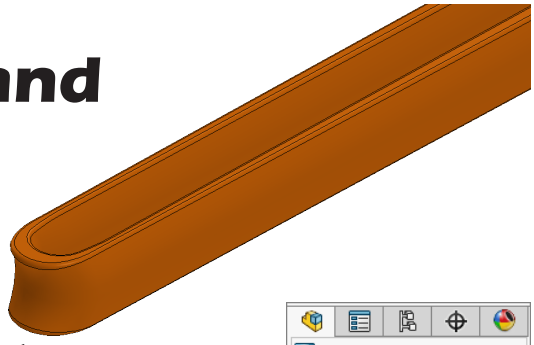
Delta Dart

Rubber Band



A. New Component Part.

Step 1. Open your **DELTA DART ASSEMBLY** file.

Step 2. Click Insert Menu > Component > New Part.

Step 3. Click **Front Plane** in the Feature Manager, **Fig. 1**.

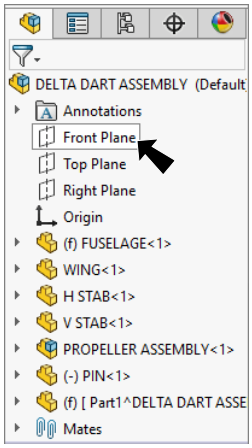


Fig. 1

Step 4. Click **Exit Sketch** on the Sketch toolbar. Exit the sketch, but **stay in Edit Component**.

Step 5. Set **document units to Millimeters**, **Fig. 2**. To set units, in the status bar at bottom right corner of the display, click Unit System, then select **MMGS** (millimeter, gram, second).

B. Save as "RUBBER BAND".

Step 1. Click File Menu > Save As.

Step 2. Key-in **RUBBER BAND** for the filename and press ENTER.

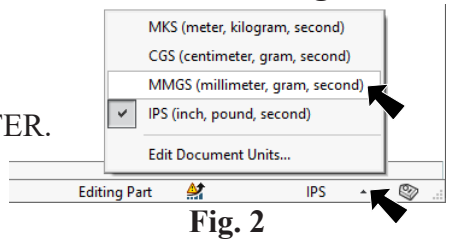


Fig. 2

C. Profile Sketch1 at Pin.

Step 1. Confirm **No External References** on the Sketch toolbar should not be on (button should not be depressed).

Step 2. Expand RUBBER BAND part in the Feature Manager, click **Right Plane** and click **Sketch** on context toolbar, **Fig. 3**.

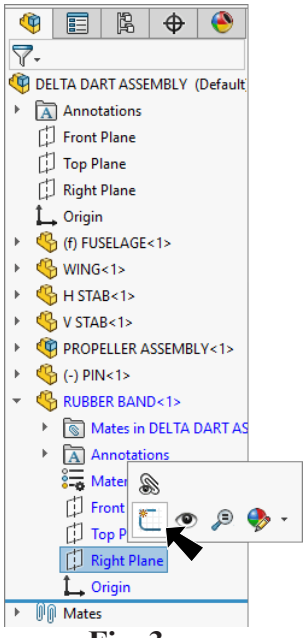


Fig. 3

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

Step 4. Zoom in around **Pin**, **Fig. 4**.

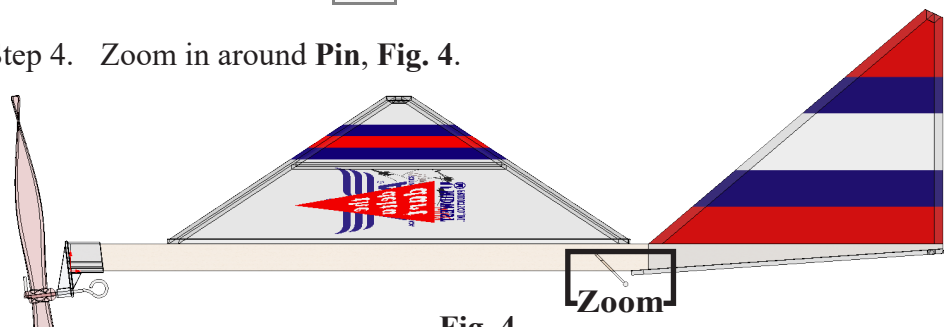


Fig. 4

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Step 5. Click **3 Point Corner Rectangle** (**S**) on the Sketch toolbar.

Step 6. Sketch a **rectangle coincident with rear silhouette edge of Pin**, **Fig. 5**.

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

Step 8. Add dimensions, **Fig. 6**.

Step 9. **Right click graphics area and click Select** from menu to un-select Smart Dimension.

Step 10. **Ctrl click rear silhouette edge and rectangle edge** to select both. Release Ctrl key and click **Make Collinear** on the context toolbar, **Fig. 7**.

Step 11. Click **Exit Sketch** on the Sketch toolbar. Exit the sketch but we are still in Part.

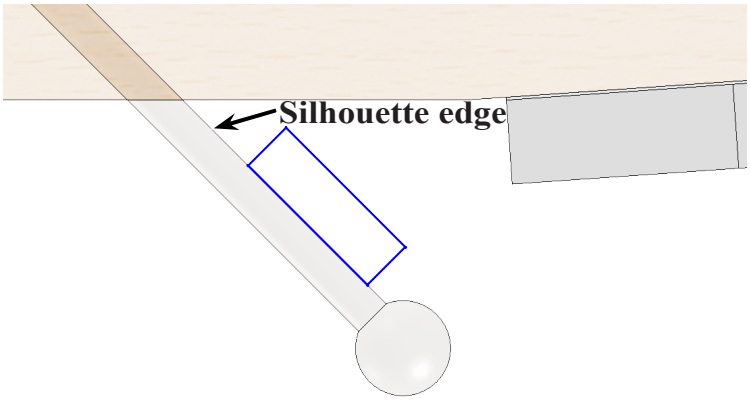


Fig. 5

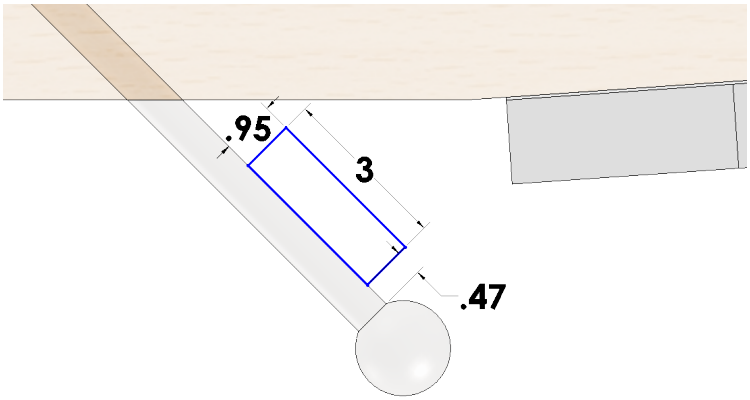


Fig. 6

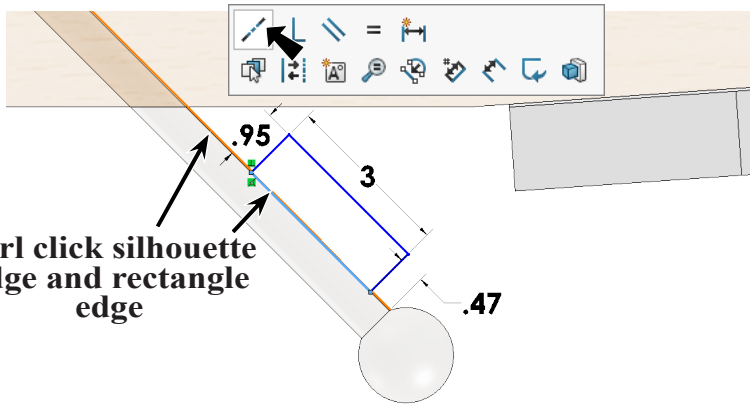


Fig. 7

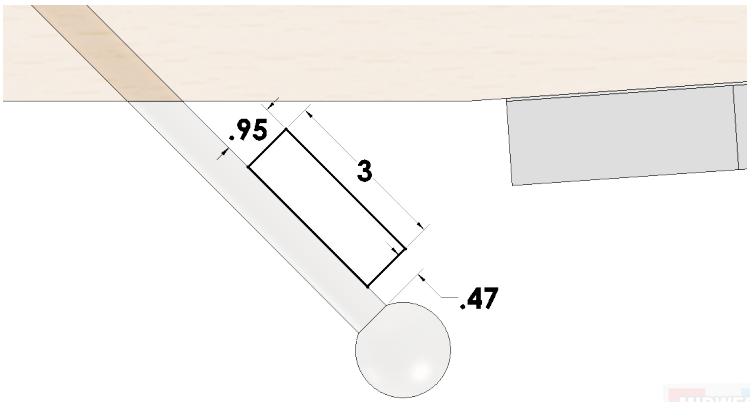


Fig. 8

D. Profile Sketch2 at Prop Wire.

Step 1. Expand RUBBER BAND part in the Feature Manager, click **Right Plane** and click **Sketch** on context toolbar, **Fig. 9**.

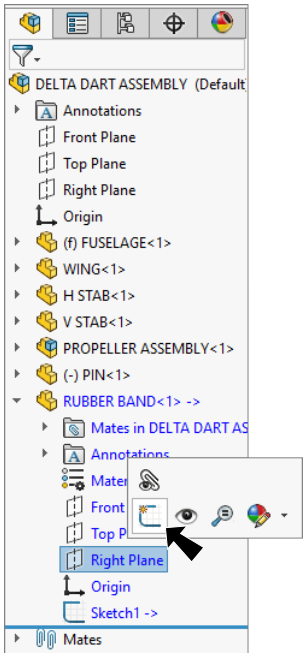


Fig. 9

Step 2. Click **Zoom to Fit** (**F**) on the View toolbar.

Step 3. Zoom in around **Prop Wire**, **Fig. 10**.

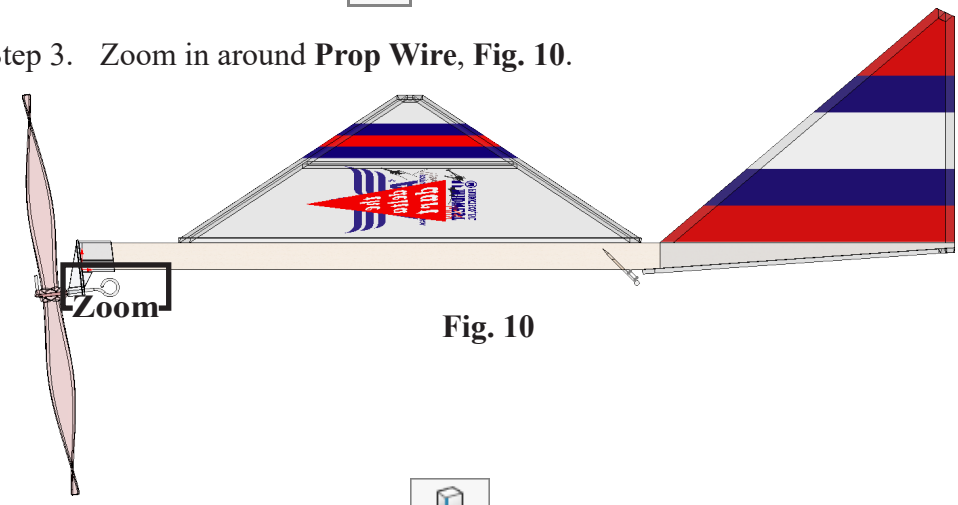


Fig. 10

Step 4. Click **Convert Entities** on the Sketch toolbar.

Step 5. In the Convert Entities Property Manager:
under Entities to Convert, **Fig. 11**
click **inside silhouette edge of Prop Wire**, **Fig. 12**
click OK .

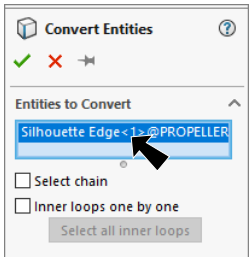


Fig. 11

Step 6. Click **3 Point Corner Rectangle** (**S**) on the Sketch toolbar.

Step 7. Sketch a **rectangle at an angle and corners coincident with converted curve**, **Fig. 13**.

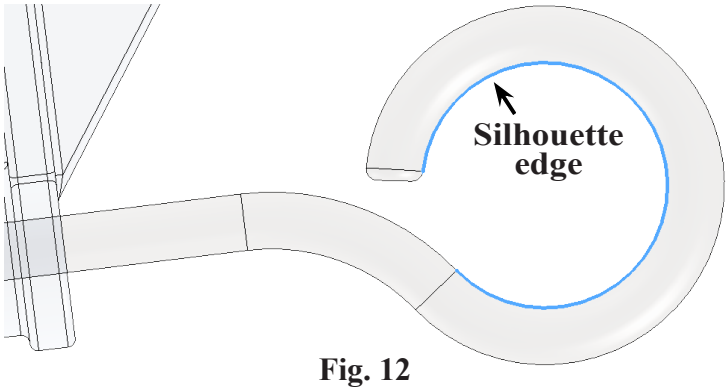


Fig. 12

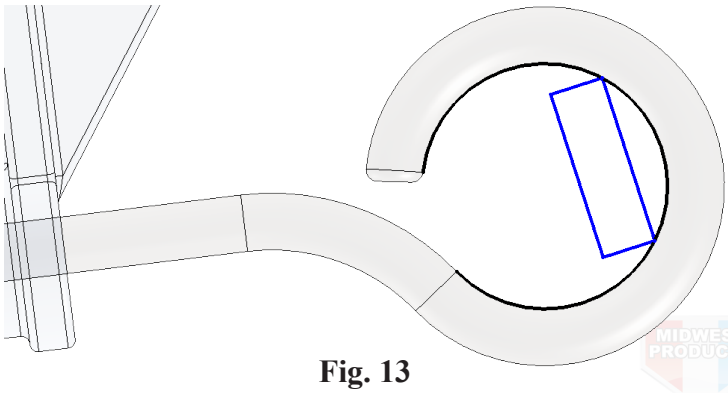


Fig. 13

Step 8. Click **Trim Entities**

(S) on the Sketch toolbar.

Step 9. In the Trim Property Manger:

select **Trim to closest** , **Fig. 14**

Trim **two segments of silhouette edge outside rectangle**, **Fig. 15**.
Click segments to trim.
Results shown in **Fig. 16**.
Click OK ✔ when done.

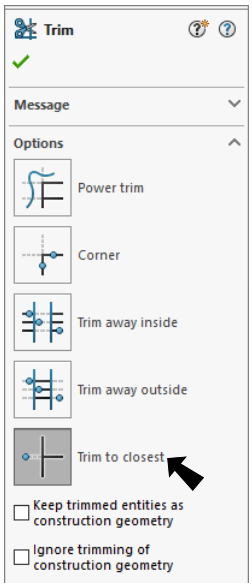


Fig. 14

Step 10. Click **Smart Dimension**

(S) on the Sketch toolbar.

Step 11. Dimension rectangle **.95 by 3**, **Fig. 16**.

Step 12. Click **3 Point Arc** **(S)** in the **Arc flyout** on the Sketch toolbar.

Step 13. Sketch **arc across left side of rectangle**. To sketch arc, click Point 1 for start point and Point 2 for ending point, then Point 3 for third point, **Fig. 17**.

Step 14. **Right click graphics area and click Select** from menu to un-select Arc tool.

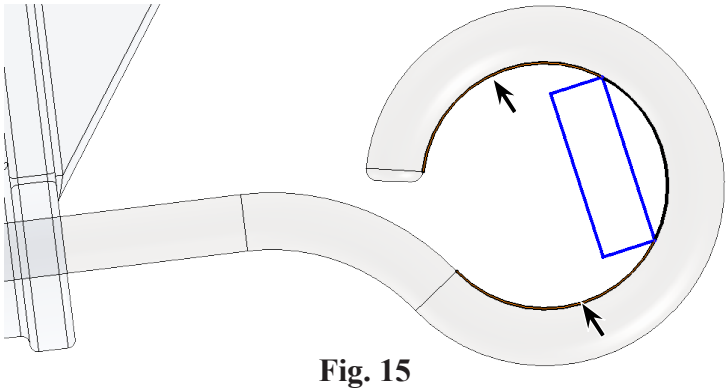


Fig. 15

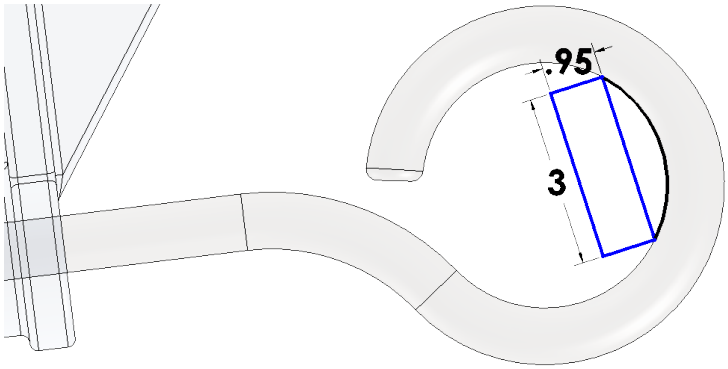


Fig. 16

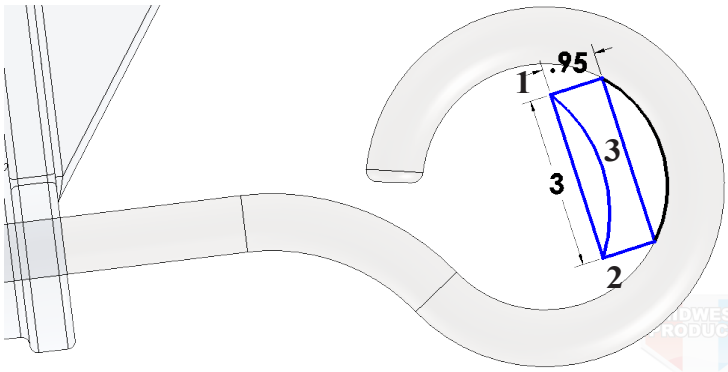


Fig. 17

Step 15. **Ctrl click both arcs** to select both. Release Ctrl key and click **Make Equal** on the context toolbar, **Fig. 18**.

Step 16. **Ctrl click both long lines of rectangle** to select both and click **Construction Geometry** on the context toolbar, **Fig. 19**.

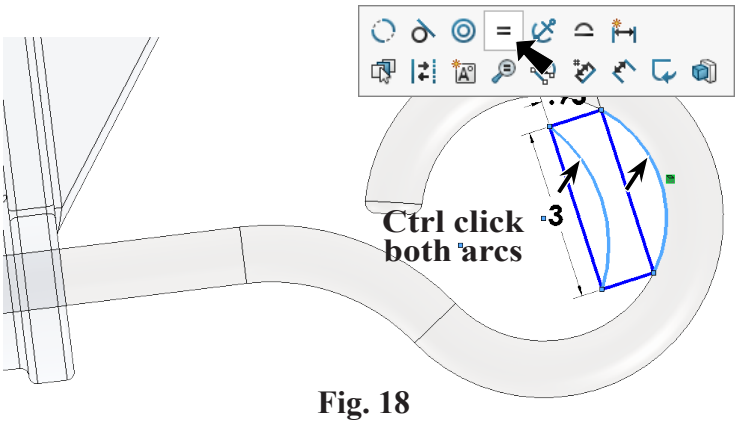


Fig. 18

Step 17. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 18. Sketch **a construction line out from Midpoint of right side of rectangle perpendicular** to rectangle edge, **Fig. 20**. Be sure to use the inferred Perpendicular icon ⊥.

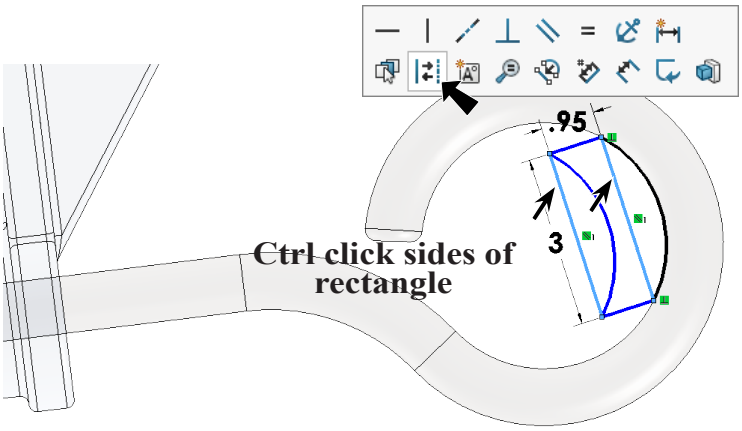


Fig. 19

Step 19. **Right click graphics area and click Select** from menu to un-select Centerline tool.

Step 20. You can grab end-point of the construc-tion line and pivot around the rectangle, **Fig. 21**.

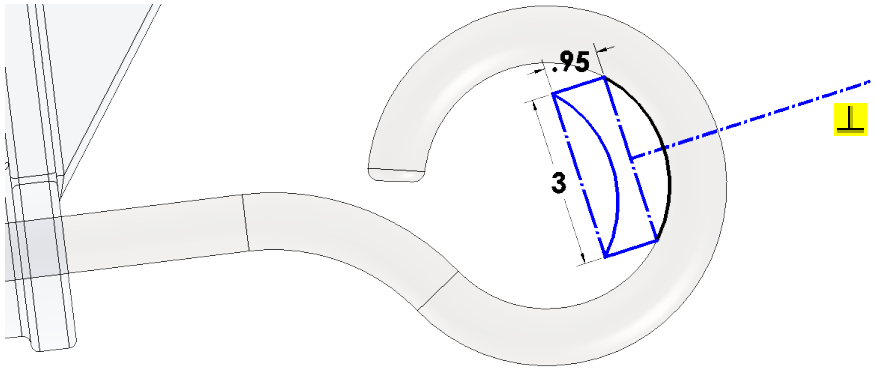


Fig. 20

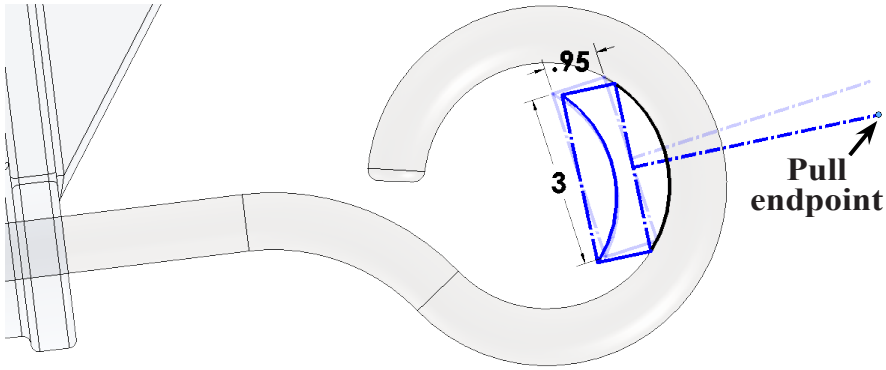


Fig. 21

Step 21. Pull the endpoint of construction line over to the Pin, **Fig. 22**. Zoom out and zoom in as necessary. Keep endpoint slight away from the Pin and **not** horizontal. We don't want any relations to Pin at this time.

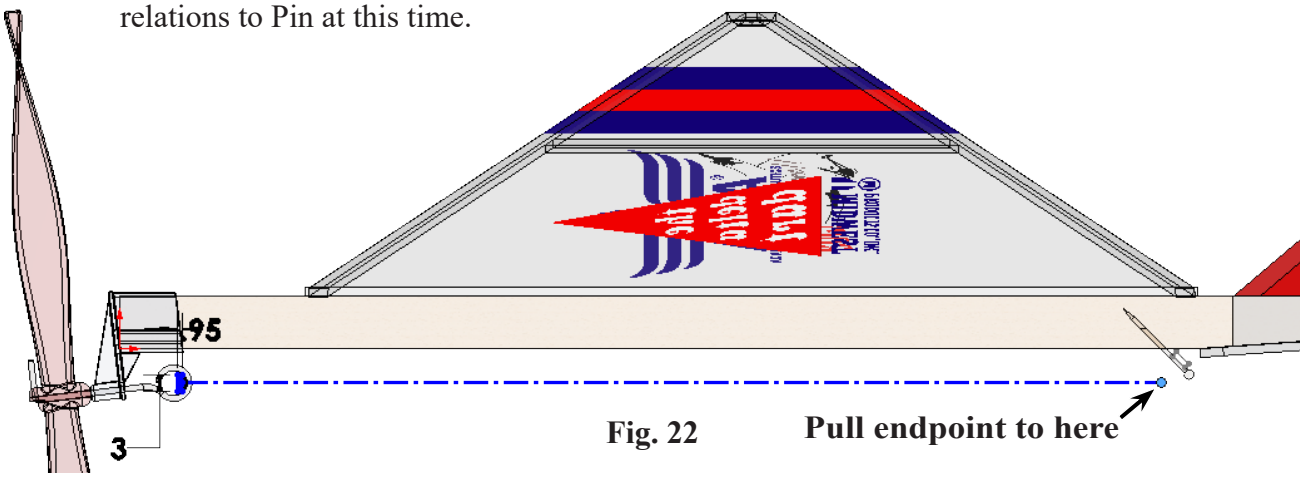


Fig. 22

Step 22. Zoom in around **Pin**, **Fig. 23**.

Step 23. Grab endpoint of the construction line and **"snap" to Midpoint of long front line of rectangle**, **Fig. 24**. If you are careful the Midpoint icon will show under long line of rectangle. This Midpoint icon will also be displayed. The sketch is now fully defined, **Fig. 25**.

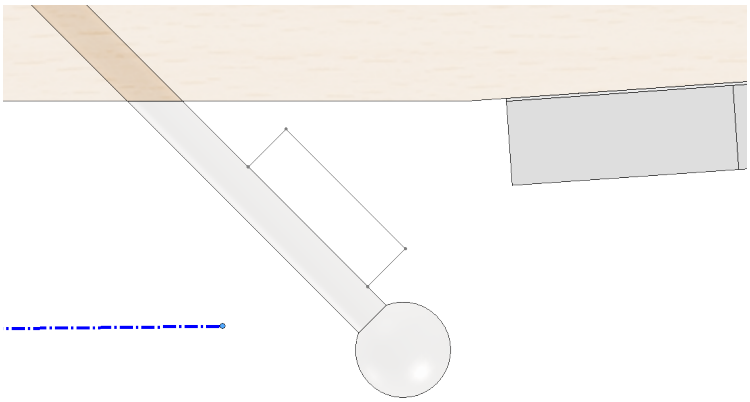
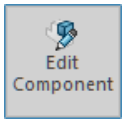


Fig. 23

Step 24. Click **Exit Sketch**

on the Sketch toolbar.

Step 25. Click **Edit Component** 

on the Sketch toolbar to turn off Edit Component and return to the assembly.

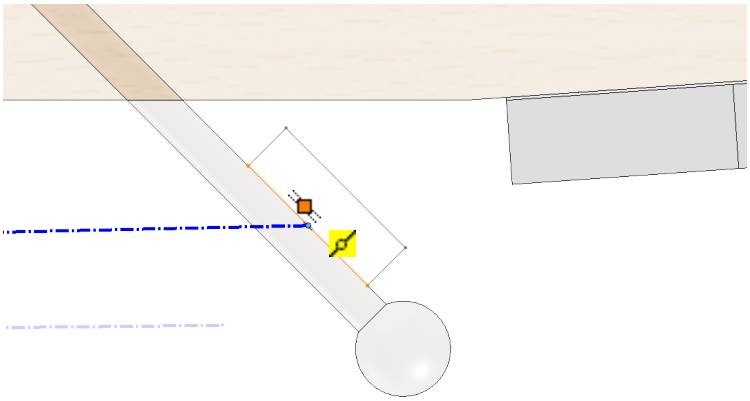


Fig. 24

Step 26. Save. Use **Ctrl-S**.

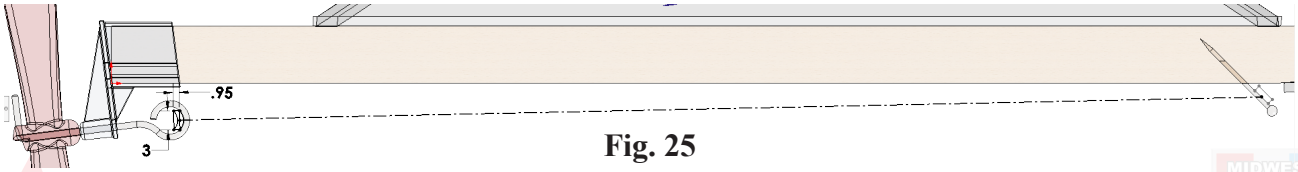


Fig. 25

E. Open Rubber Band File and Rename Sketches.

Step 1. Click **RUBBER BAND** part in the Feature Manager and click **Open Part** on the context toolbar, **Fig. 26**.

Step 2. Rename Sketches in the Feature Manager. To rename, slowly click twice over the Sketch name (**F2**) and key-in new name, **Fig. 27**. Change:

Sketch1 to PROFILE AT PIN
Sketch2 to PROFILE AT WIRE

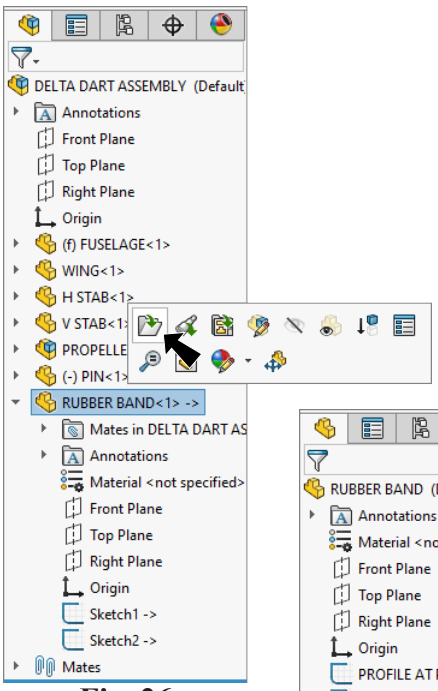


Fig. 26

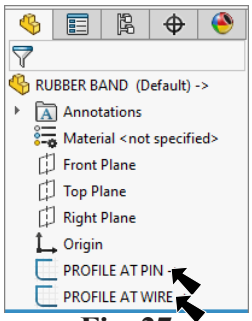


Fig. 27

F. Create Plane1 for Guide Curve.

Step 1. Click **Right Plane** in the Feature Manager to select Plane, **Fig. 28**.

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

Step 3. Click **Reference Geometry** on the Features toolbar and **Plane** from the menu.

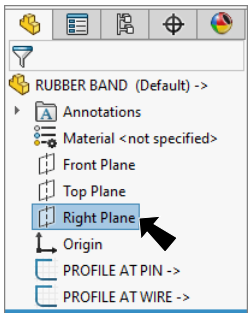


Fig. 28

Fig. 29

Step 4. In the Plane Property Manager set:
under **First Reference**, **Fig. 29**
Right Plane was preselected
click **Perpendicular**
under Second Reference
click in Secondary Reference box
click **construction line** in PROFILE AT WIRE sketch, **Fig. 30**
click OK .

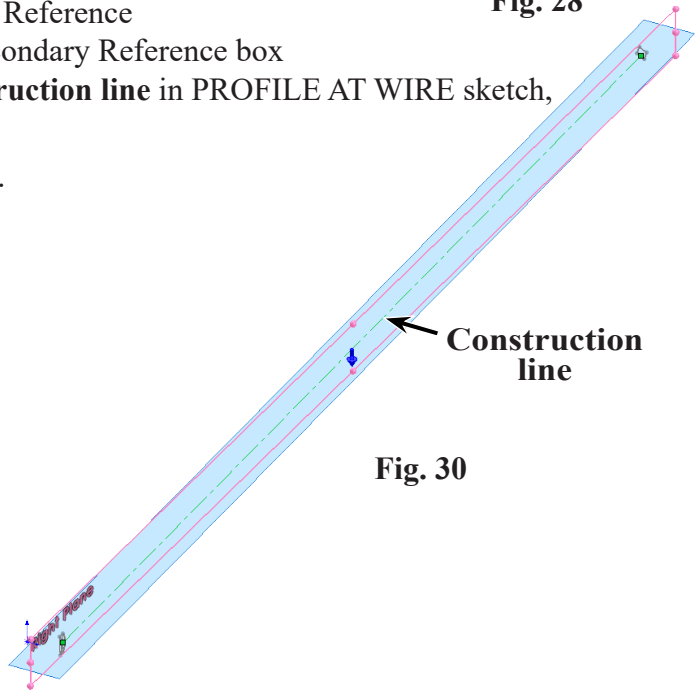


Fig. 30

G. Sketch Guide Curve 1.

Step 1. Hide **Plane1**. Click View Menu > Hide/Show > Planes.

Step 2. Click **Plane1** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 31**.

Step 3. Click **Straight Slot** on the Sketch toolbar.

Step 4. Sketch **slot along side of the sketches**. Keep slot off to side of sketches, **Fig. 32**.

Step 5. Zoom in to **PROFILE AT WIRE sketch**, **Fig. 32**.

Step 6. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 7. Dimension **slot arc radius .9**, **Fig. 33**.

Step 8. **Right click graphics area and click Select** from menu to unselect Smart Dimension.

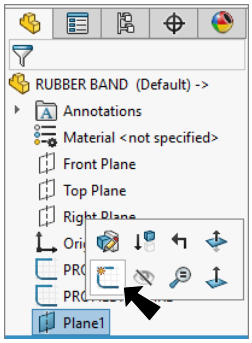


Fig. 31

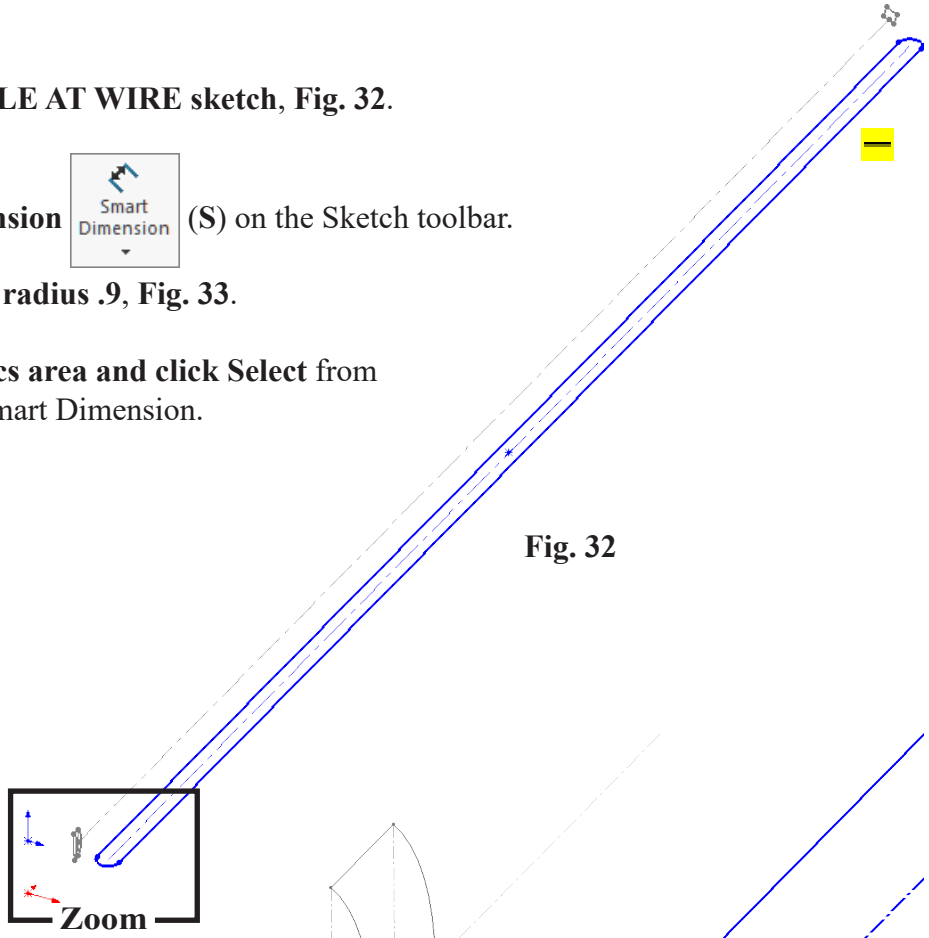


Fig. 32

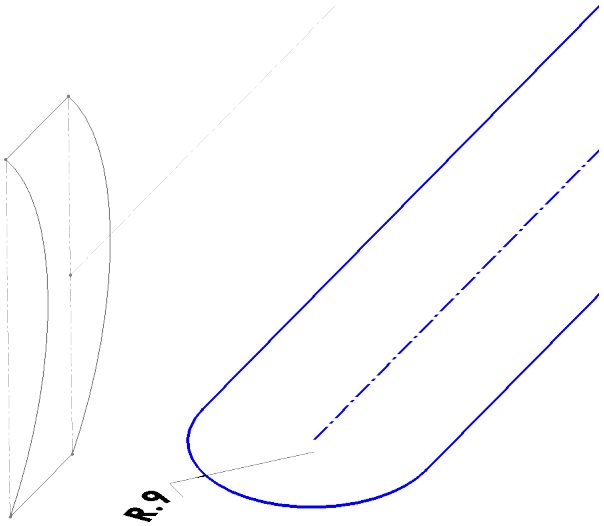


Fig. 33

Step 9. **Ctrl click Midpoint in slot arc and rear arc in PROFILE AT WIRE sketch** . Release Ctrl key and click **Make Pierce** on the context toolbar, **Fig. 34**. Make Pierce adds a Pierce relation between the slot Guide Curve sketch and PROFILE AT WIRE sketch,.

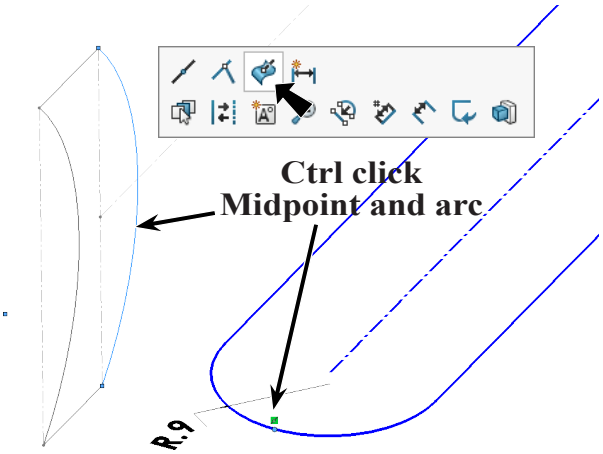


Fig. 34

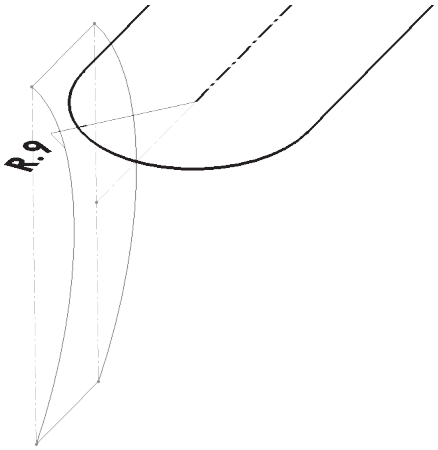


Fig. 35

Step 10. Click **Zoom to Fit** (**F**) on the View toolbar.

Step 11. Zoom in to **PROFILE AT PIN sketch**, **Fig. 36**.

Step 12. **Ctrl click Midpoint in slot arc and long front line in PROFILE AT PIN sketch**. Release Ctrl key and click **Make Pierce** on the context toolbar, **Fig. 37**.

Step 13. Click **Exit Sketch** on the Sketch toolbar.

Step 14. Save. Use **Ctrl-S**.

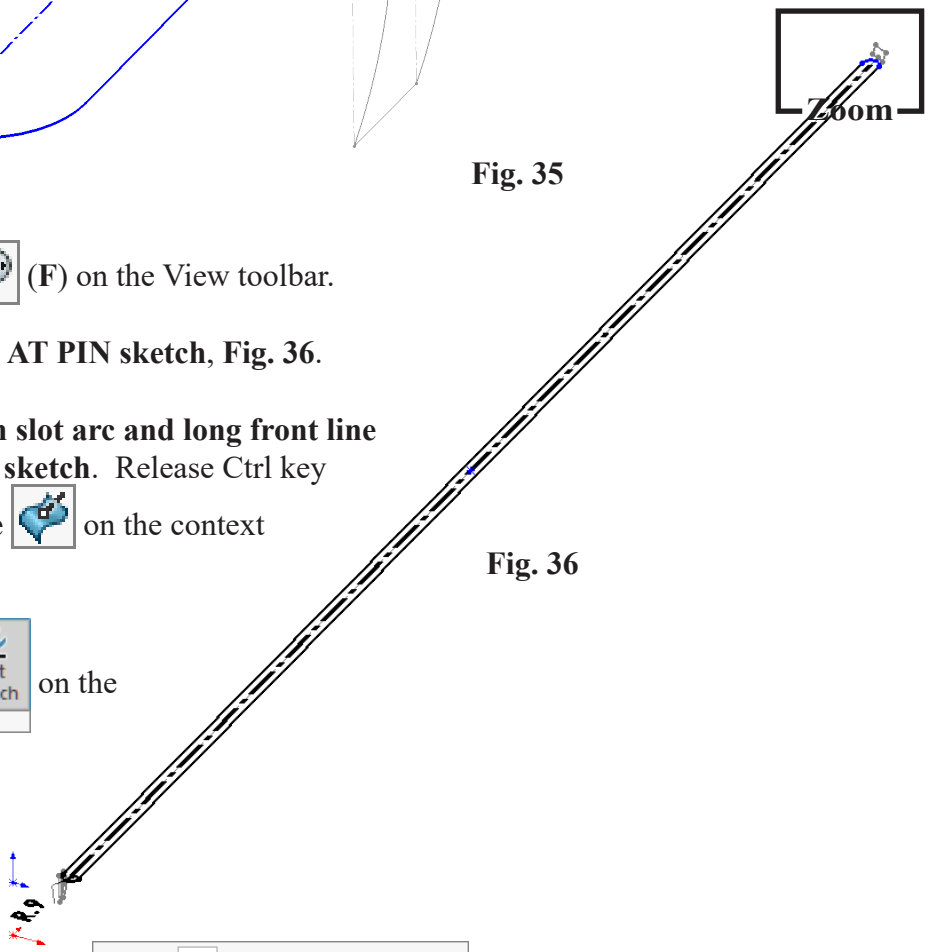


Fig. 36

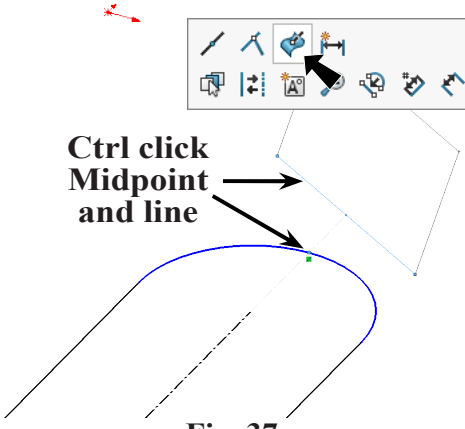


Fig. 37

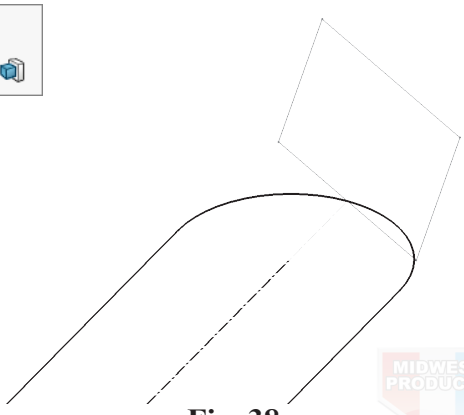


Fig. 38

H. Rename Sketch .

Step 1. Rename Sketch3 to **GUIDE CURVE 1** in the Feature Manager, **Fig. 39**. To rename, slowly click twice over the Feature name (F2) and key-in new name.

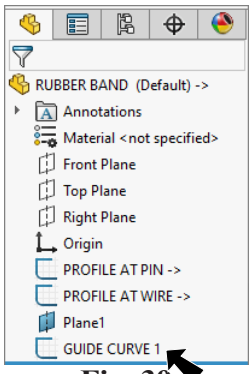
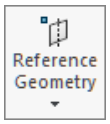


Fig. 39

Step 2. Save. Use **Ctrl-S**.

I. Create Plane2.

Step 1. Click **Zoom to Fit** **(F)** on the View toolbar.

Step 2. Click **Reference Geometry**  on the Features toolbar and **Plane** from the menu.

Step 3. In the Plane Property Manager set:

under First Reference, **Fig. 40**

click **Midpoint of centerline in slot**, **Fig. 41**

under Second Reference

click in Secondary Reference box

click **centerline of slot**

click OK .

Tip: You can confirm and size the new **Plane** by selecting **Plane2** in the Feature Manager and resize by dragging the corners, **Fig. 42**.

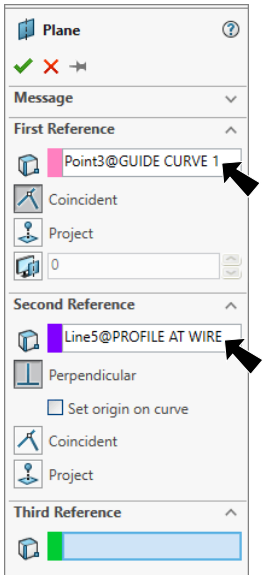


Fig. 40

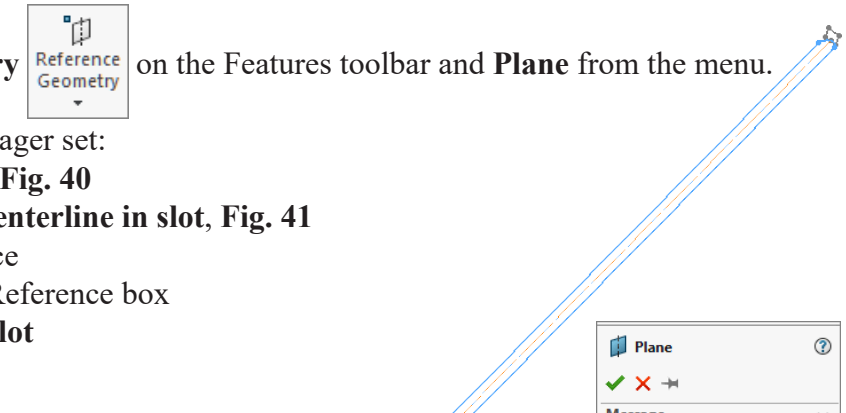


Fig. 41

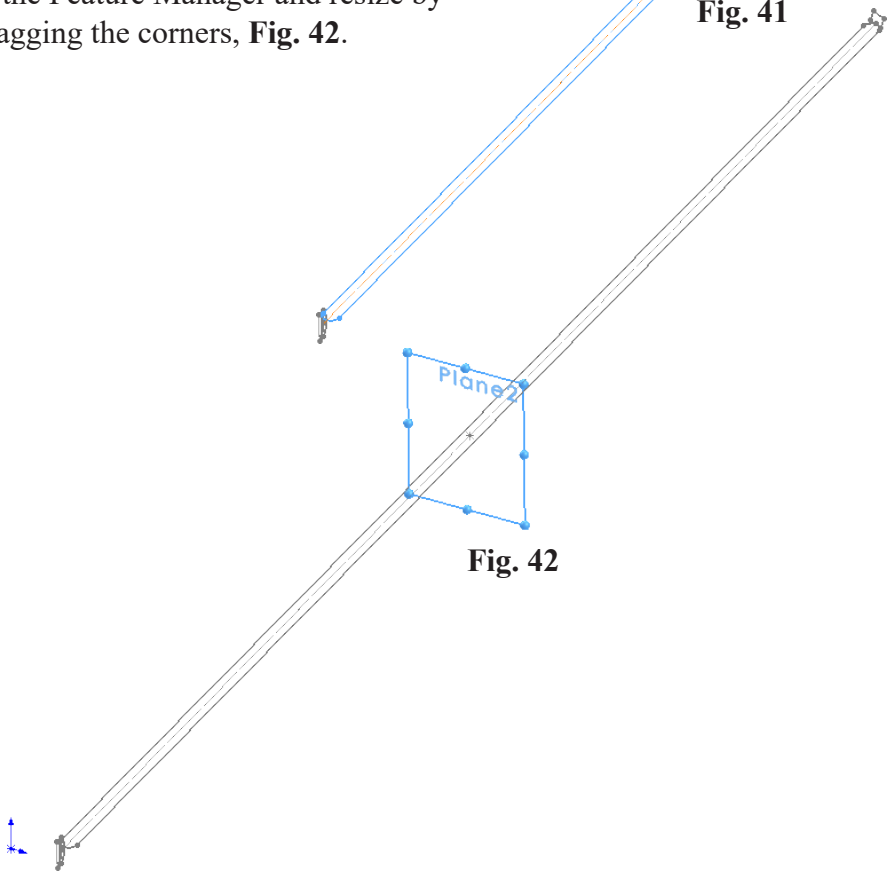


Fig. 42

J. Profile Sketch3 at Midpoint.

Step 1. Click **Plane2** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 43**.

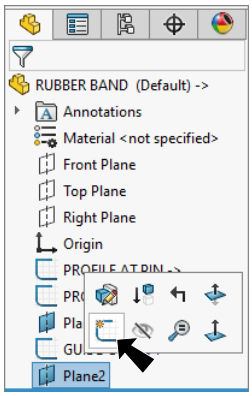


Fig. 43

Step 2. Zoom in around **Midpoint of slot in** GUIDE CURVE 1 sketch, **Fig. 44**.

Step 3. Click **Corner Rectangle** in the **Rectangle flyout** on the Sketch toolbar.

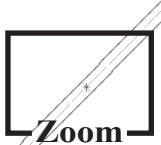


Fig. 44

Step 4. Sketch a **rectangle along side slot**, **Fig. 45**. Keep rectangle away from slot.

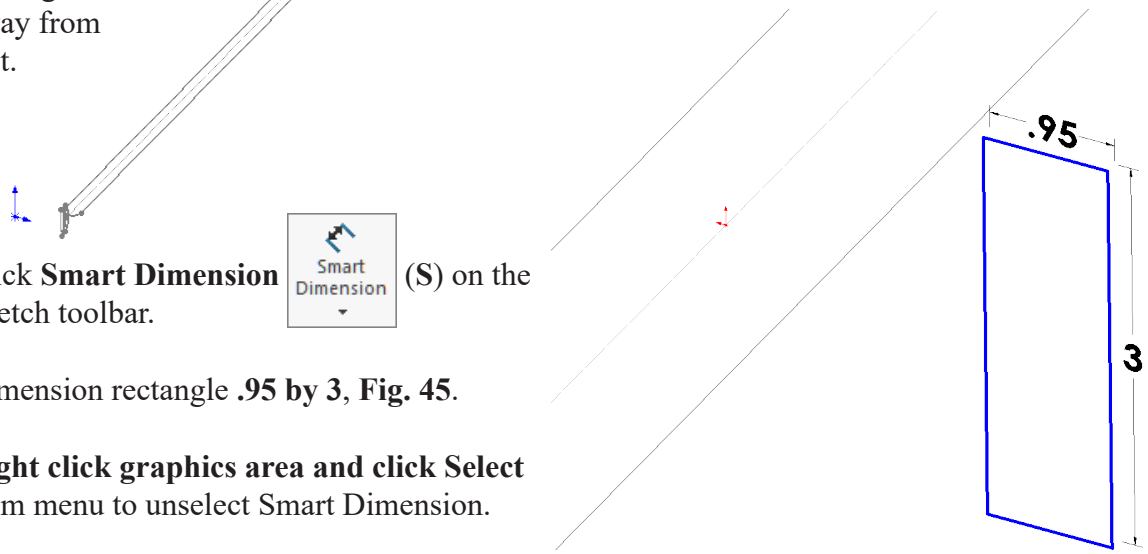


Fig. 45

Step 5. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 6. Dimension rectangle **.95 by 3**, **Fig. 45**.

Step 7. **Right click graphics area and click Select** from menu to unselect Smart Dimension.

Step 8. **Ctrl click Midpoint long side of rectangle closest to slot and line of slot in GUIDE CURVE 1 sketch**. Release Ctrl key and click **Make Pierce** on the context toolbar, **Fig. 46**.

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

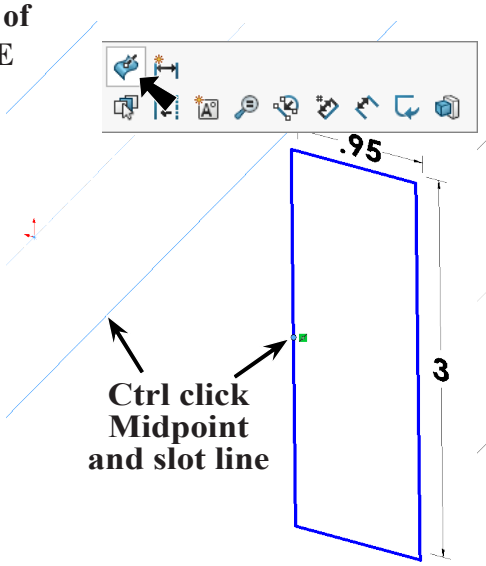


Fig. 46

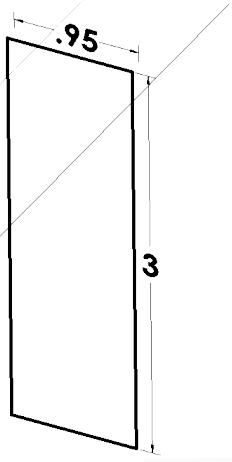


Fig. 47

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

K. Profile Sketch4 at Midpoint 2.

Step 1. Click **Plane2** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 48**.

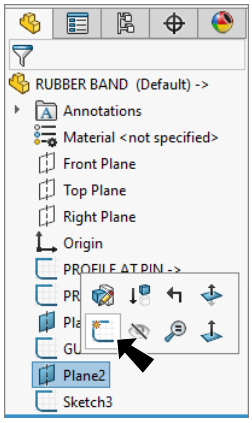


Fig. 48

Step 2. Click **Corner Rectangle** **(S)** on the Sketch toolbar.

Step 3. Sketch a **rectangle along side slot**, **Fig. 49**. Keep rectangle away from slot.

Step 4. Click **Smart Dimension** **(S)** on the Sketch toolbar.

Step 5. Dimension rectangle **.95 by 3**, **Fig. 49**.

Step 6. **Right click graphics area and click Select** from menu to un-select Smart Dimension.

Step 7. **Ctrl click Midpoint long side of rectangle closest to slot and line of slot in GUIDE CURVE 1 sketch**. Release Ctrl key and click **Make Pierce** on the context toolbar, **Fig. 50**.

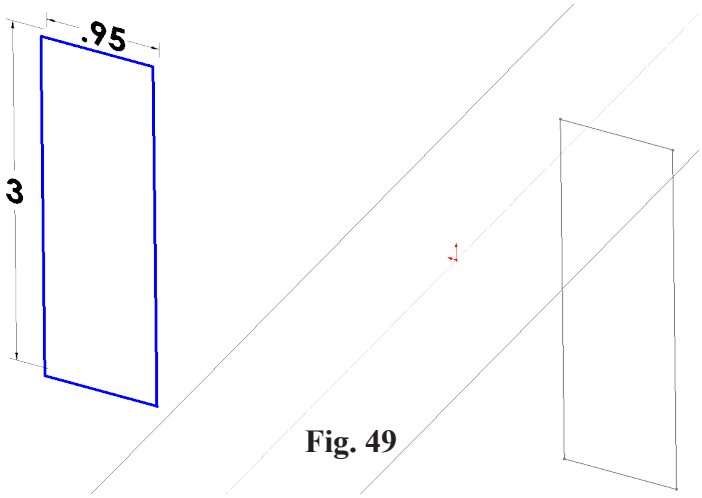


Fig. 49

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

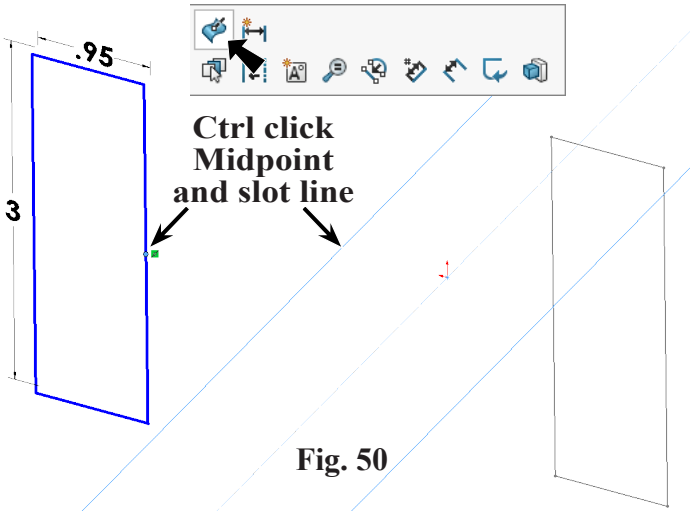


Fig. 50

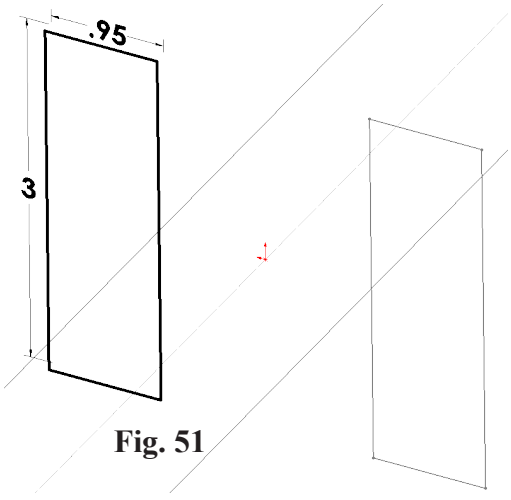


Fig. 51

L. Rename Sketches PROFILE MID 2 and PROFILE MID 1.

Step 1. Rename Sketches **PROFILE MID 1** and **PROFILE MID 2** in the Feature Manager. To rename, slowly click twice over the Feature name (**F2**) and key-in new name, **Fig. 52**.

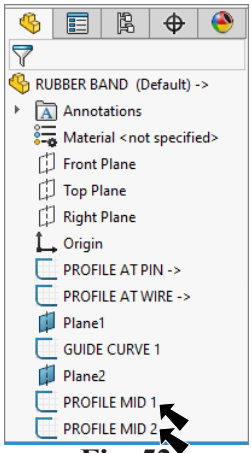


Fig. 52

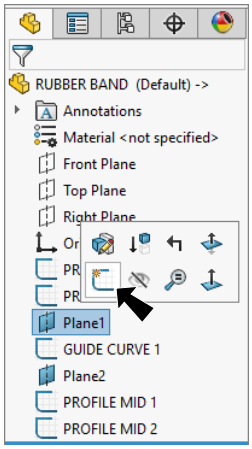


Fig. 53

M. Sketch Guide Curve 2.

Step 1. Click **Plane1** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 53**.

Step 2. Click **Zoom to Fit** (**F**) on the View toolbar.

Step 3. Click **Straight Slot** on the Sketch toolbar.

Step 4. Sketch a **slot parallel to the first slot**. Keep slot off to side of sketches, **Fig. 54**.

Step 5. Zoom in to **PROFILE AT WIRE sketch**, **Fig. 54**.

Step 6. **Ctrl click Midpoint of new slot arc** and outside or forward arc **of PROFILE AT WIRE sketch**. Release Ctrl key and click **Make Pierce** on the context toolbar, **Fig. 55**.

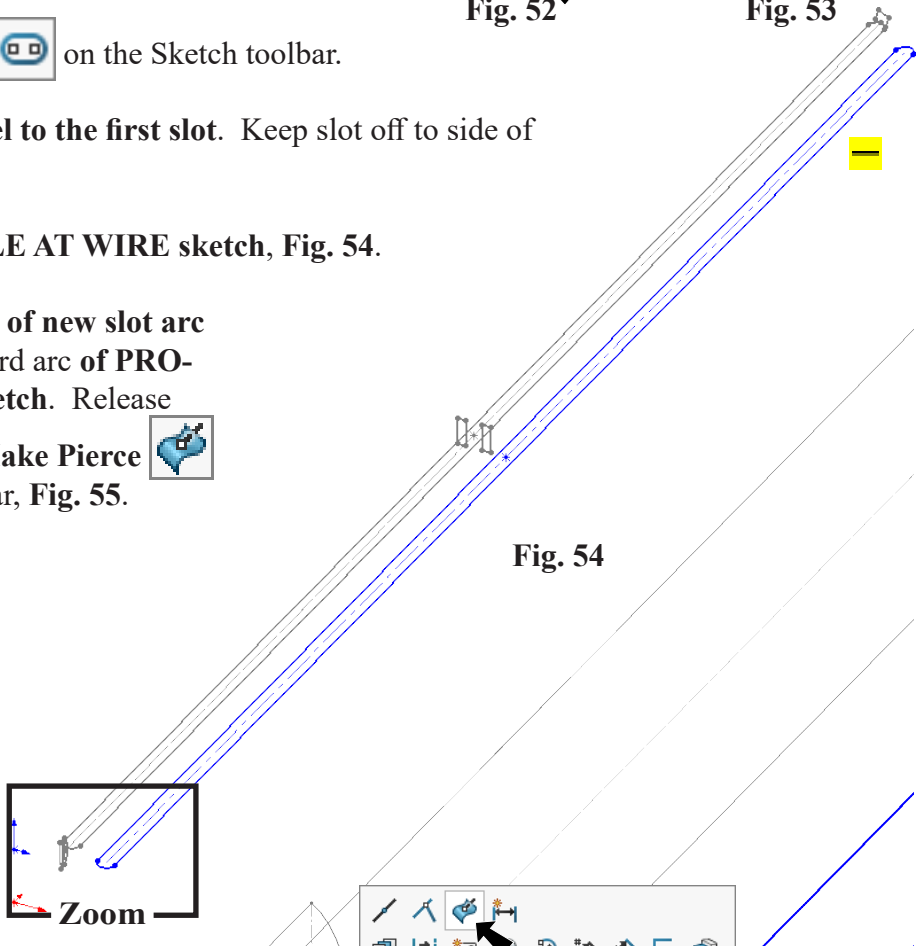


Fig. 54

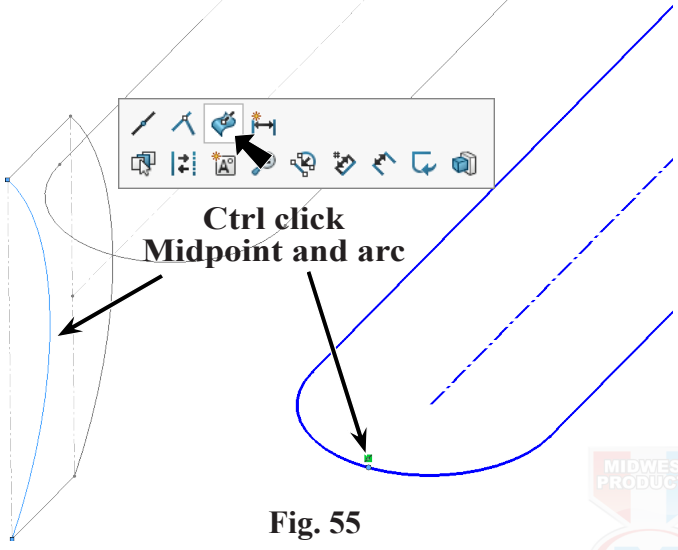


Fig. 55

Step 7. Click **Smart Dimension**

(S) on the Sketch toolbar.

Step 8. Dimension **between the two slots .95**, **Fig. 56**.

Step 9. Click **Zoom to Fit** **(F)** on the View toolbar.

Step 10. Zoom in to **PROFILE AT PIN sketch**, **Fig. 57**.

Step 11. **Right click graphics area and click Select** from menu to unselect Smart Dimension.

Step 12. **Ctrl click Midpoint arc of new slot** outside or rear arc **of PROFILE AT WIRE sketch**. Release Ctrl key and click **Make Pierce** on the context toolbar, **Fig. 58**.

Step 13. Click **Exit Sketch**

on the Sketch toolbar.

Step 14. Save. Use **Ctrl-S**.

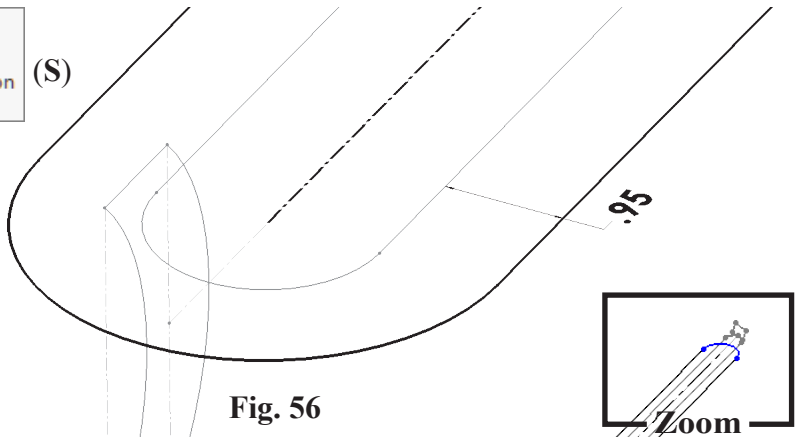


Fig. 56

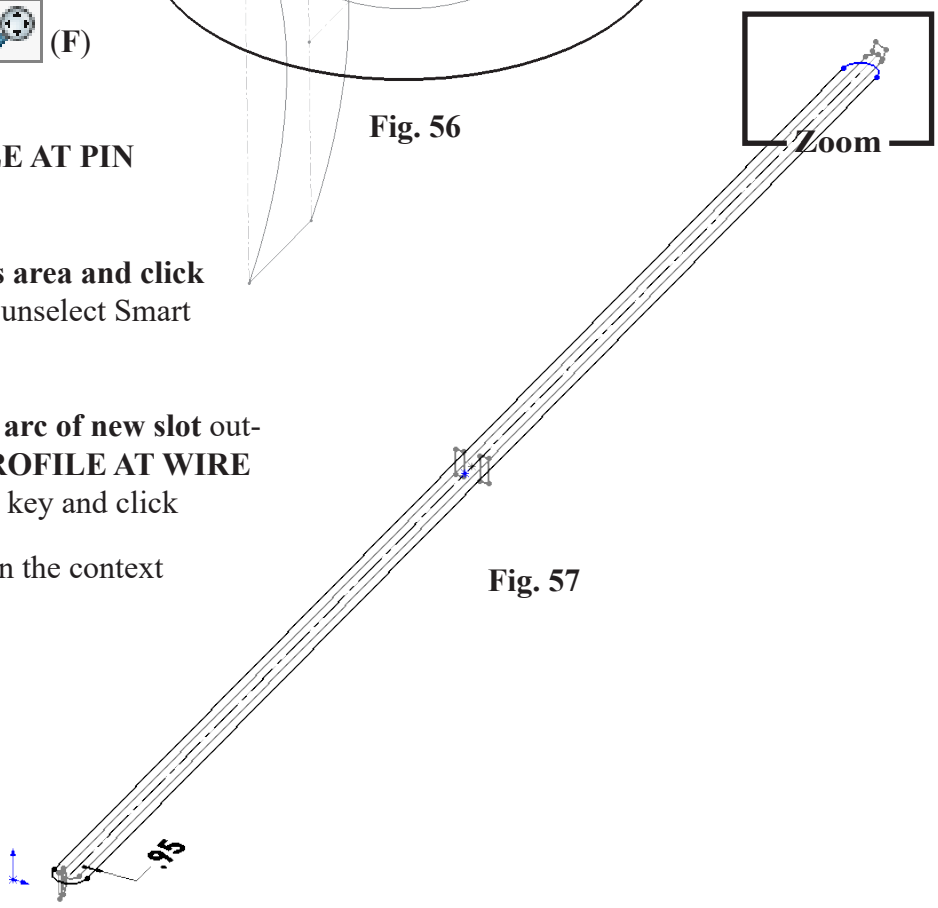


Fig. 57

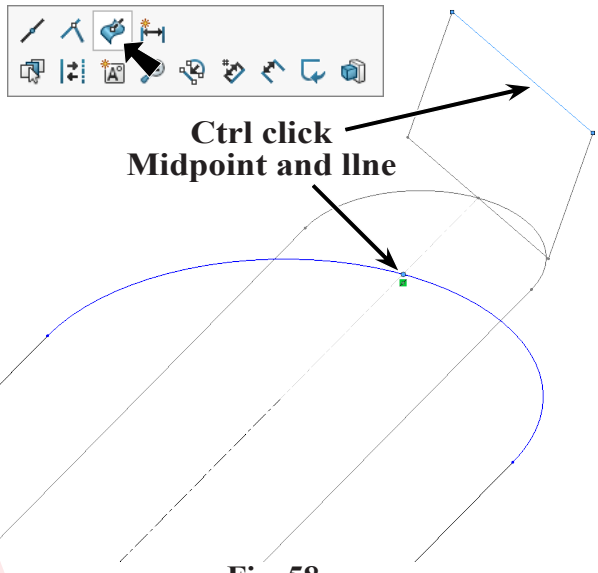


Fig. 58

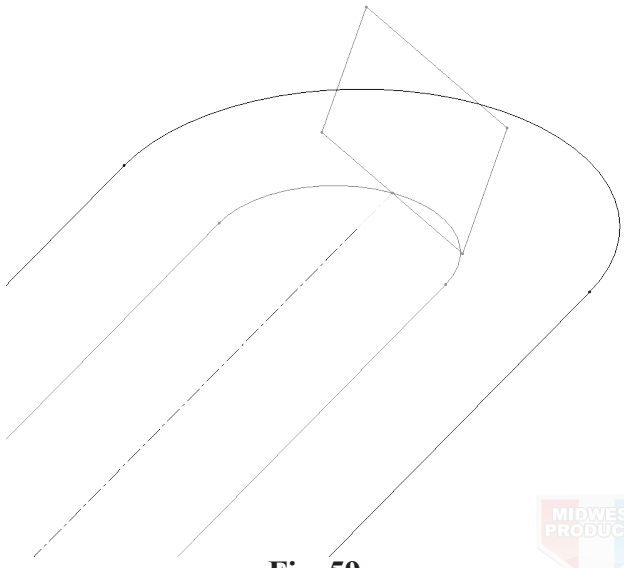


Fig. 59

N. Rename Sketch .

Step 1. Rename Sketch to **GUIDE CURVE 2** in the Feature Manager, **Fig. 60**.

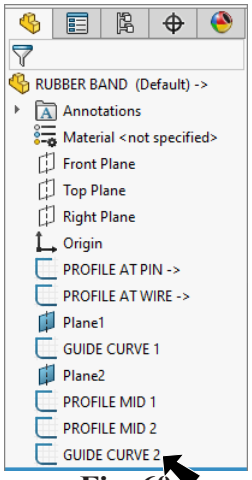
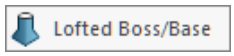


Fig. 60

O. Loft.

Step 1. Click **Zoom to Fit** **(F)** on the View toolbar.

Step 2. Click **Lofted Boss/Base**  on the Features toolbar.

Step 3. In the Loft Property Manager set:

under Profiles, **Fig. 61**

click **top outside rectangle vertex on all 4 profiles sketches in order**, **Fig. 81.** Zoom in.

PROFILE AT WIRE, **Fig. 62**

PROFILE MID 1, **Fig. 63**

PROFILE AT PIN, **Fig. 64**

PROFILE MID 2, **Fig. 65**

under Guide Curves

click in the **Guide Curves box**, **Fig. 61**

click the **two Guide Curve sketches**, **Fig. 66**

GUIDE CURVE 1

GUIDE CURVE 2

under Options

check **Close loft**

click OK .

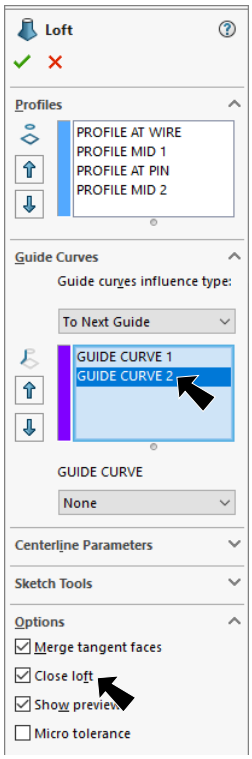


Fig. 61

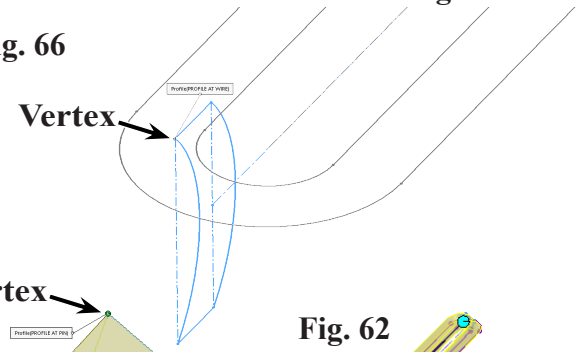


Fig. 62

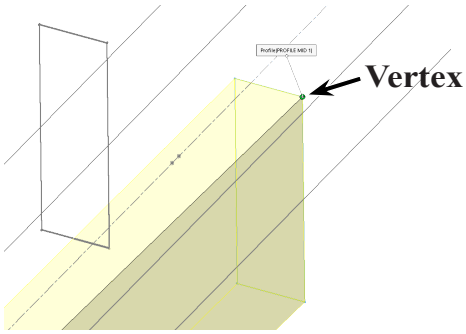


Fig. 63

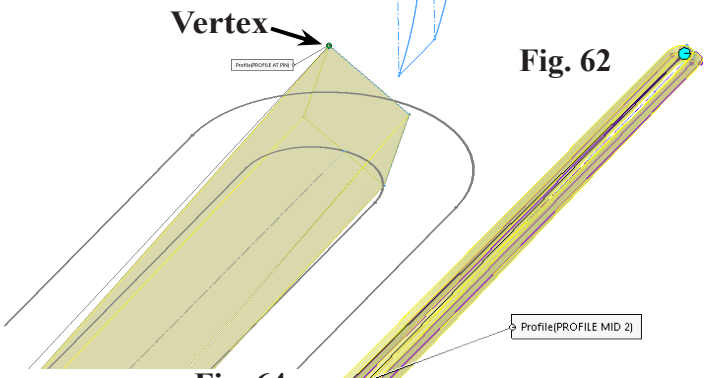


Fig. 64

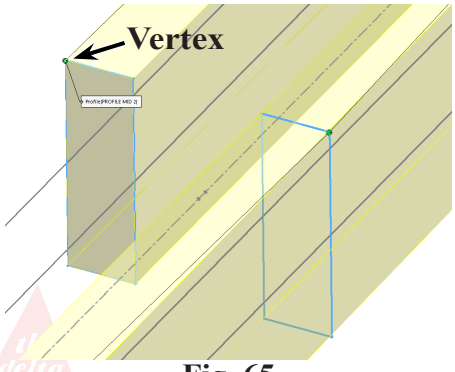


Fig. 65

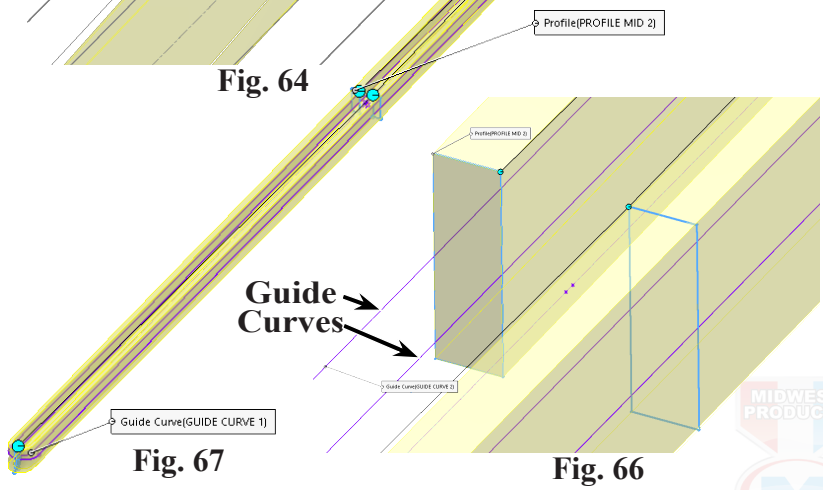


Fig. 67

Fig. 66

P. Fillets.

Step 1. Zoom in on **front of Rubber Band**, **Fig. 68**.

Step 2. Click **Fillet**

on the Features toolbar.

Step 3. In the Fillet Property Manager set:
select **FilletXpert**, **Fig. 69**

Radius .15
click **top edge**, **Fig. 70**

click **Internal to feature** on the Fillet pop-up toolbar

click OK .

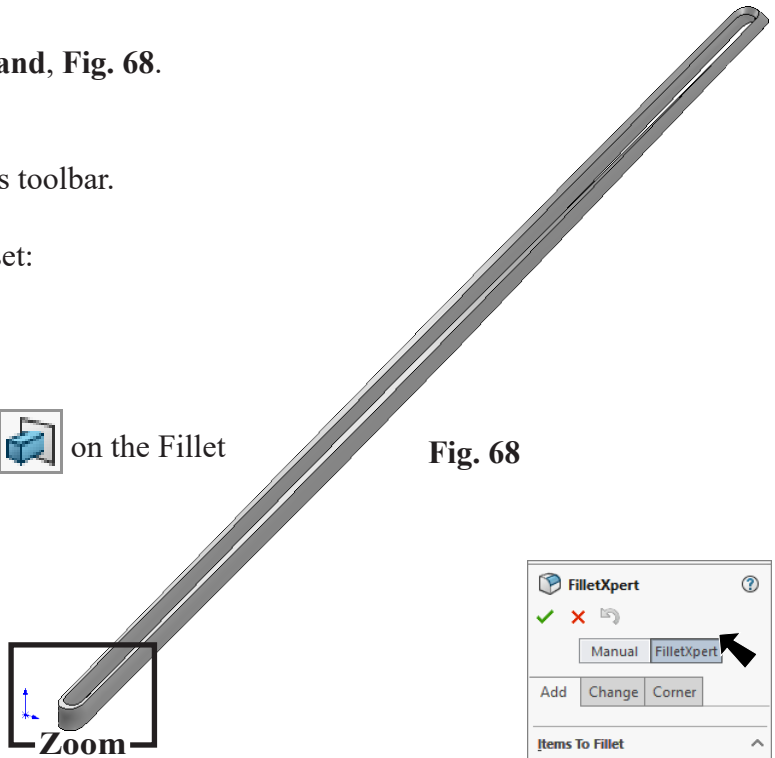


Fig. 68

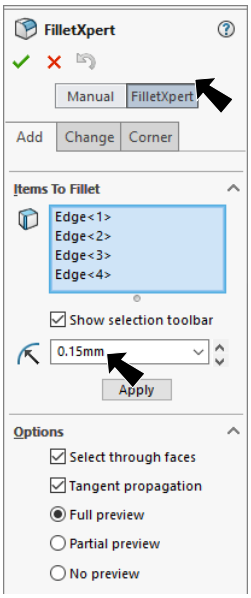


Fig. 69

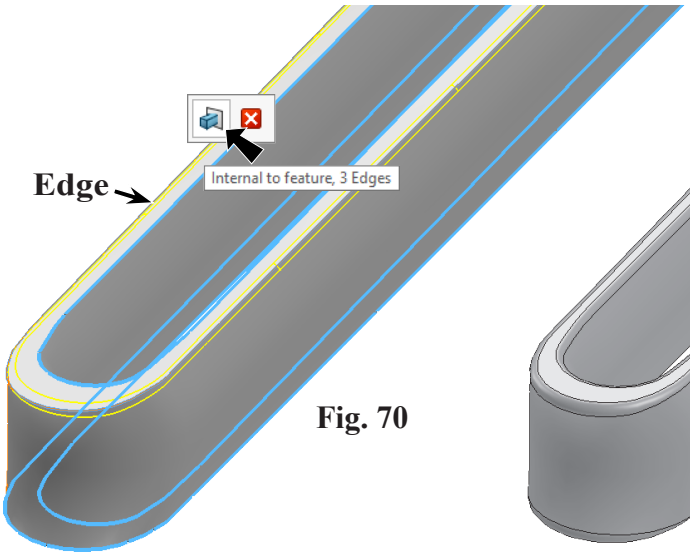


Fig. 70

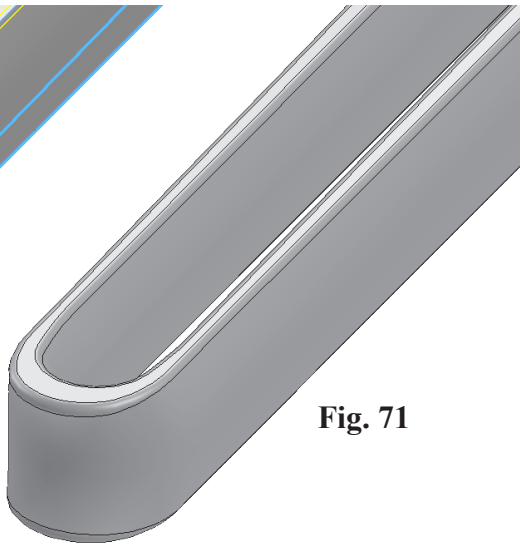


Fig. 71

Q. Material Rubber.

Step 1. **Right click Material** in the Feature Manager and click **Edit Material**, **Fig. 72**.

Step 2. Expand **Other Non-metals** in the material tree and click **Rubber**. Click **Apply** and **Close**.

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

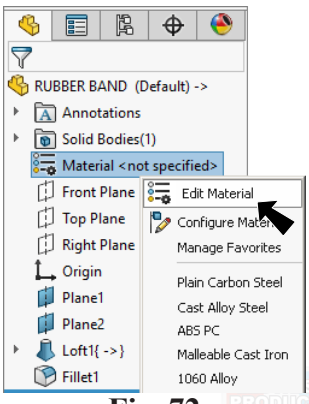


Fig. 72

R. Appearance Color.

Step 1. Click PhotoView 360 Menu > Edit Appearance.

Step 2. In the Appearances Property Manager:
under Color, **Fig. 73**
click **orange** swatch
click OK ✔ .

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

Step 4. Switch back to ASSEMBLY file. Use **Ctrl-Tab**.

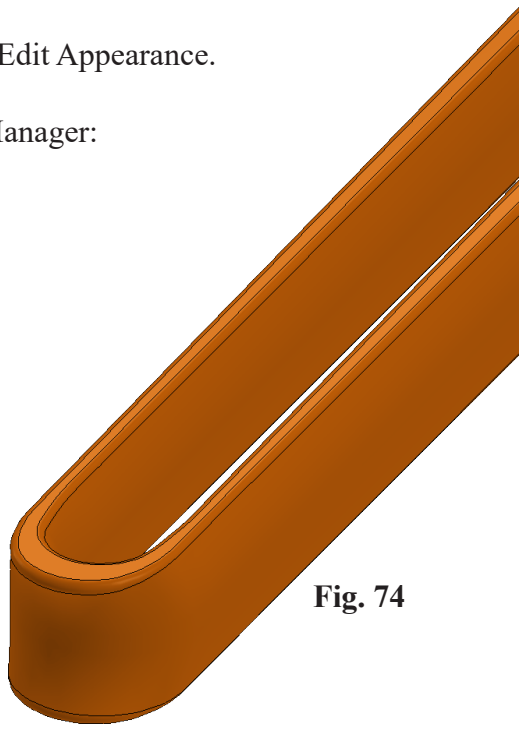


Fig. 74

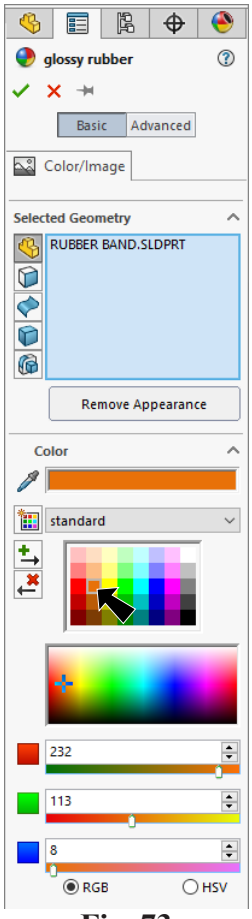


Fig. 73

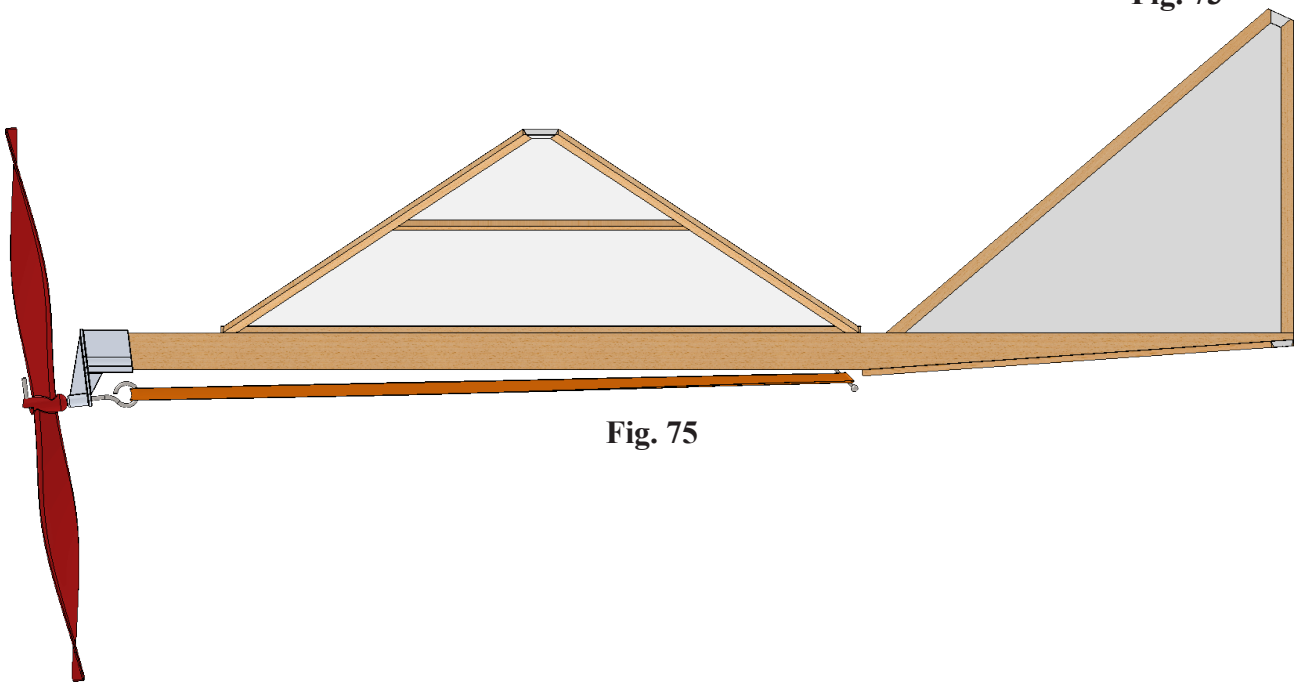


Fig. 75