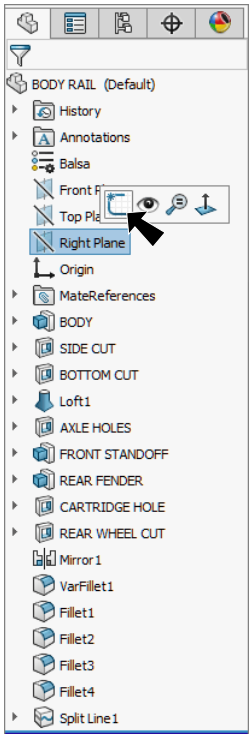


Fig. 137

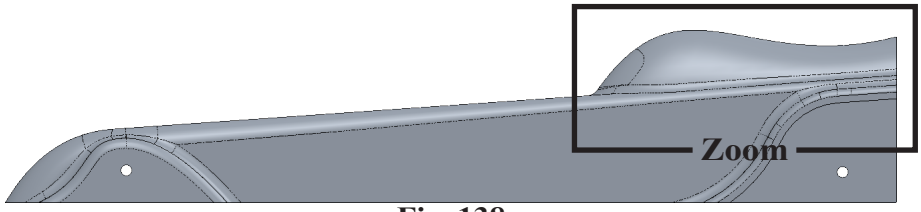


Fig. 138

Step 4. Click **Offset Entities** 

on the Sketch toolbar.

Step 5. In the Offset Entities Property Manager set:

click **Keep Visible**, **Fig. 139**

Distance **3**

click **Reverse**

uncheck **Select chain**

click **top edge of cockpit loft**, **Fig. 140**.

The yellow offset should be inside the cockpit.

If it is not, unclick Reverse.

Click OK .

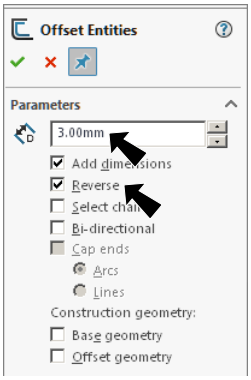


Fig. 139

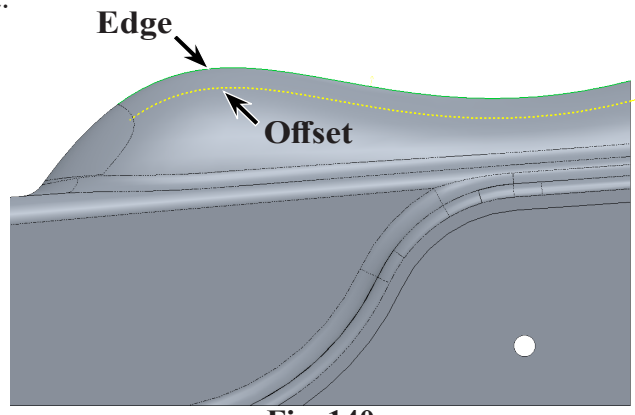


Fig. 140

Step 6. Set **Distance** **5** **Fig. 141**

click **rear edge of cockpit loft**, **Fig. 142**.

The yellow offset should be inside the cockpit.

Click OK .

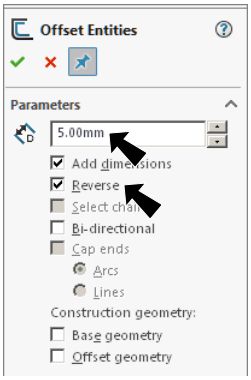


Fig. 141

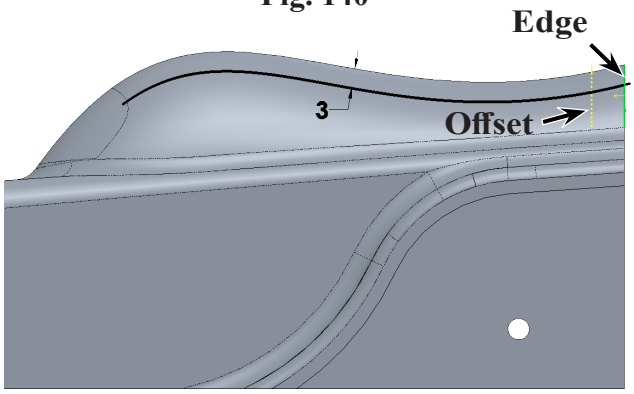


Fig. 142

Step 7. Set **Distance** **.1** **Fig. 143**

click the **two edges of fillet at the bottom of cockpit loft**, **Fig. 144** and **Fig. 145**.

The yellow offset should be inside the cockpit.

Click OK **twice** .

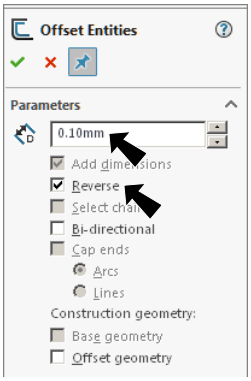


Fig. 143

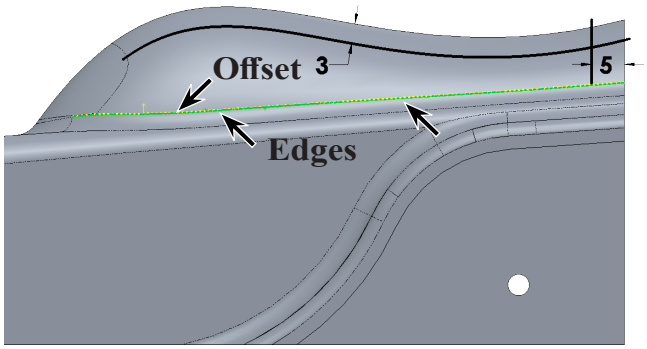


Fig. 144

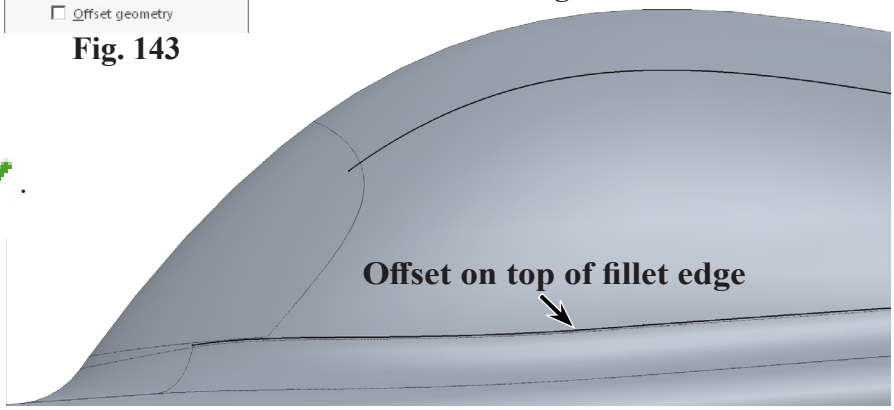


Fig. 145

Step 8. Click **3 Point Arc** (S) in the **Arc flyout** on the Sketch toolbar.

Step 9. Sketch **3 point arc** across offsets at front of the cockpit, **Fig. 146**.

Step 10. Click **Smart Dimension** (S) on the Sketch toolbar.

Step 11. Add dimensions, **Fig. 147**.

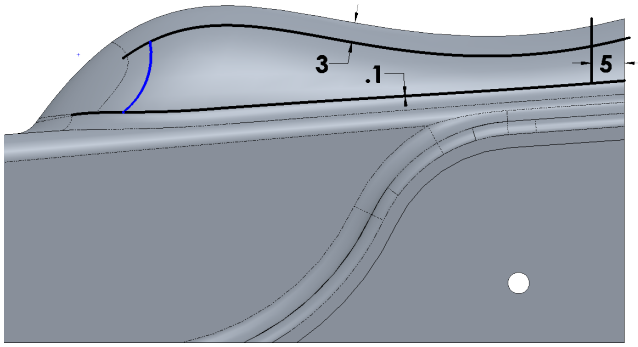


Fig. 146

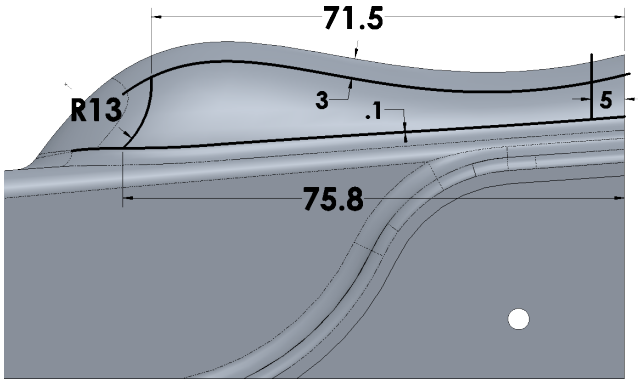


Fig. 147

Step 12. Click **Trim Entities** on the Sketch toolbar.

Step 13. In the Property Manger select:

Corner , **Fig. 148**
click the inside corner geometry (offsets and arc) to trim, **Fig. 149**.
Results shown in **Fig. 150**.
Click OK .

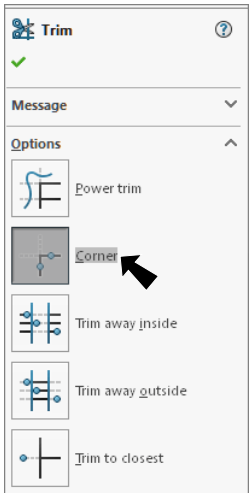


Fig. 148

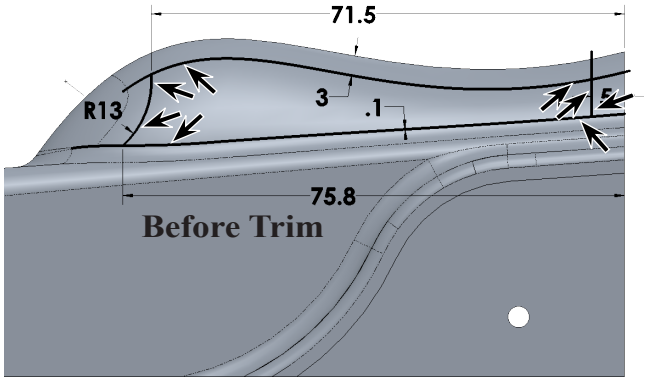


Fig. 149

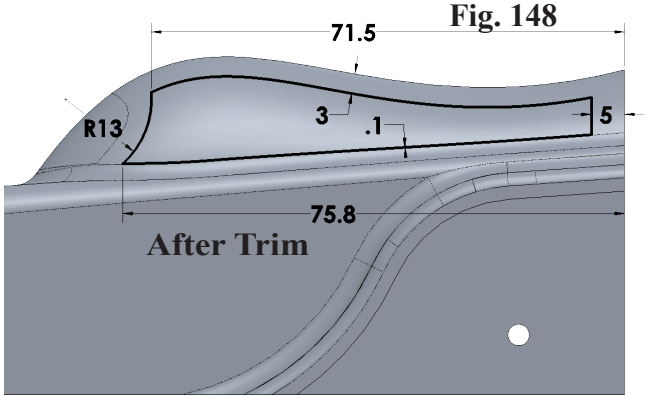


Fig. 150

Step 14. Click Insert Menu > Curve > Split Line.

Step 15. In the Split Line Property Manager:
under Type of Split, **Fig. 151**
select Projection
under Selections
Current Sketch should be selected

for the Faces to Split box click the **cockpit loft**, **Fig. 152**
click OK .

Step 16. Save. Use **Ctrl-S**.

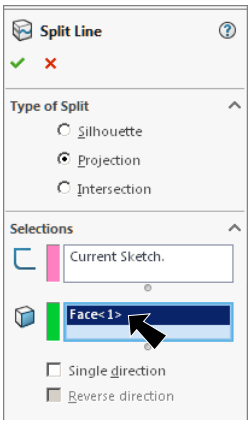


Fig. 151

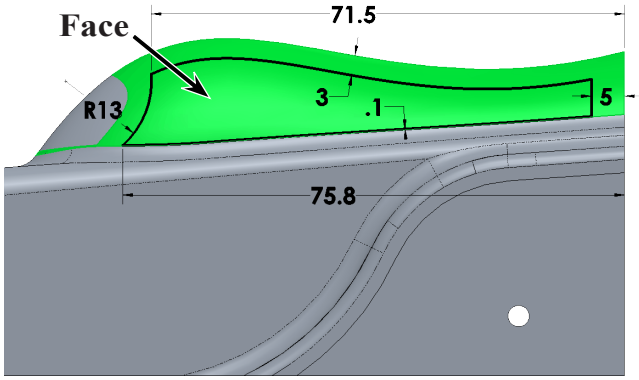


Fig. 152

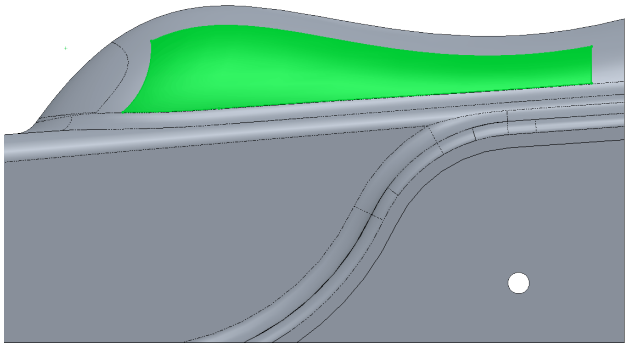


Fig. 153

Z. Appearance Window Color.

Step 1. Rotate view slightly to view **all three Split Line faces**, hold down middle mouse button (wheel) and drag to rotate view, **Fig. 154**.

Step 2. Click a Split Line face, click **Appearance Callout**  on the context toolbar and click **Face 1 Split...**  , **Fig. 154**.

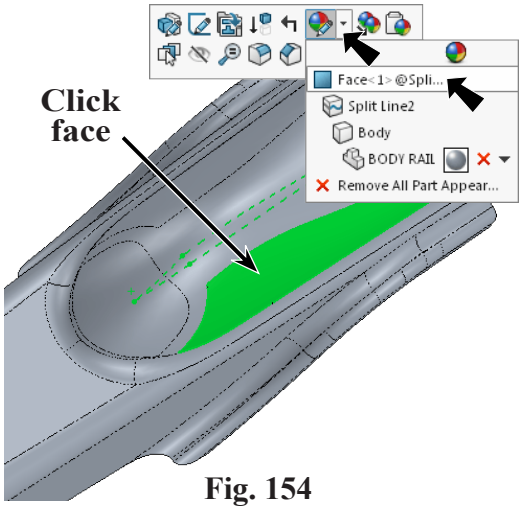


Fig. 154

Step 3. In the Appearances Property Manager,
click **Advanced button**, **Fig. 155**
under Selected Geometry
click the **other two Split Line faces**, **Fig. 156**
under Color
set **RGB values:**
R 247
G 148
B 29
click **Illumination tab**  , **Fig. 157**
set **Transparent amount .20**
click OK  .

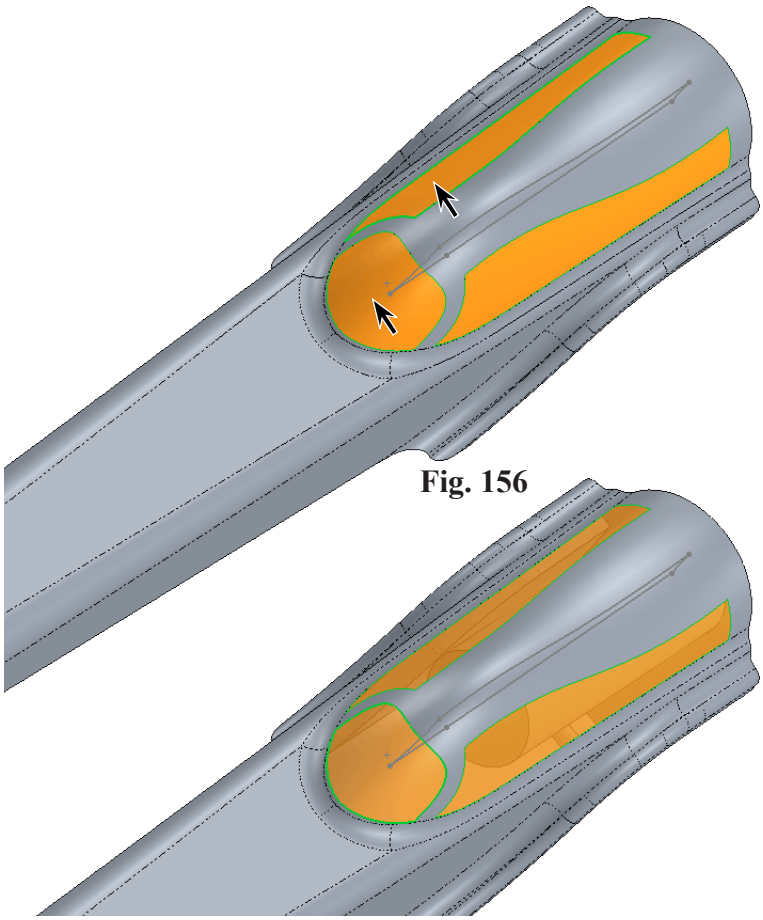


Fig. 156

Fig. 158

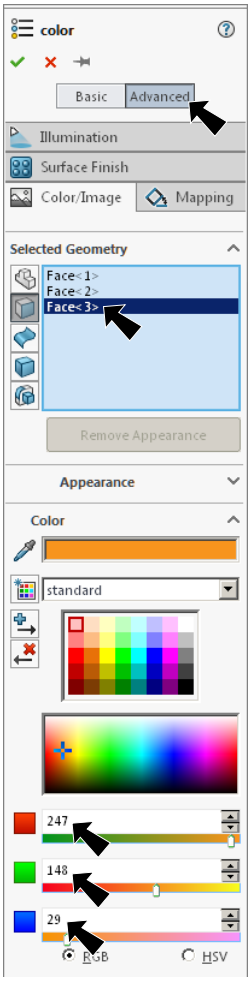


Fig. 155

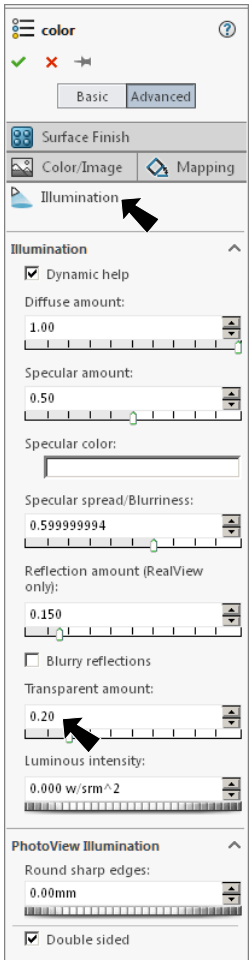


Fig. 157

AA. Add Configurations.

Step 1. Click the **body** (not window faces) and click **Copy Appearance** on the context toolbar to copy body color, **Fig. 159**.

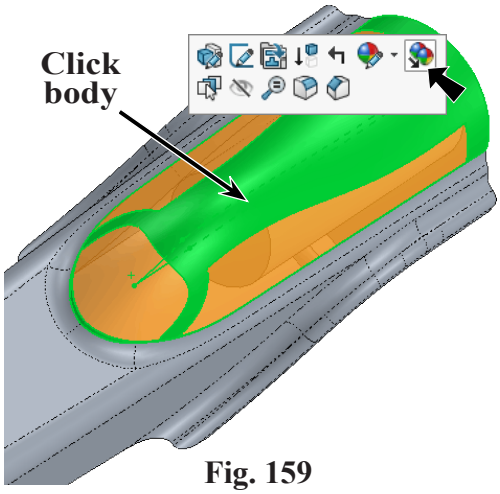


Fig. 159

Step 2. Click **Configurations tab** at the top of the Feature Manager Design Tree, **Fig. 160**.

Step 3. **Right click BODY RAIL Configuration(s)** in the Configuration Manager and click **Add Configuration** from menu, **Fig. 160**.

Step 4. In the Add Configuration Property Manager:
under Configuration name, **Fig. 161**
key-in **GRAY SIDES**
click OK .

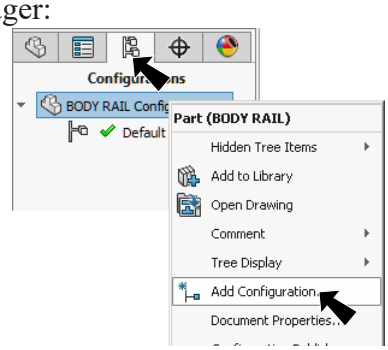


Fig. 160

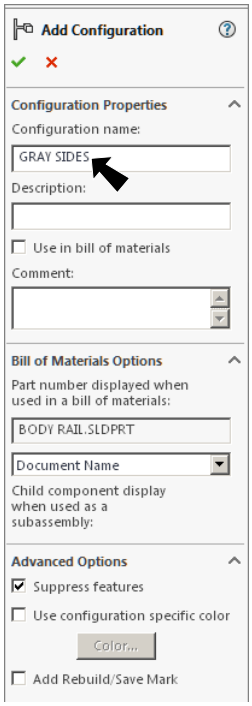


Fig. 161

Step 5. Click **Yes** to link message, **Fig. 162**.

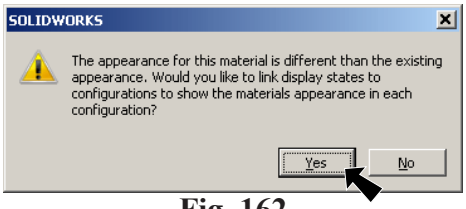


Fig. 162

Step 6. Click the **body** and click **Paste Appearance** on the The Appearance Target palette context toolbar. Then, click **Body** on the Appearance Target palette, **Fig. 163** and **Fig. 164**.

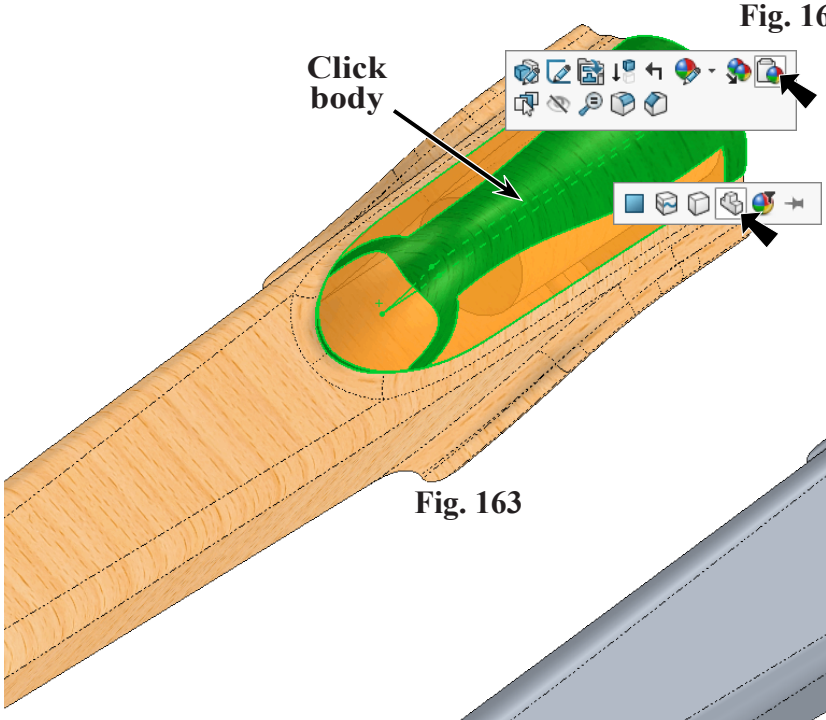


Fig. 163

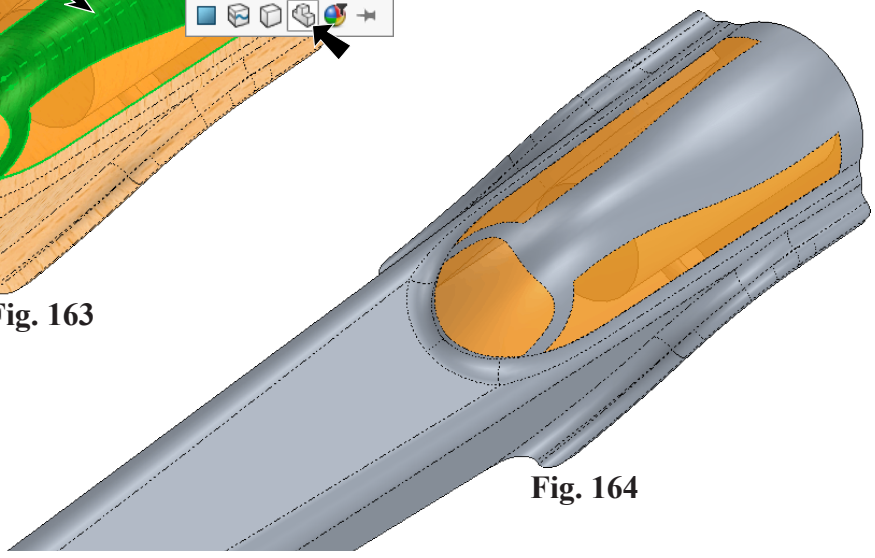


Fig. 164

Step 7. **Right click BODY RAIL Configuration(s)** in the Configuration Manager and click **Add Configuration** from menu, **Fig. 165**.

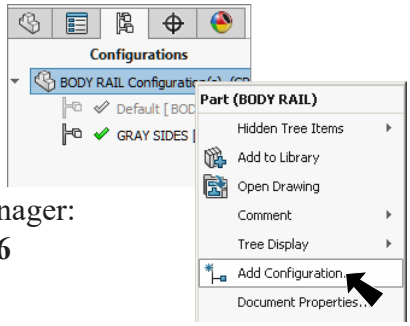


Fig. 165

Step 8. In the Add Configuration Property Manager:
under Configuration name, **Fig. 166**
key-in **ORANGE SIDES**
click OK ✔ .

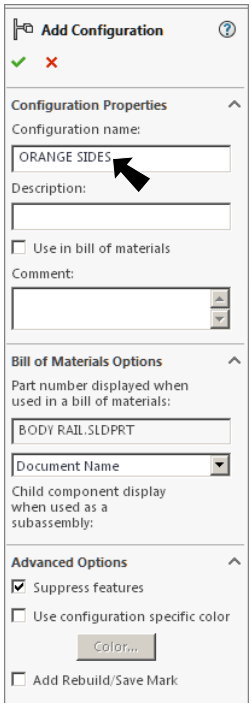


Fig. 166

Step 9. Click Yes to link message, **Fig. 167**.

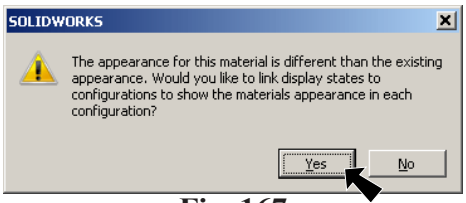


Fig. 167

Step 10. Click the **body** and click **Paste Appearance**  on the The Appearance Target palette context toolbar. Then, click **Body**  on the Appearance Target palette, **Fig. 168** and **Fig. 169**.

Step 10. Note the **Display State** change at the bottom of the Configurations Manager, **Fig. 170**.

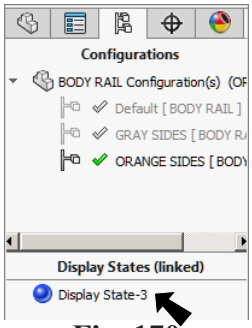


Fig. 170

Step 11. Save. Use **Ctrl-S**.

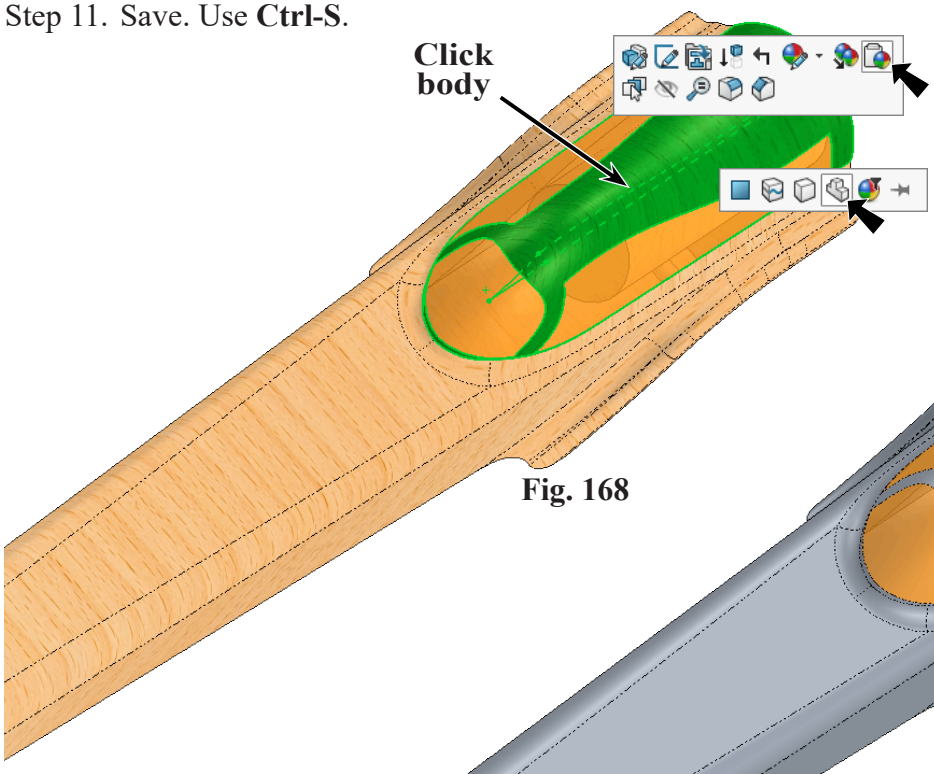


Fig. 168

Fig. 169

BB. Appearance Faces Color.

Step 1. Click the **left side face of body**, click **Appearance Callout** on the context toolbar and click **Face <1> BODY**, **Fig. 171**.

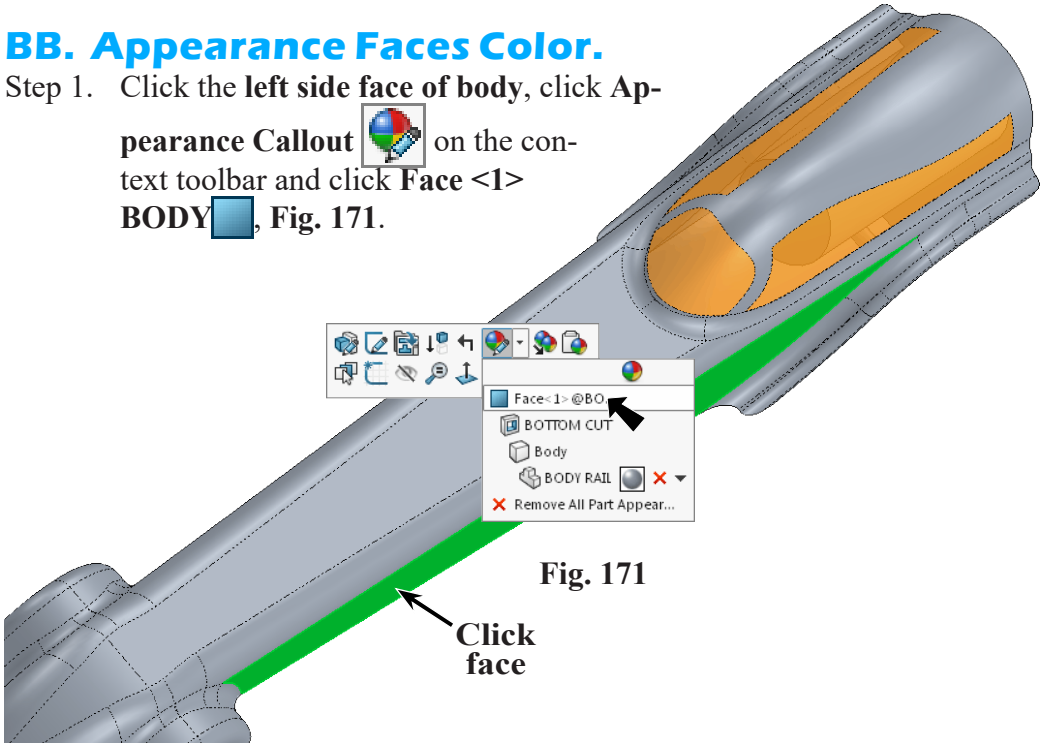


Fig. 171

Step 2. In the Appearances Property Manager,
under Selected Geometry, **Fig. 172**
rotate view to view **top and right side faces of body**, **Fig. 173**
click **both top faces and right side faces of body**
under Color, **Fig. 172**
set **RGB values:**
R 247
G 148
B 29
expand **Display States**
select **This display state**
click OK .

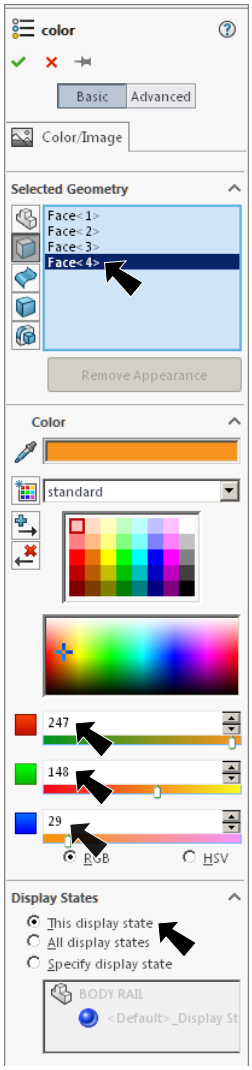


Fig. 172

Step 3. Save. Use **Ctrl-S**.

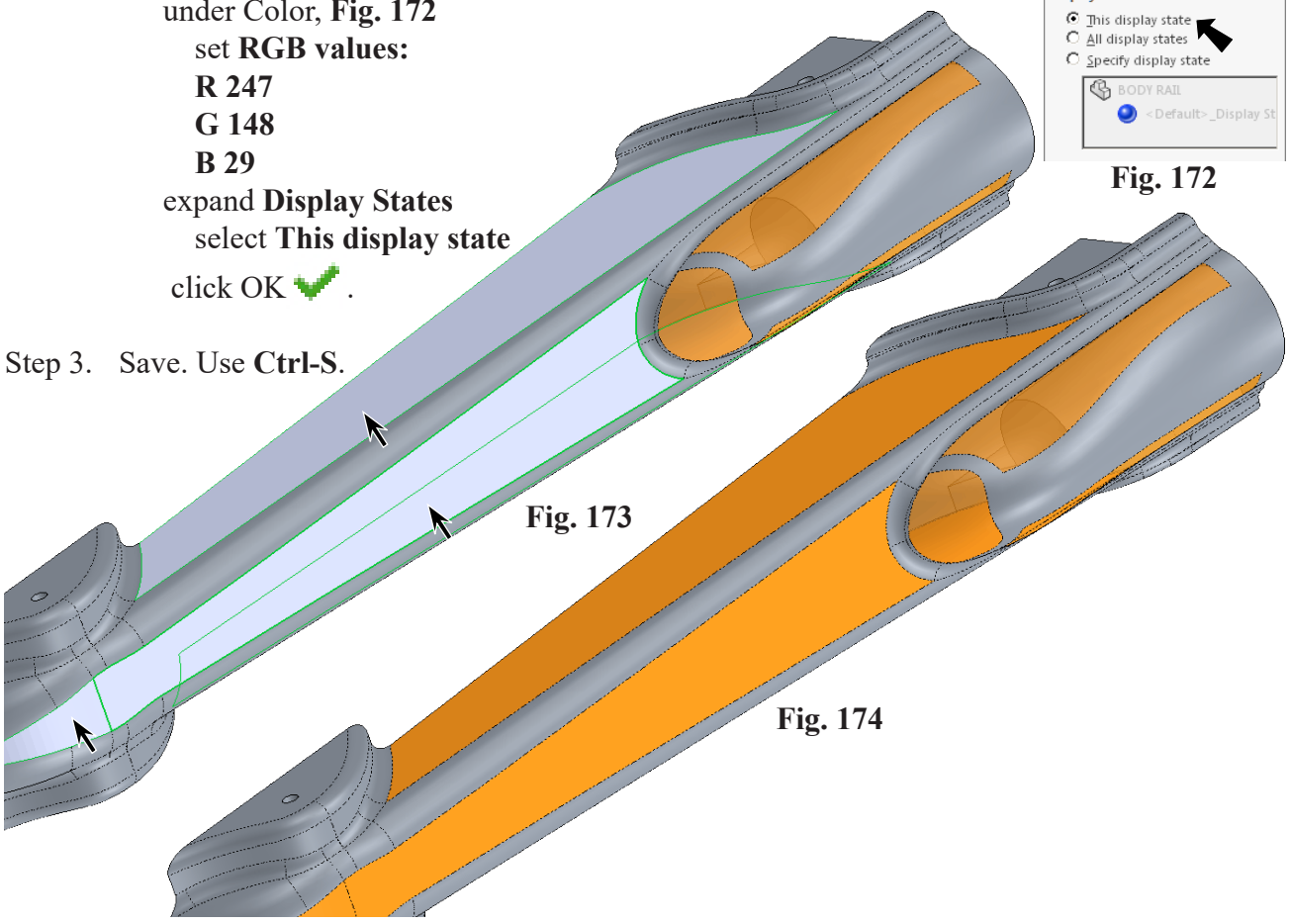


Fig. 173

Fig. 174

CC. Confirm the Two Configurations.

Step 1. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 2. In the Configurations Property Manager:
under Configurations, **Fig. 175**
double click **GRAY SIDES**
note the Display State
double click **ORANGE SIDES**
note the Display State

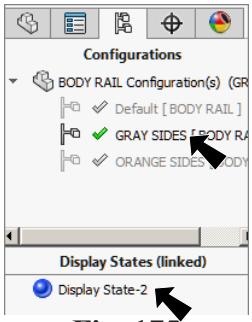


Fig. 175

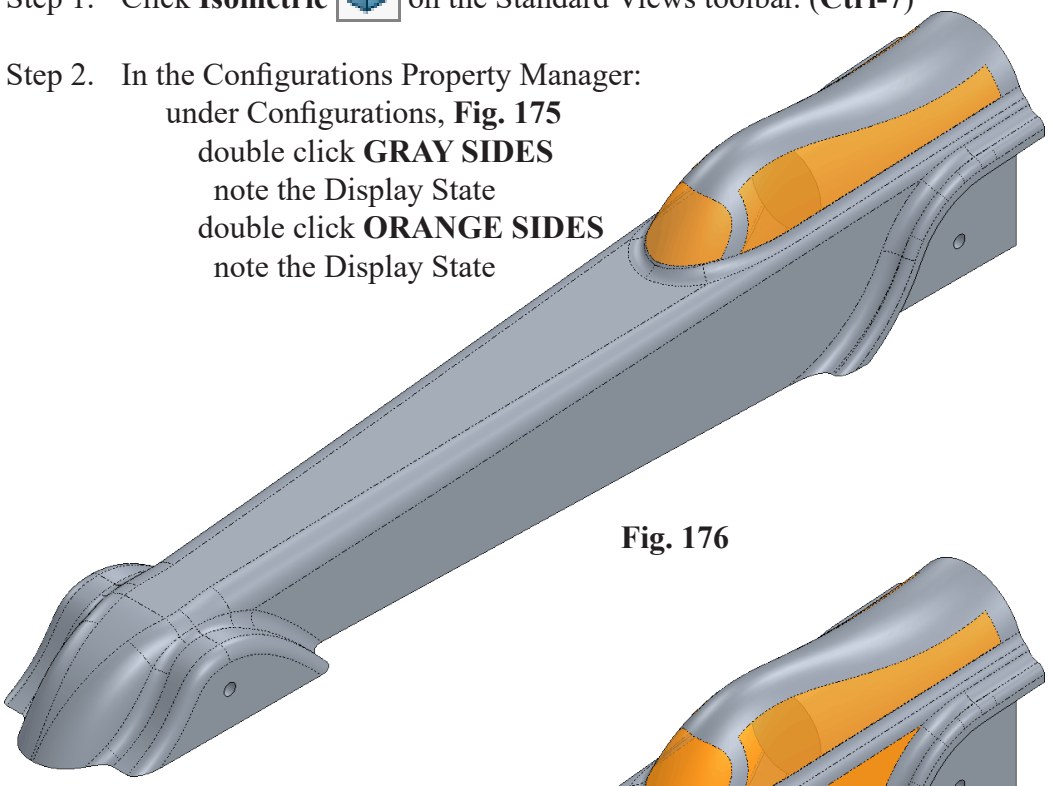


Fig. 176

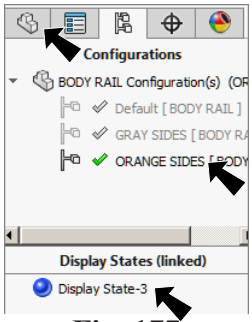


Fig. 177

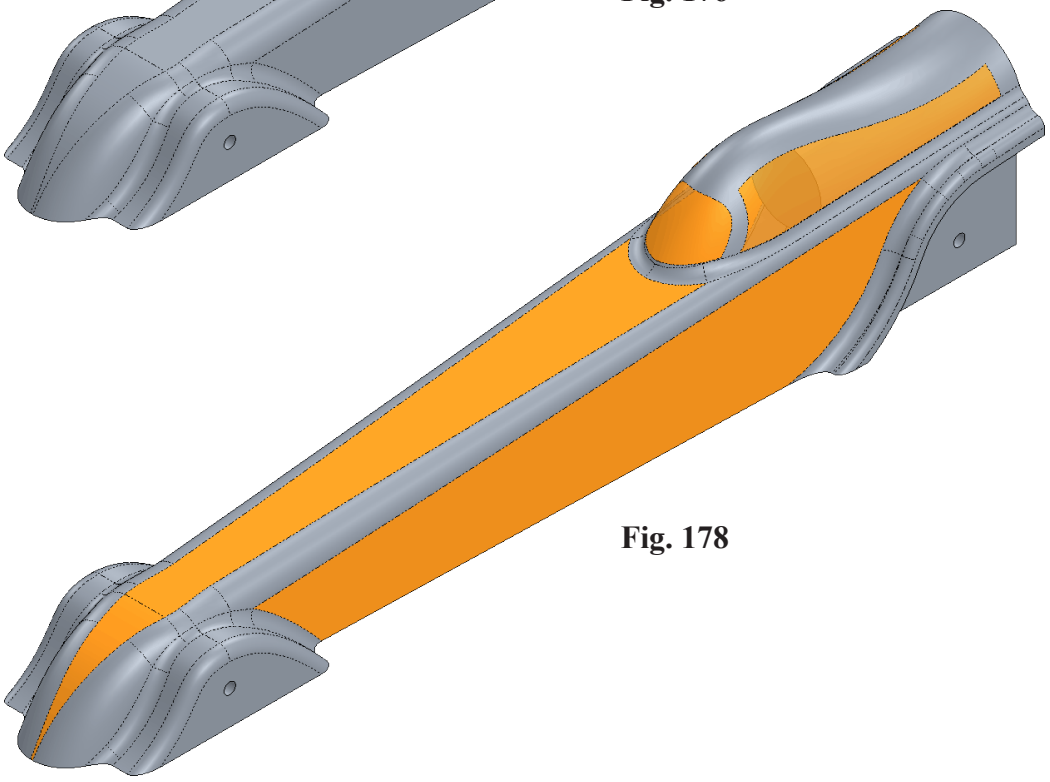


Fig. 178

Step 3. Click **Feature Manager Design Tree tab** at the top of the Feature Manager Design Tree to return to Feature Manager, **Fig. 177**.

Step 4. Save. Use **Ctrl-S**.