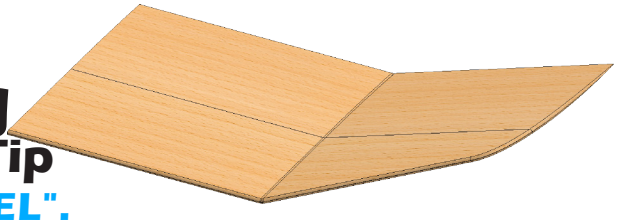
Glider
Wing
4 Panel Tip



A. Open and Save As "WING 4 PANEL".

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

Step 2. Click File Menu > Save As.

Step 3. Key-in **WING 4 PANEL** for the filename and press ENTER.

B. Sketch Wing.

Step 1. Click the **top face** of the Wing Blank and click **Sketch** on the Content menu, **Fig. 1**.

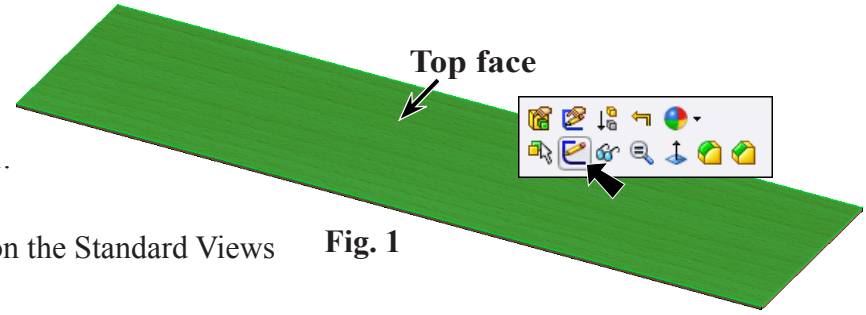


Fig. 1

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

C. Lines.

Step 1. Click **Line** (**L**) on the Sketch toolbar.

Step 2. Draw the **4 lines** in **Fig. 2**. The vertical line (centerline) is drawn from the Mid-point of edge down through the Origin.

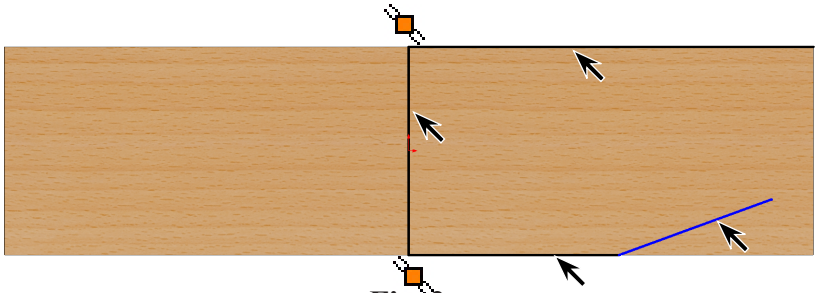


Fig. 2

Step 3. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 4. Add the Dimensions as shown in **Fig. 3**. To Smart dimension angle, click line and bottom edge, then move the cursor between and click. Key-in 20 for dimension and press ENTER. Add the other dimensions.

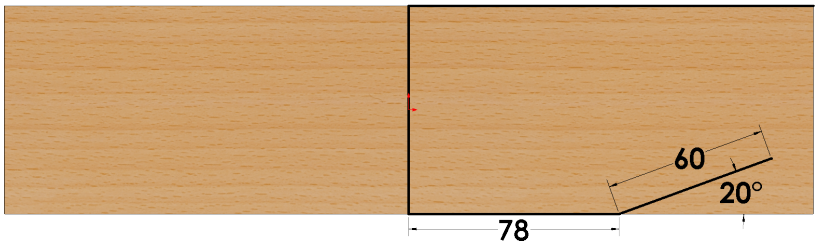


Fig. 3

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

D. 2 Point Spline.

Step 1. Click **Spline** (**S**) on the Sketch toolbar.

Step 2. Draw a **2 Point Spline** from endpoint of angled line to top right corner of Wing Blank, **Fig. 4**. Press Escape to end spline.

Fig. 4

Step 3. **Ctrl click line and spline** to select both. Release Ctrl key and click **Make Tangent** on the Content menu, **Fig. 5**.

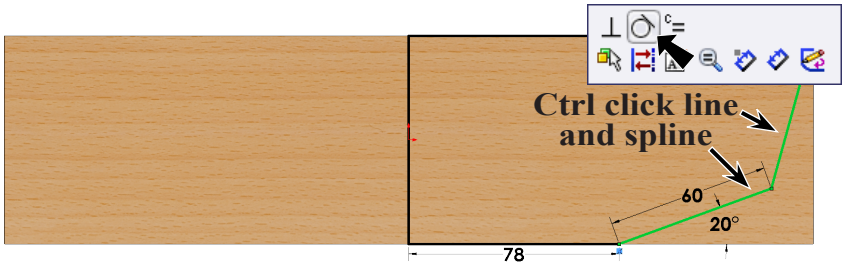


Fig. 5

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

Step 5. Dimension Spline Point 1 **Tangent Weighting2 30**, **Fig. 6** and **Fig. 7**. To dimension Tangent Weighting, click the **Circular Spline handle**, **Fig. 6**, then move the cursor out away from spline and click. Key-in 30 and press ENTER.

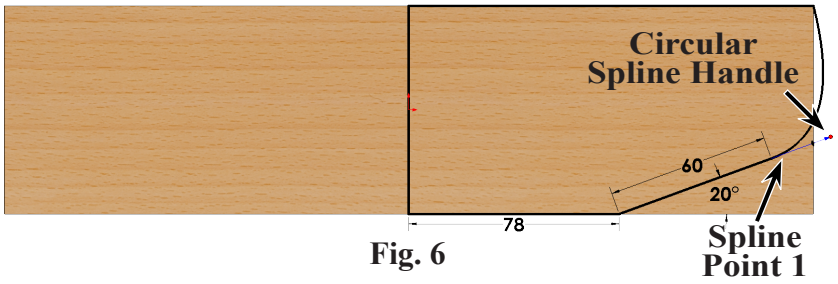


Fig. 6

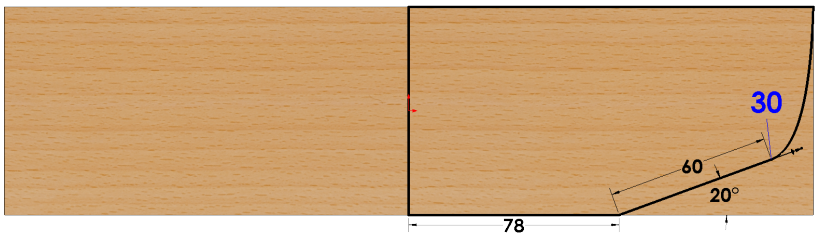


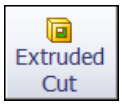
Fig. 7

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

E. Extruded Cut WING.

Step 1. Click **Features** 

on the Command Manager toolbar.

Step 2. Click **Extruded Cut** 

on the Features toolbar.

Step 3. In the Cut-Extrude Property Manager set:

under Direction1, **Fig. 8**

End Condition **Through All**

check **Flip side to cut**

uncheck **Direction 2**

under Selected Contours

click the **wing contour** in graphics area, **Fig. 9**.

The Direction arrow should point towards area to be cut away, **Fig. 9.** If arrow is pointing in wrong direction, uncheck **Flip side to cut, Fig. 8**.

click OK  .

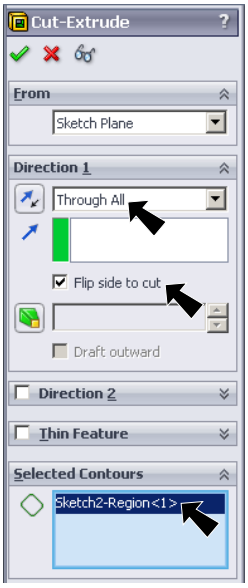


Fig. 8

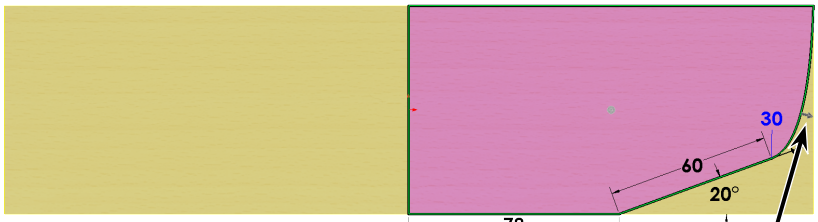


Fig. 9

F. Convert to Sheet Metal.

Step 1. Click **Trimetric**  on the Standard Views toolbar.

Step 2. Click Insert Menu > Sheet Metal > Convert To Sheet Metal.

Step 3. In the Property Manager set:

under Sheet Metal Parameters, **Fig. 10**

in the **Select a fixed entity** box

click the **top face of Wing**, **Fig. 11**

Sheet Thickness  **1.5, Fig. 10**

Default radius for bends  **2**

click OK  .

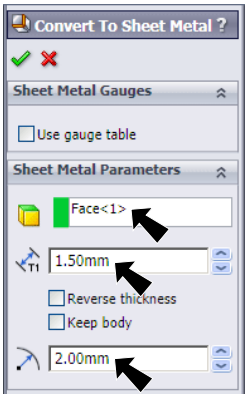


Fig. 10

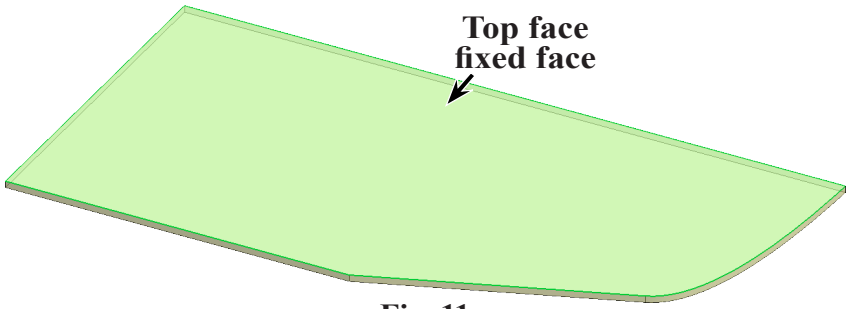


Fig. 11

G. Bend 1.

Step 1. Click the **top face** and click **Sketch** on the Content menu, **Fig. 12**.

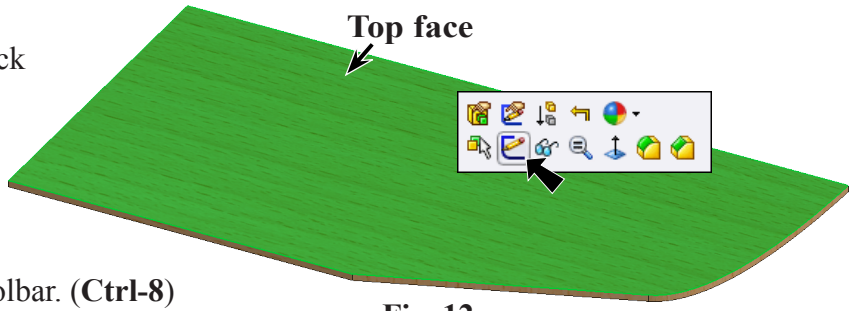


Fig. 12

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

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

Step 4. Draw vertical line up from corner of sheet metal Wing, **Fig. 13**. Be sure cursor changes to **Coincident/Vertical** shape to confirm vertical line (relation).

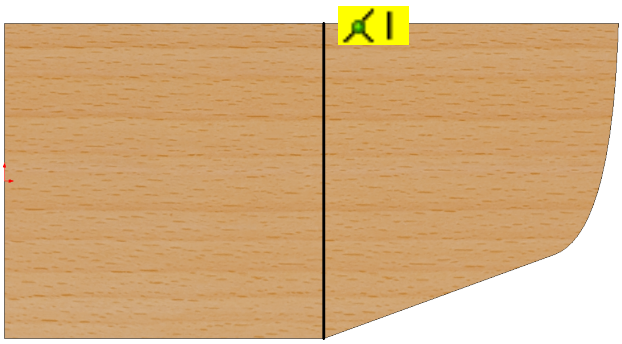


Fig. 13

Step 5. Click **Trimetric** on the Standard Views toolbar.

Step 6. Click Insert Menu > Sheet Metal > Sketched Bend.

Step 7. In the Sketched Bend Property Manager set:

in the **Fixed Face** box, **Fig. 14**
click the **top inboard face of Wing**, **Fig. 15**

Bend position: Bend Centerline, **Fig. 14**
Bend Angle 18

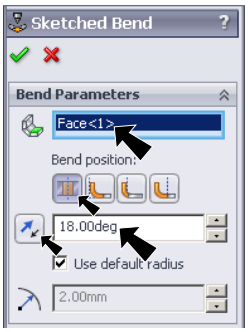


Fig. 14

The Direction arrow should point up, **Fig. 15**. If arrow is pointing in wrong direction, click **Reverse Direction**, **Fig. 14**.

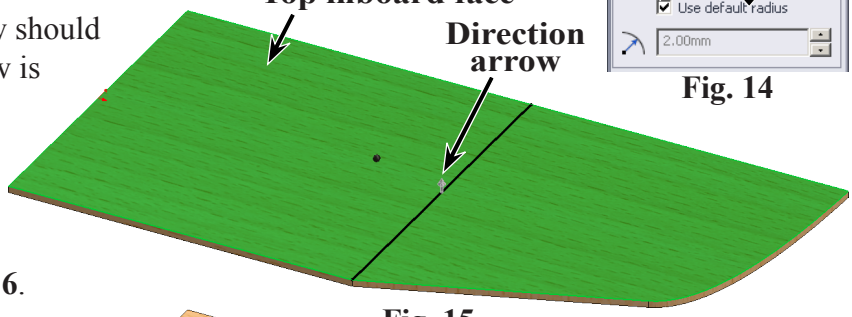


Fig. 15

Click OK, **Fig. 16**.

Step 8. Save. Use **Ctrl-S**.

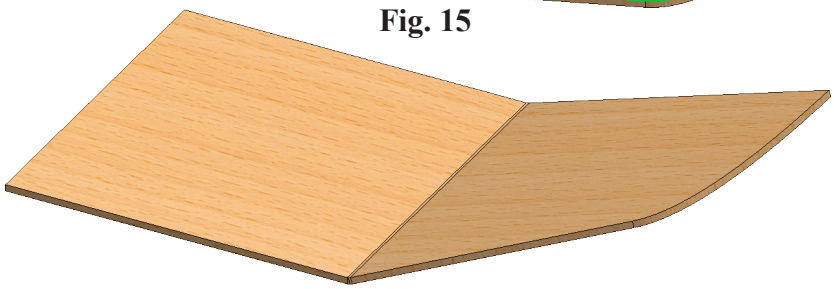


Fig. 16

H. Air Foil Sweep Cut Profile Sketch.

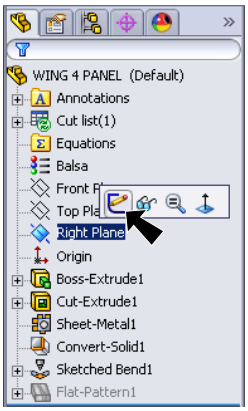


Fig. 17

Step 1. Click **Right Plane** in the Feature Manager and click **Sketch** from the Content toolbar, **Fig. 17**.

Step 2. Click **Left** on the Standard Views toolbar. (**Ctrl-4**)

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

Step 4. Draw a centerline part way across the sketch, **Fig. 18**. Start from Mid-point of trailing edge.

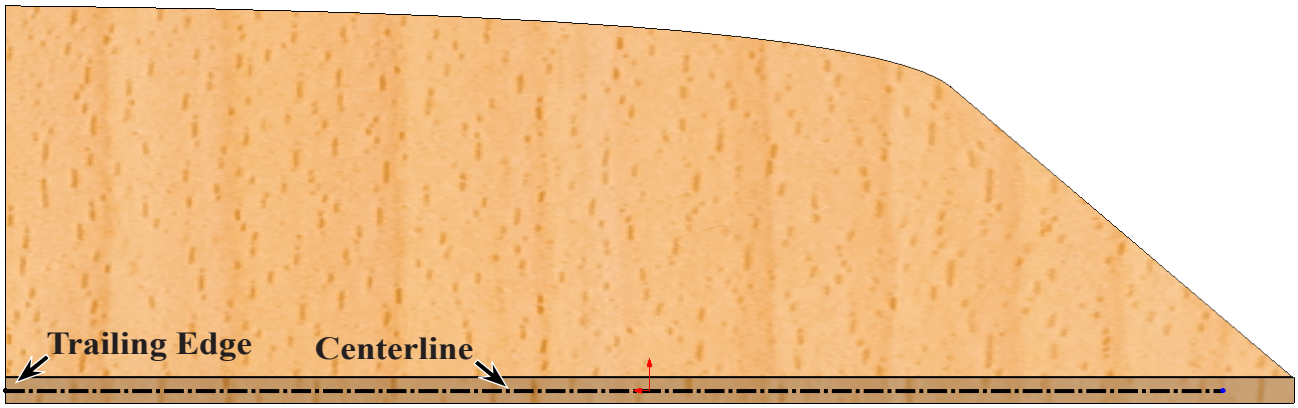


Fig. 18

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

Step 6. Draw a **2 Point Spline** from left endpoint of centerline to top edge of Wing, **Fig. 19**. Press Escape to end spline.

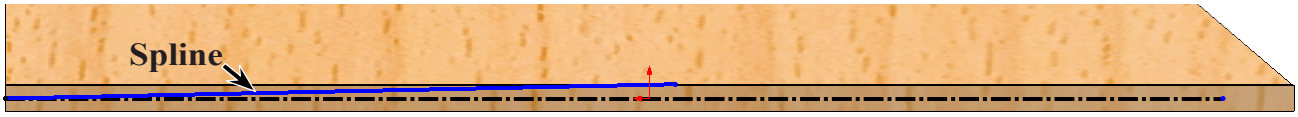


Fig. 19

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

Step 8. Add the **40** dimension, **Fig. 20**. Confirm spline is drawn to edge and not bend. If necessary zoon in, **Fig. 21**.

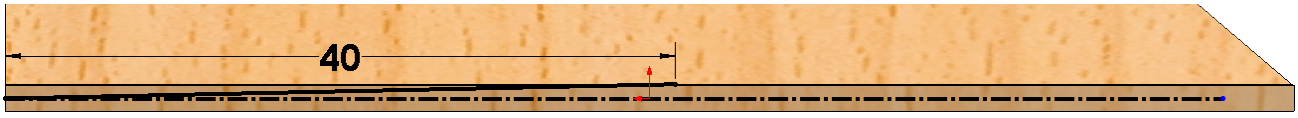


Fig. 20

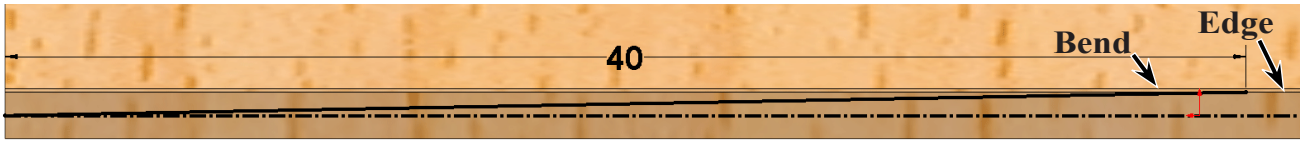


Fig. 21

Step 9. Click the Spline to select it and locate the **Circular Spline handle** (small gray dot) of **Spline Point 1**, **Fig. 22**. To find the Circular spline handle, start your cursor at the bottom Spline Point, Spline Point 1 and move cursor up along the spline. The Spline Point the Circular Spline handle will highlight as a red circle.

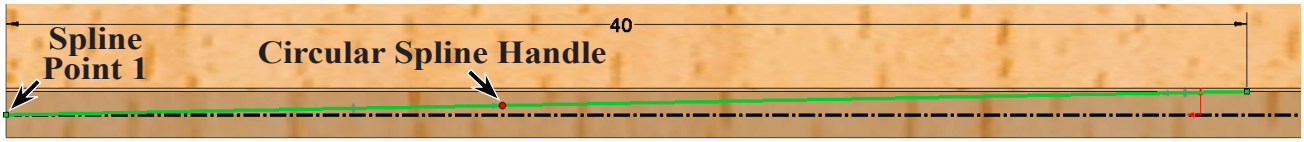


Fig. 22

Step 10. Dimension Spline Point 1 **Tangent Weighting2 40**, **Fig. 23**. To dimension Tangent Weighting, click the **Circular Spline handle**, then move the cursor out away from spline and click. Key-in 40 and press ENTER.

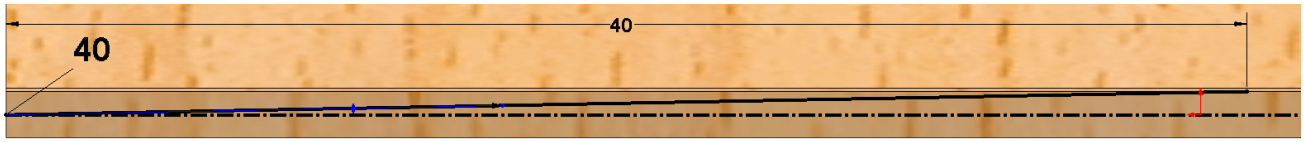


Fig. 23

Step 11. Dimension Spline Point 1 **Tangent Radial Direction 2.6 degrees**, **Fig. 24**. To dimension Tangent Radial Direction, click the **Circular Spline handle and centerline**, then move cursor between and click. Key-in 2.6 and press ENTER.

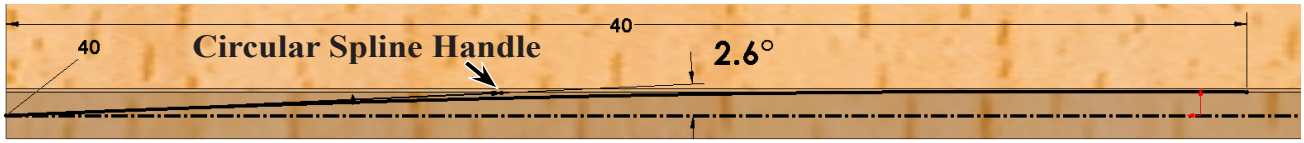


Fig. 24

Step 12. Click Spline to display the Circular Spline handle and locate the **Circular Spline handle** of **Spline Point 2**, **Fig. 25**.

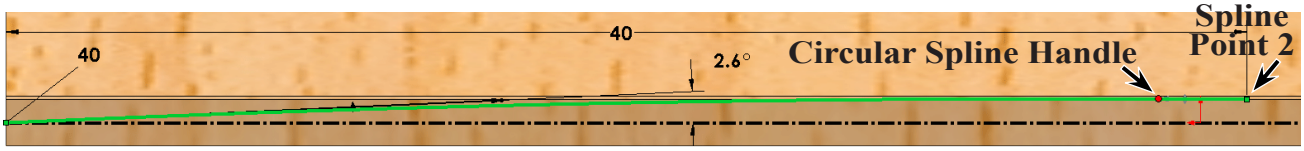


Fig. 25

Step 13. Dimension Spline Point 2 **Tangent Weighting1 40**, **Fig. 26**. To dimension Tangent Weighting, click the **Circular Spline handle**, then move the cursor out away from spline and click. Key-in 40 and press ENTER.

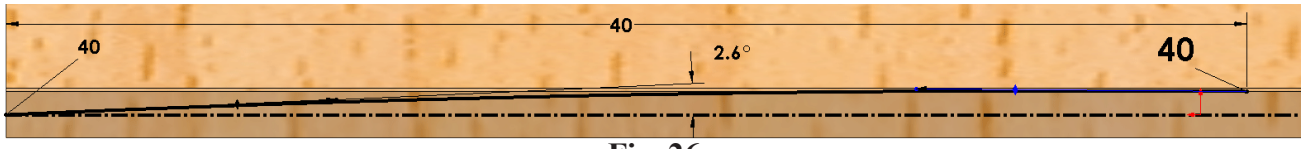


Fig. 26

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

Step 15. **Ctrl click** the **Circular Spline handle** ● **of Spline Point 2 and the top edge of Wing** to select both, **Fig. 27**. Click **Make Collinear**  on the Property Manager, **Fig. 28**.

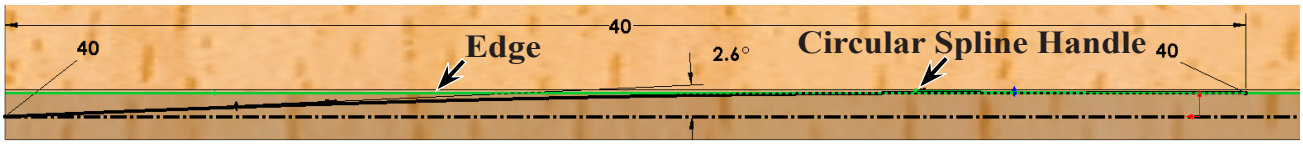


Fig. 27

Step 16. **Drag selection around the sketch** to select all entities, **Fig. 29**. To drag selection, click **below** and to right of sketch and drag up and to left to drag around all.

Step 17. Click **Mirror Entities**  on the Sketch toolbar.

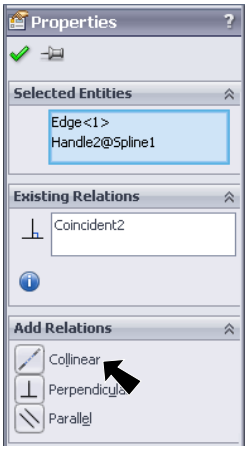


Fig. 28

Drag a selection around all geometry

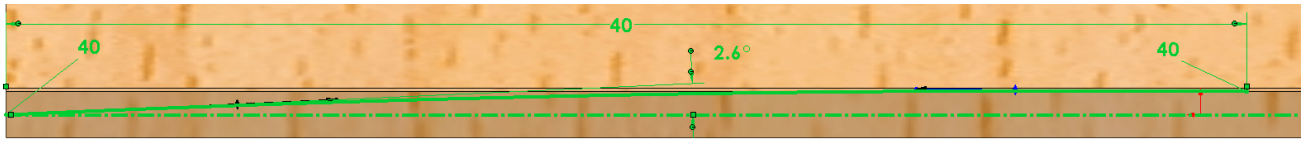


Fig. 29

Step 18. Click **Line**  **(L)** on the Sketch toolbar.

Step 19. Draw **3 lines**, **Fig. 30**. Draw lines starting from the endpoint of spline around Wing and extend out beyond trailing edge. I changed color of lines for clarity. You don't change color.

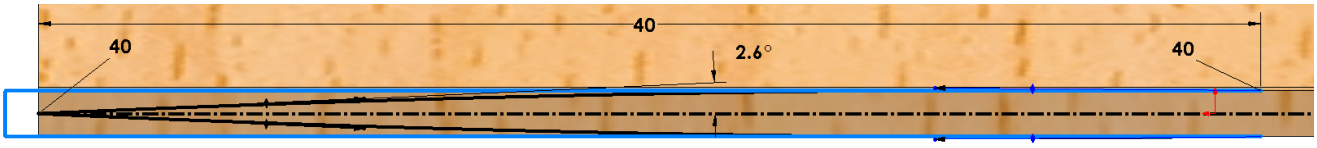


Fig. 30

Step 20. Click **Smart Dimension**  **(S)** on the Sketch toolbar.

Step 21. Add **41** dimension, **Fig. 31**.

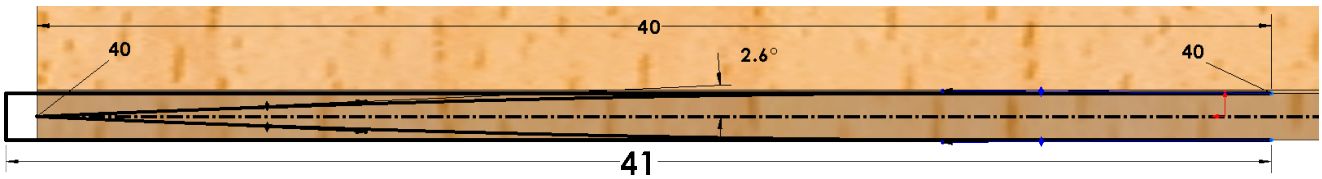
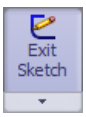


Fig. 31

Step 22. Click **Exit Sketch**  on the Sketch toolbar and Save. Use **Ctrl-S**.

I. Air Foil Sweep Cut Path Sketch.

Step 1. Rotate view to view **along trailing edge** as shown in **Fig. 32**. Hold down middle mouse button (wheel) and drag.

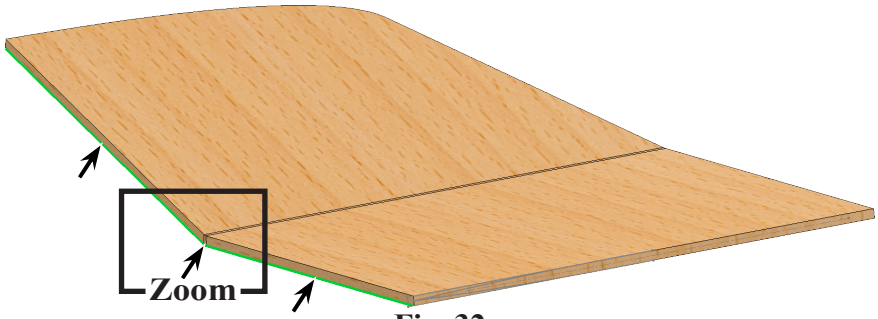


Fig. 32

Step 2. Click Insert Menu > Curve > Composite.

Step 3. In the Property Manager set:
for Entities to Join, **Fig. 33**
click **edges along trailing edge**, **Fig. 32**.
If necessary, zoom in to select the bend edge, **Fig. 34**
Click OK  .

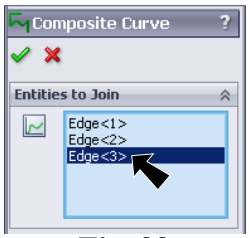


Fig. 33

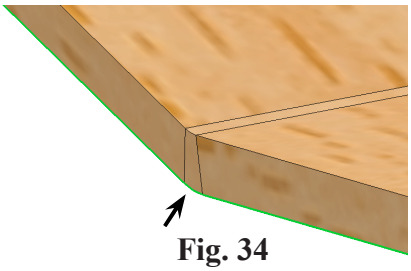


Fig. 34

J. Air Foil Sweep Cut.

Step 1. **Ctrl click both Sketch4 and Composite Curve** in the Feature Manager to select both, **Fig. 35**.

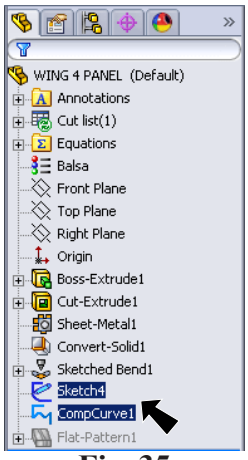


Fig. 35

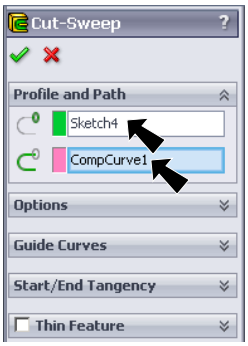
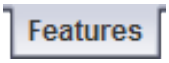


Fig. 36

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

Step 3. Click **Swept Cut**  on the Features toolbar.

Step 4. In the Cut Swept Property Manager set:
Profile  and **Path**  were preselected, **Fig. 36**
click OK  .

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

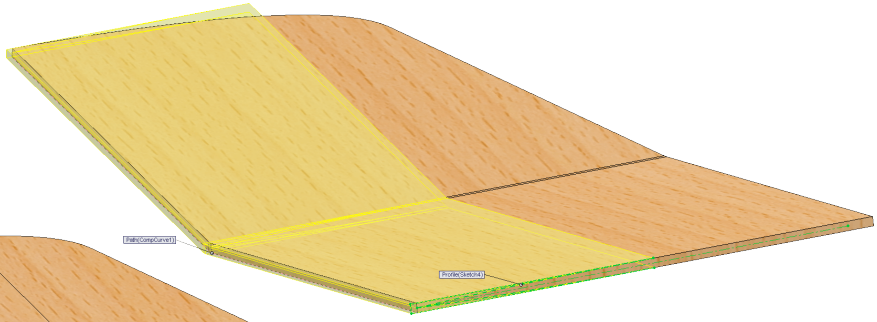


Fig. 37

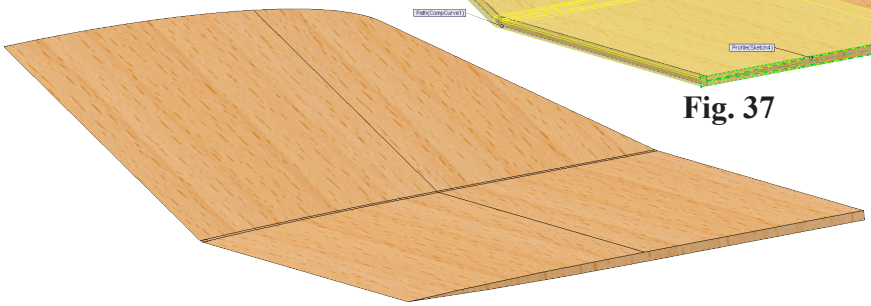


Fig. 38

K. Fillet Face1.

Step 1. Click **Trimetric** on the Standard Views toolbar.

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

Step 3. In the Fillet Property Manager,
select **Manual**, **Fig. 39**
under Fillet Type
select **Face fillet**
Radius **.73**
click in the **Face Set 1** box
click **the 4 top faces along the leading edge of Wing**, **Fig. 40**
click in the **Face Set 2** box, **Fig. 39**
click **front faces all across leading edge**, **Fig. 41**
click OK, **Fig. 42**.

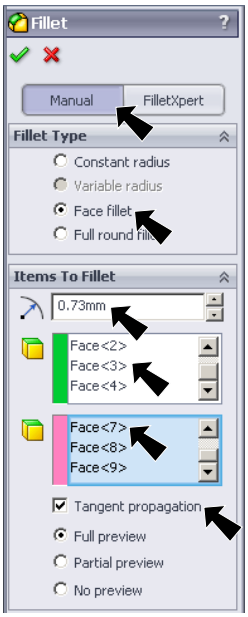


Fig. 39

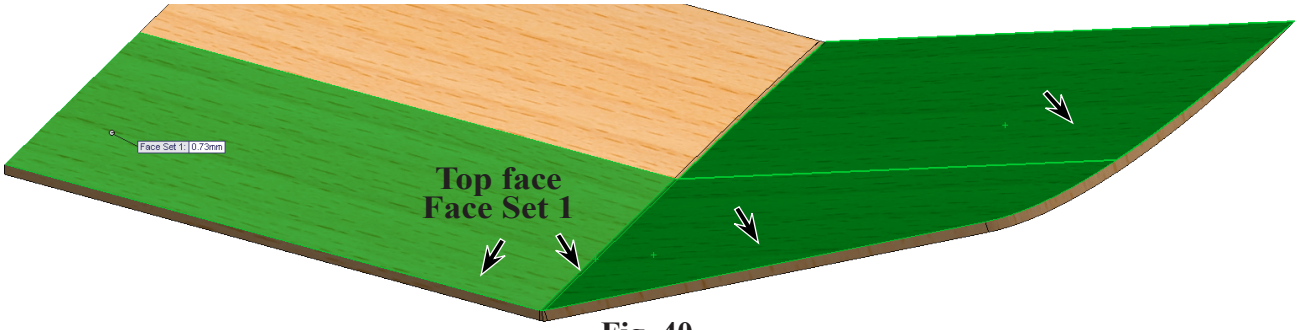


Fig. 40

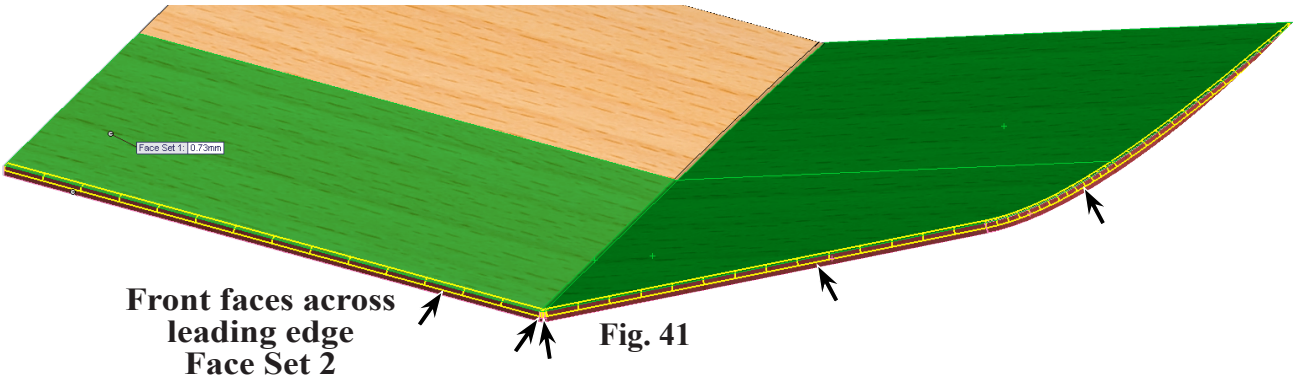


Fig. 41

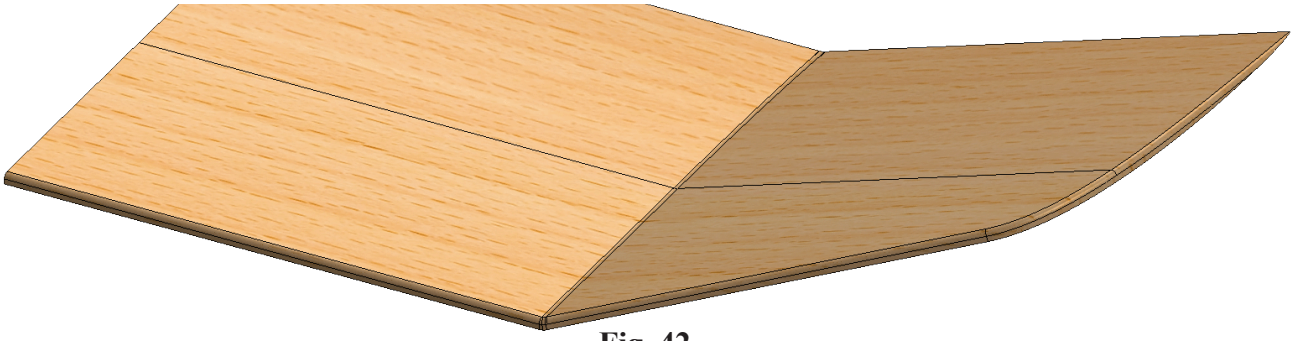


Fig. 42

L. Fillet Face2.

Step 1. Click **Fillet** 

on the Features toolbar.

Step 2. In the Fillet Property Manager,
select **Manual**, **Fig. 43**
under Fillet Type
select **Face fillet**
Radius  **.73**
uncheck **Tangent propagation**
click in the **Face Set 1** box
click **front faces all across leading edge**, **Fig. 44**
click in the **Face Set 2** box, **Fig. 43**
rotate view to view **bottom faces**, hold down middle mouse button (wheel) and drag to rotate view, **Fig. 45**
click **bottom faces across wing**, **Fig. 45**
click OK  , **Fig. 46**.

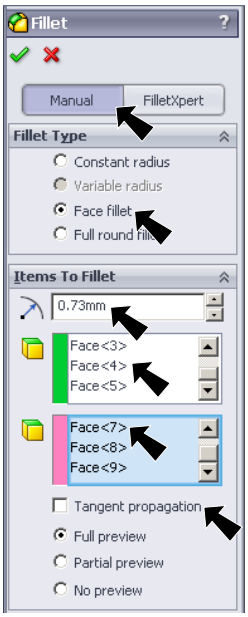
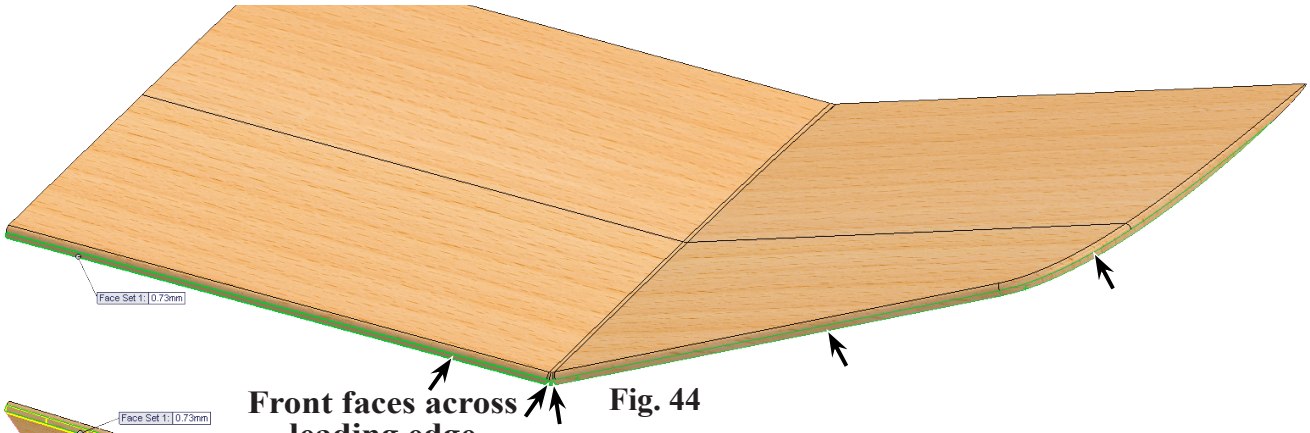
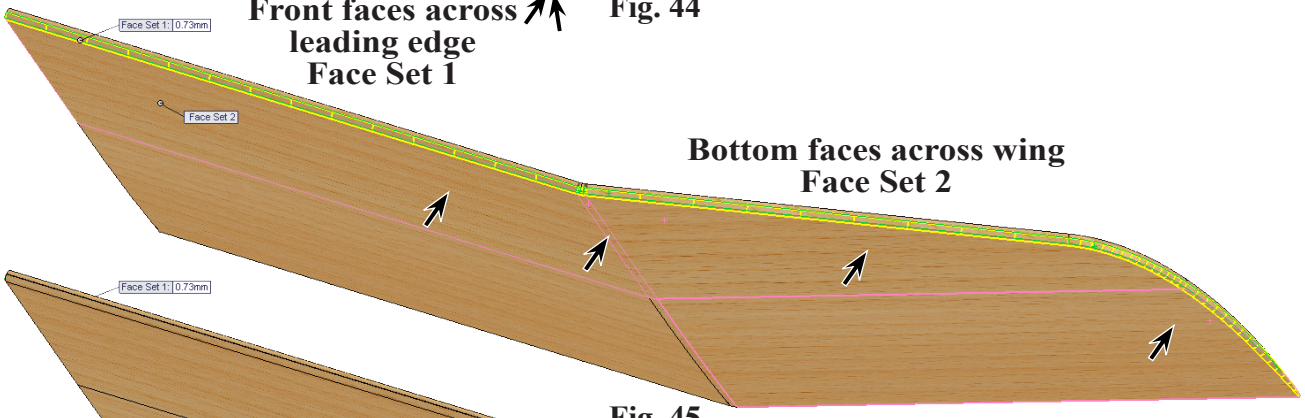


Fig. 43



Front faces across leading edge
Face Set 1

Fig. 44



Bottom faces across wing
Face Set 2

Fig. 45

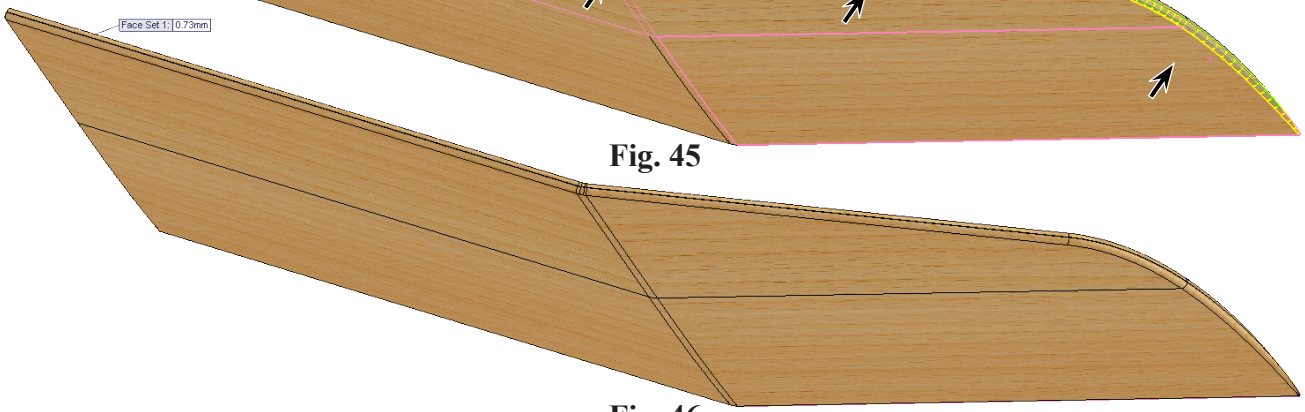


Fig. 46

M. Flatten Sheet Metal.

Step 1. Click **Trimetric** on the Standard Views toolbar.

Step 2. The Sheet Metal will flatten with the Cut-Sweep and Fillets suppressed. Click the **Cut-Sweep1** feature in the Feature Manager and click **Suppress** from menu, **Fig. 47**.

Step 3. To Flatten, click the **Flat-Pattern1** feature in the Feature Manager and click **Unsuppress** in the menu, **Fig. 48** and **Fig. 49**.

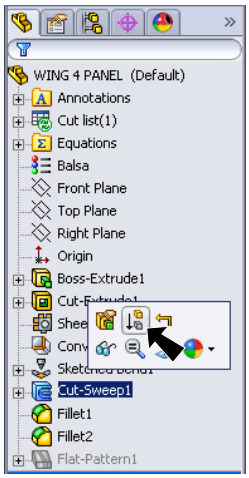


Fig. 47

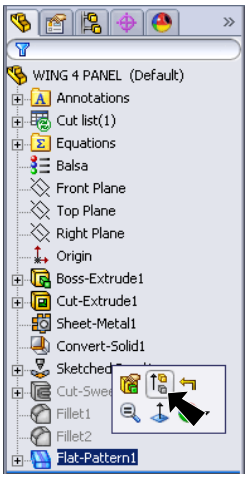


Fig. 48

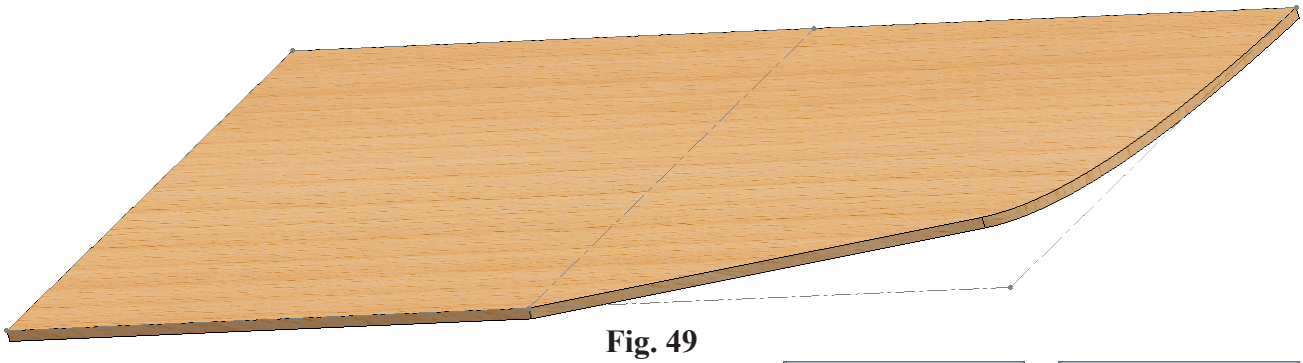


Fig. 49

Step 4. To return part to bent state, click the **Flat-Pattern1** feature and click **Suppress** in the menu, **Fig. 50**.

Step 5. Then, **unsuppress the Cut-Sweep1 and both Fillets**. To unsuppress, **Ctrl click** the Cut-Sweep1 and both Fillets to select all three, release the Ctrl key and click **Unsuppress** from menu, **Fig. 51**.

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

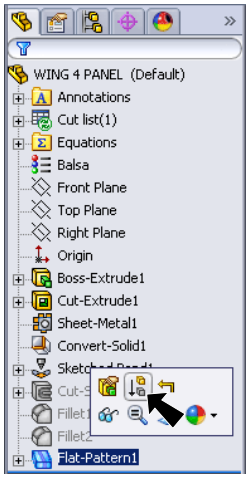


Fig. 50

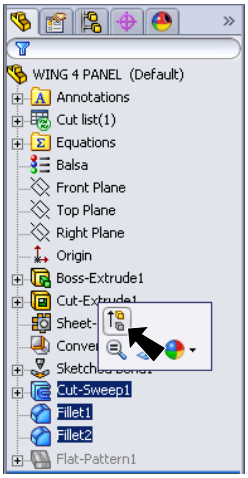


Fig. 51

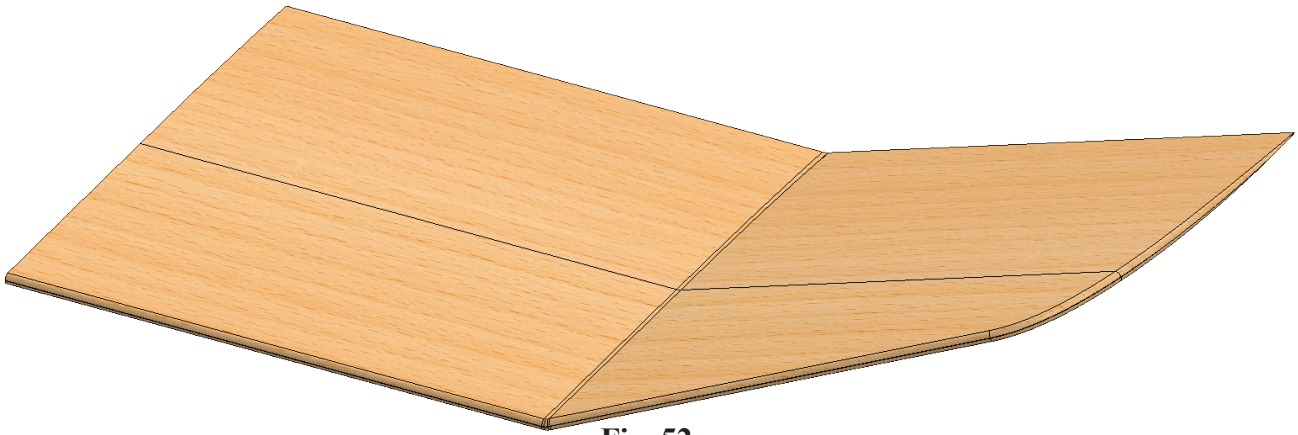


Fig. 52