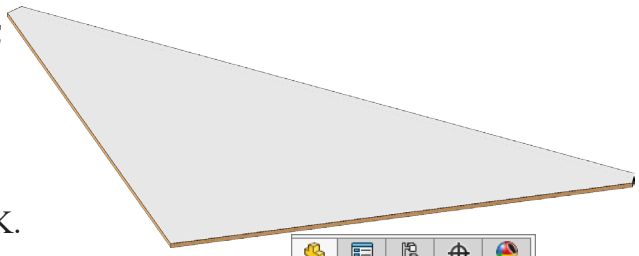
Chapter 3

Delta Dart
H Stab



A. Sheet Metal Sketch.

Step 1. Click File Menu > New, click **Part Metric** and OK.

Step 2. Click **Top Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 1**.

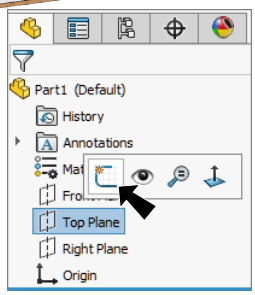


Fig. 1

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

Step 4. Starting at the Origin sketch three lines to make a triangle, **Fig. 2**. Keep left side line vertical and top line horizontal.

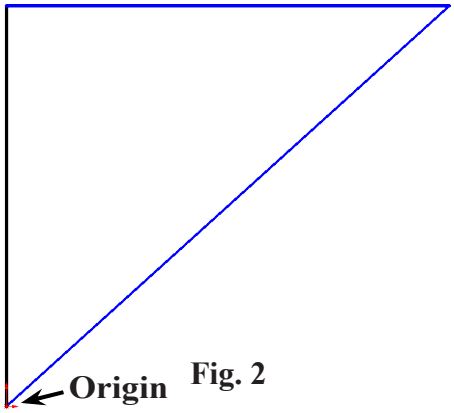


Fig. 2

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

Step 6. Add the dimensions, **Fig. 3**.

B. Save as "H STAB".

Step 1. Click File Menu > Save As.

Step 2. Key-in **H STAB** for the filename and press ENTER.

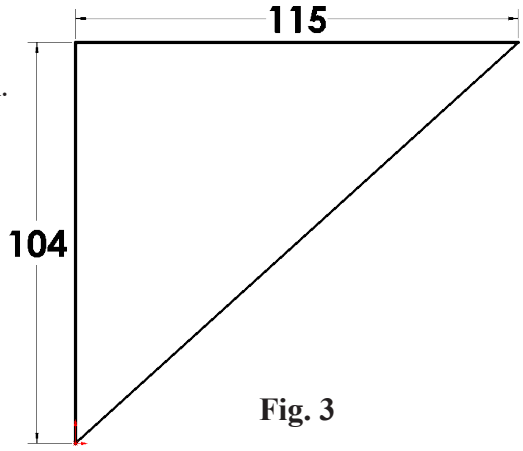


Fig. 3

C. Base Flange.

Step 1. **Right click Sketch** on the Command Manager toolbar select > Tabs > **Sheet Metal**, **Fig. 4**.

Step 2. Click **Sheet Metal** on the Command Manager toolbar.

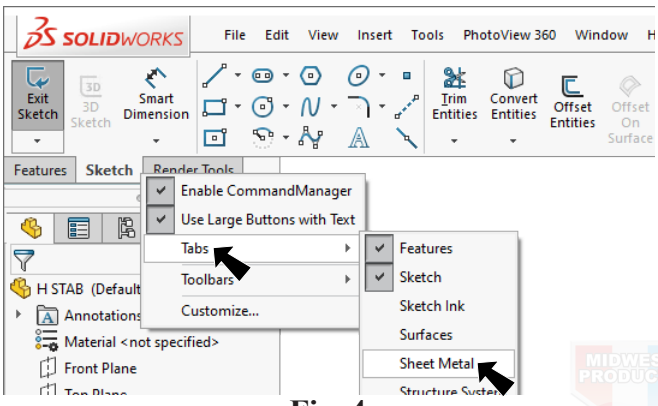


Fig. 4

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Step 3. Click **Base Flange/Tab**

on the Sheet Metal toolbar.

Step 4. In the Property Manager set:
under Sheet Metal Parameters, **Fig. 5**

Thickness .05

click OK .

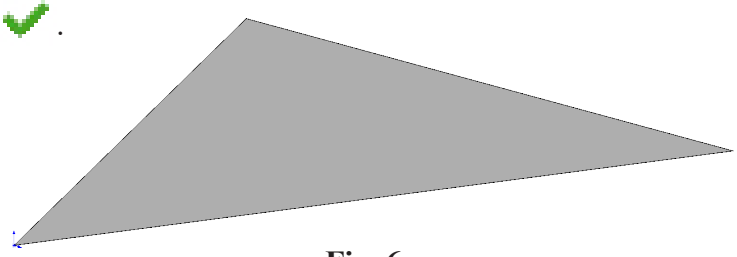

Fig. 6

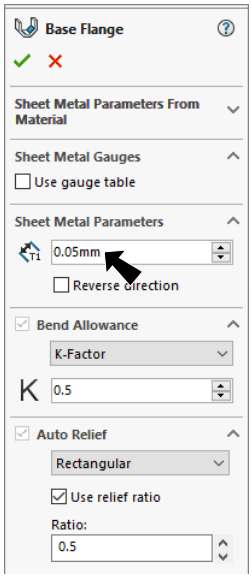

Fig. 5

D. Set Bend Radius.

Step 1. Click **Sheet-Metal** in the Feature Manager and click **Edit Feature** on the context toolbar, **Fig. 7**.

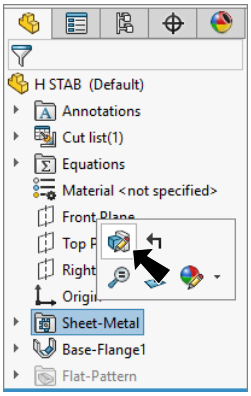

Fig. 7

Step 2. In the Property Manager set:
under Bend Parameters, **Fig. 8**

Bend Radius (Default) .01

click OK .

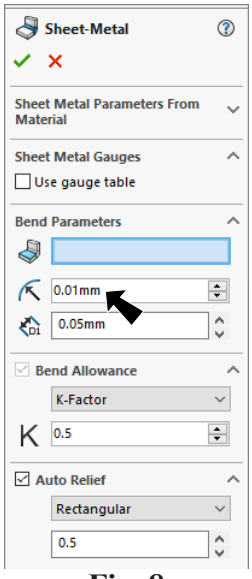

Fig. 8

E. Material Paper -Sheet Metal.

Step 1. Expand **Cut List(1)** in the Feature Manager. Expand **Sheet 1**, **right click Base-Flange1** body and click **Material** > **Edit Material** from menu, **Fig. 9**.

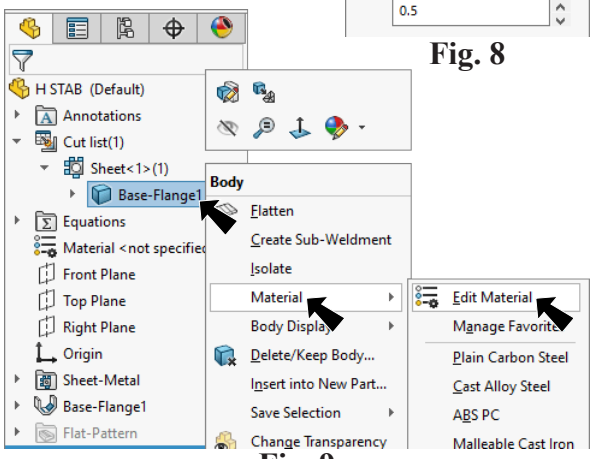

Fig. 9

Step 2. **Expand Other Non-metals** in the material tree.

Select **Corrugated Paper** and **Copy**, **Fig. 10**.

Use **Ctrl-C** or right click and Copy.

Step 3. **Right click Custom Materials** and click **New Category**, **Fig. 11**.

Step 4. Key-in **My Materials** for category name and press ENTER, **Fig. 12**.

Step 5. Paste in Corrugated Paper. Use **Ctrl-P**, **Fig. 13**.

Step 6. **Slowly double click** Corrugated Paper, rename **White Paper** and press ENTER, **Fig. 14**.

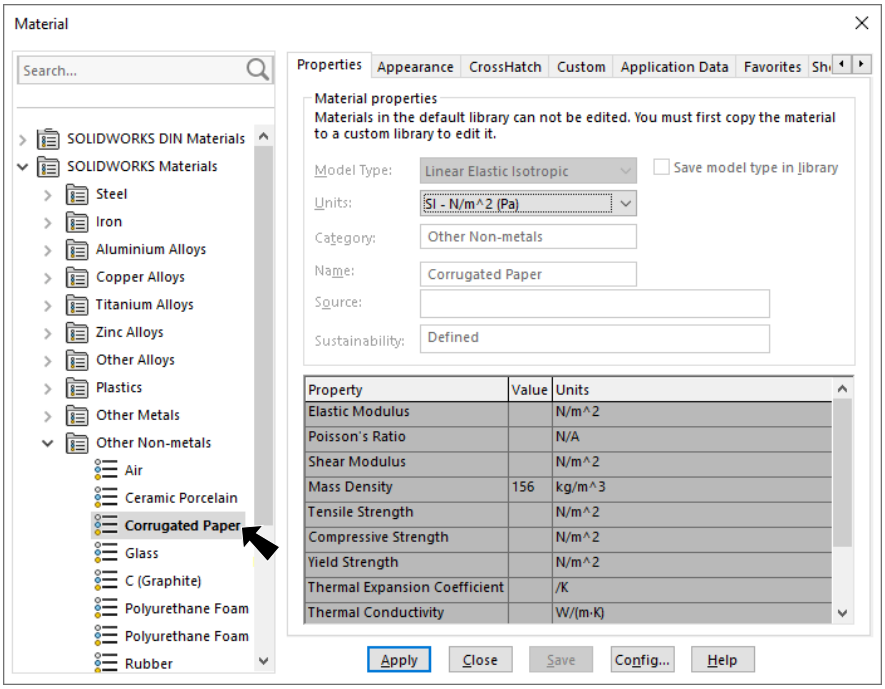

Fig. 10

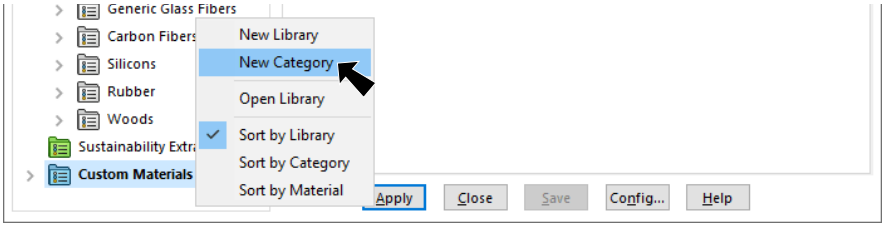

Fig. 11

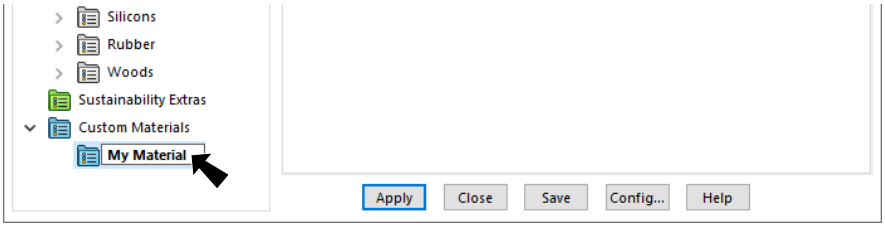

Fig. 12

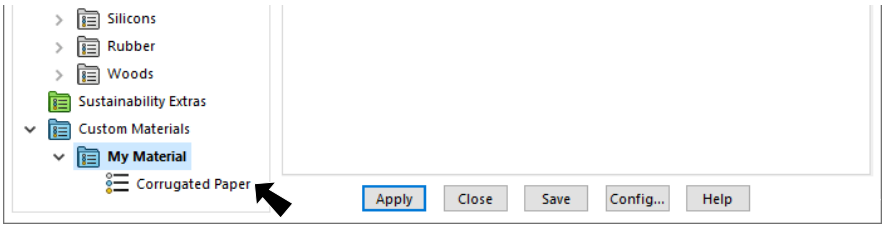

Fig. 13

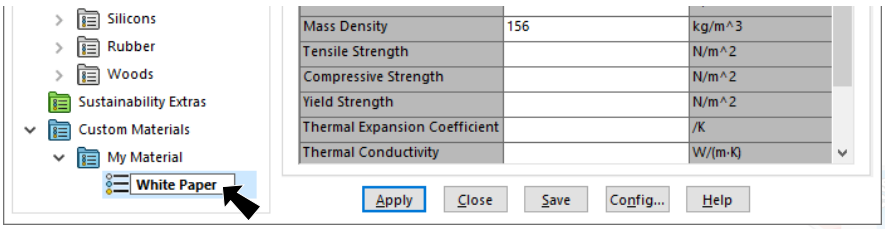

Fig. 14

Step 7. Select White Paper and click **Appearance tab** at top of dialog box.

Under Appearance, expand Plastic > High Gloss and select **white high gloss plastic** and click **Apply**, **Fig. 15**.

Step 8. Click **OK** to Poisson's ratio.

Step 9. Click **Sheet Metal tab** at top select Thickness Range, **Fig. 16**.

Step 10. Click **Favorites tab** at top click **Add, Save** and **Close**, **Fig. 17**.

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

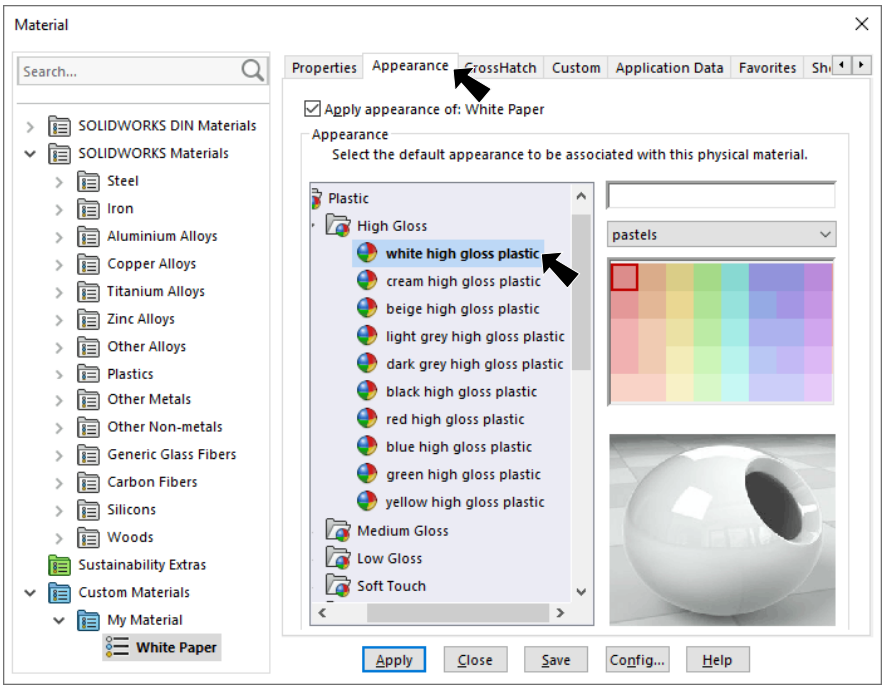

Fig. 15

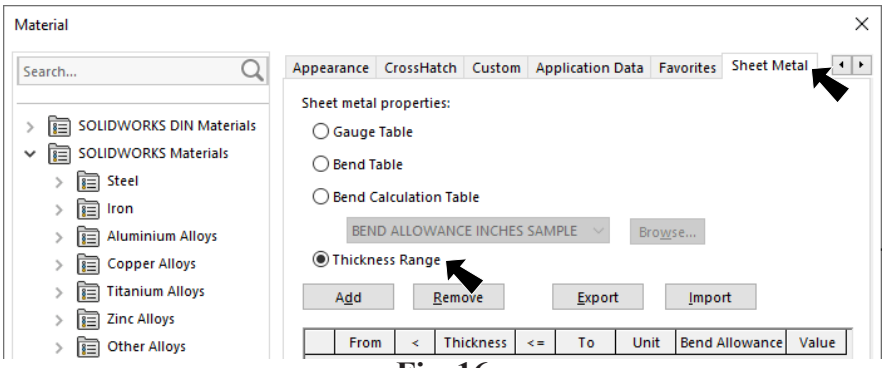

Fig. 16

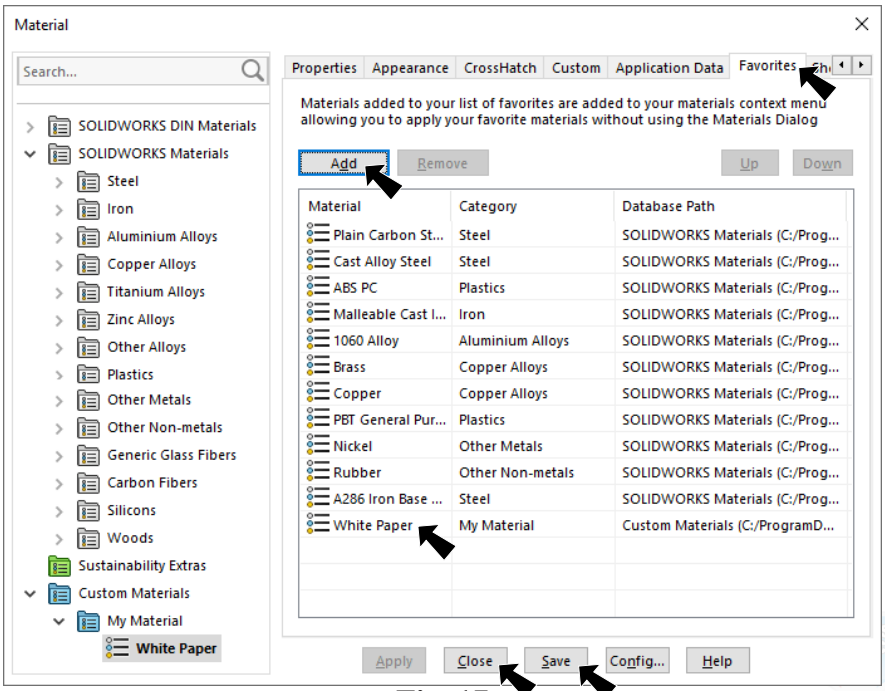

Fig. 17

F. Sketch for Weldments.

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

Step 2. Click the **bottom face of sheet metal** and click **Sketch** on the context toolbar, **Fig. 18**.

Step 3. With the face still selected, click **Convert Entities** (Convert Entities) on the Sketch toolbar **Fig. 19**.

Step 4. Click converted edge at root and click **Construction Geometry** on the context toolbar, **Fig. 20**.

Step 5. **Drag selection around the sketch** to select all entities, **Fig. 21**.

Step 6. Click **Mirror Entities** (Mirror Entities) on the Sketch toolbar, **Fig. 22**.

Step 7. Click Zoom to Fit (**F**) on the View toolbar.

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

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

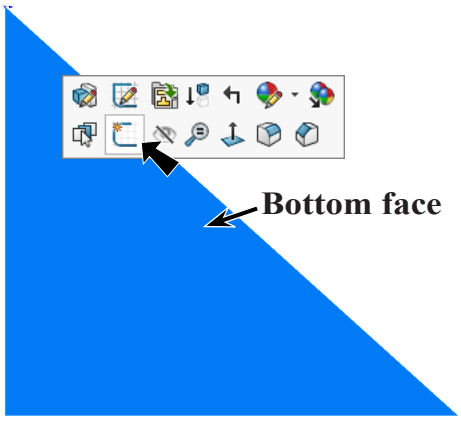

Fig. 18

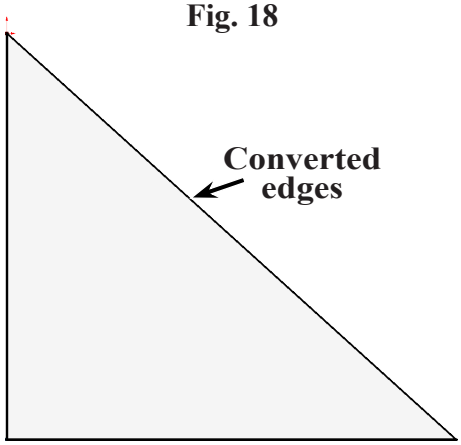

Fig. 19

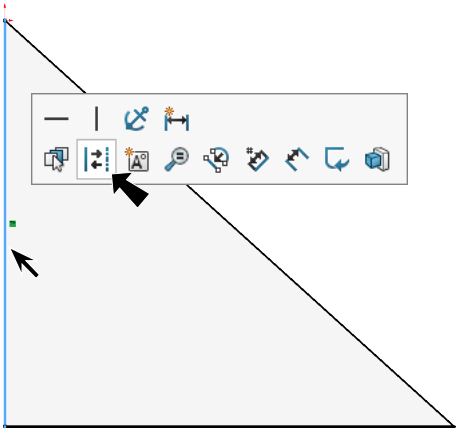

Fig. 20

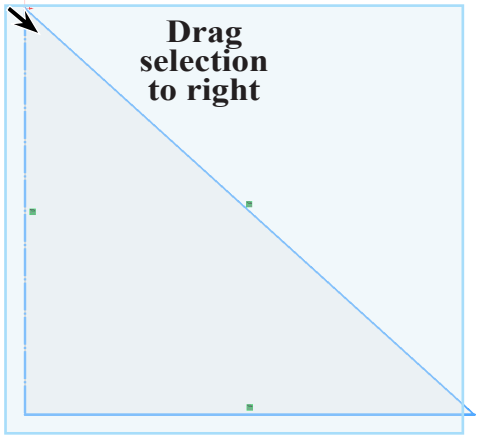

Fig. 21

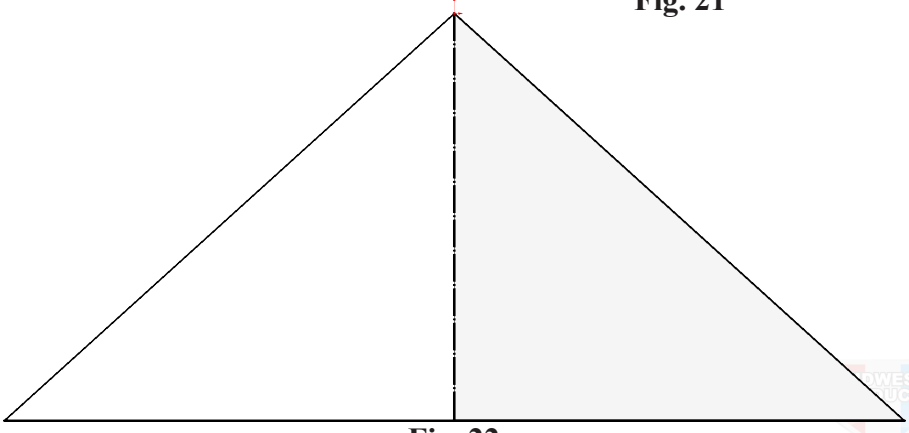

Fig. 22

G. Structural Members.

Step 1. **Right click Sketch** Sketch on the Command Manager toolbar and select **Weldments**, **Fig. 23**.

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

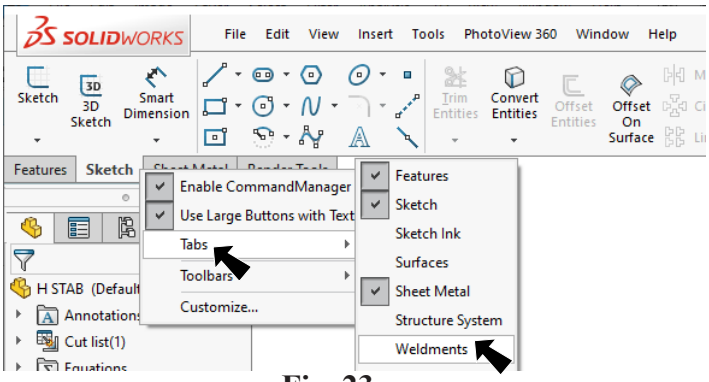

Fig. 23

Step 3. Click **Structural Member** Structural Member on the Weldments toolbar.

Step 4. In the Structural Member Property Manager set:

under Standard:

My Profiles, **Fig. 24**

under Type:

Balsa

under Size:

1.5 x 3

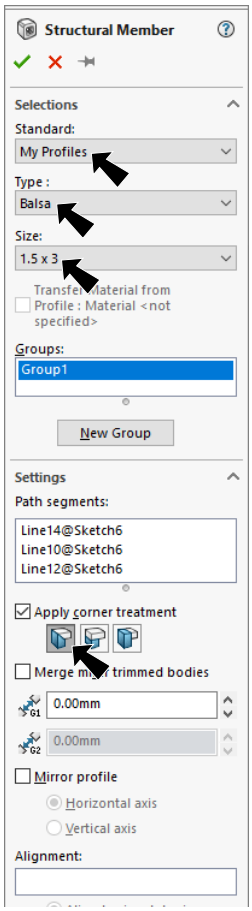

Fig. 24

click the **3 line converted edges**, **Fig. 25**

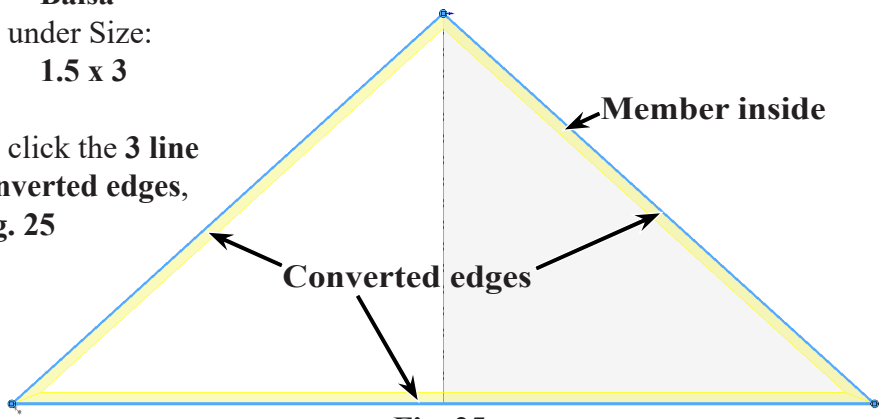

Fig. 25

click **End Miter**

confirm all members on **inside of sketch**

click OK ✔ .

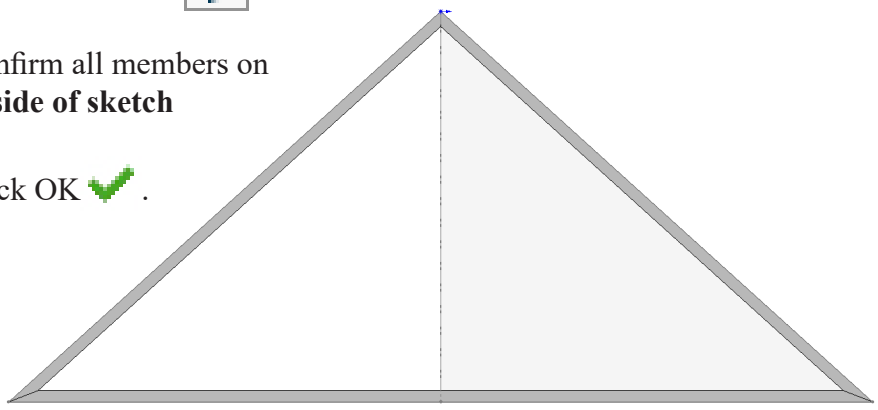

Fig. 26

Step 5. Click **Sketch2** in the Feature Manager and click **Hide** on the context toolbar, **Fig. 27**.

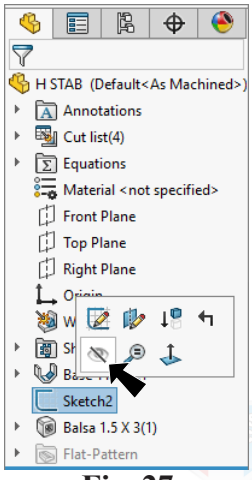

Fig. 27

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

H. Appearance: Balsa.

Step 1. Expand **Structure Member Balsa** in the Feature Manager. **Ctrl click all three Balsa bodies**, release Ctrl and click **Appearance Callout** on the context toolbar and click **Body**, **Fig. 28**.

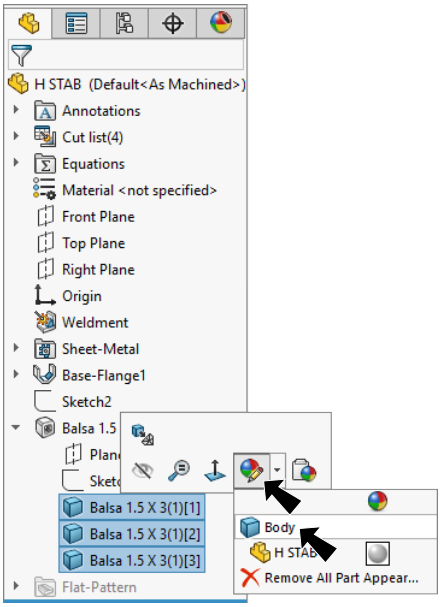

Fig. 28

Step 2. In the Appearances Task pane,
expand **Appearances**, **Fig. 29**
expand **Organic**
expand **Wood**
click **Beech** and in the lower pane select **polished beech 2d**.

Step 3. Over in the Appearances Property Manager set:
Click **Keep Visible** and OK , **Fig. 30**.
The Push Pin on allows other selections.

Step 4. Zoom in around **top of H-Stab**, **Fig. 31**. To zoom, place the cursor over the top of H-Stab area and spin the wheel on mouse back. While spinning the wheel keep cursor on the top.

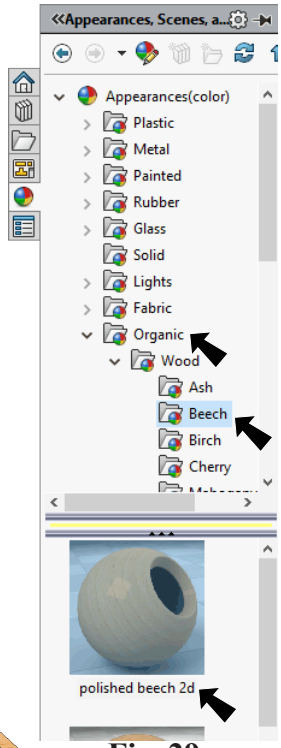

Fig. 29

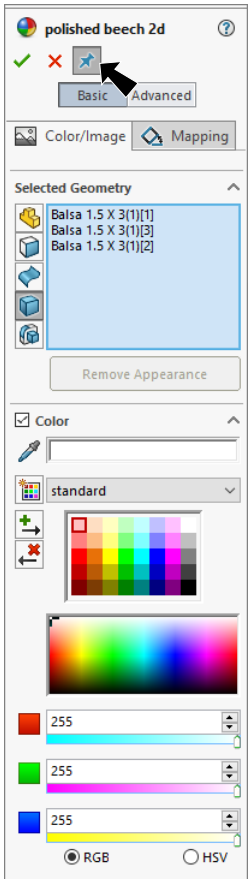

Fig. 30

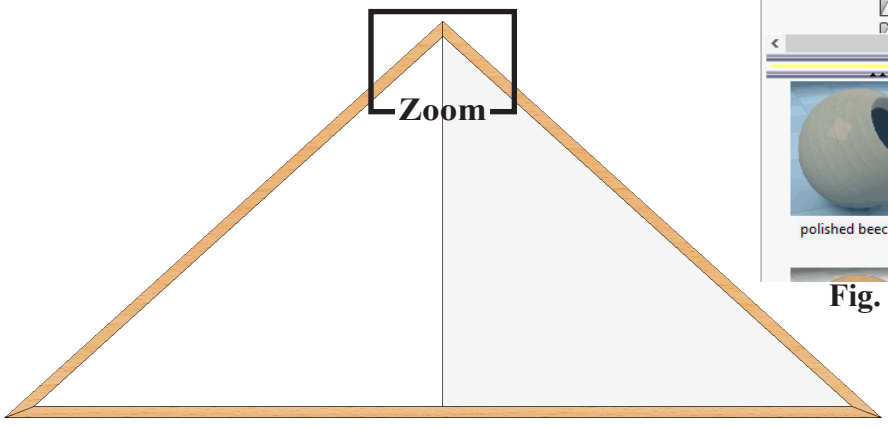

Fig. 31

Step 5. In the Appearances Property Manager set:

click **Mapping tab** Mapping, **Fig. 32**

under Selected Geometry

click **right Member**, **Fig. 33**

under Mapping controls

click **Planar mapping**

Axis direction **Current View**

Rotation 135

click **Small mapping size**

click OK .

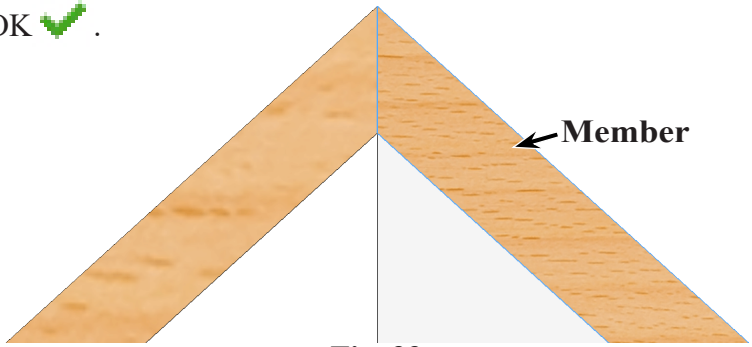

Fig. 33

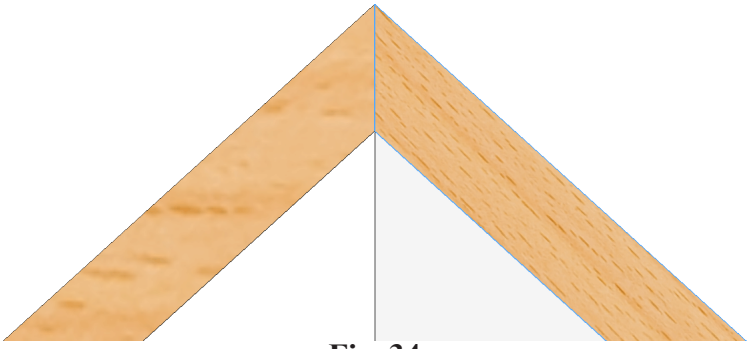

Fig. 34

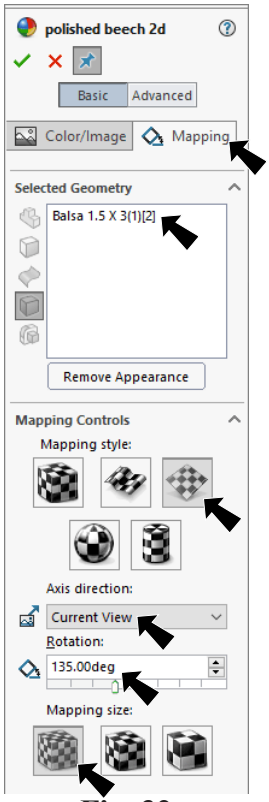

Fig. 32

Step 6. In the Appearances Property Manager:

right click in the Selected Geometry box and click **Clear Selections**, **Fig. 35**.

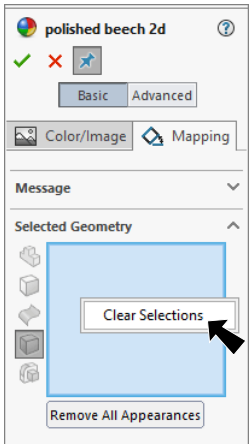

Fig. 35

Step 7. In the Appearances Property Manager set:
under Selected Geometry, **Fig. 36**
click **left Member**, **Fig. 37**
under Mapping controls
click **Planar mapping**
Axis direction **Current View**
Rotation 45
click **Small mapping size**
click OK and click Cancel.

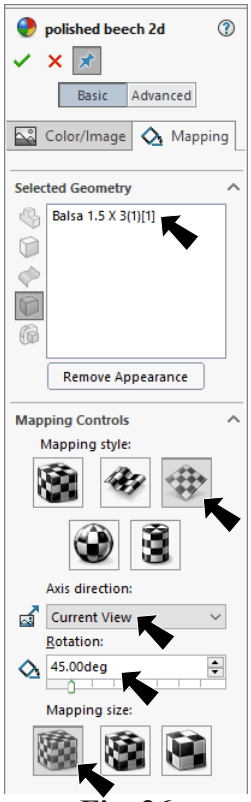

Fig. 36

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

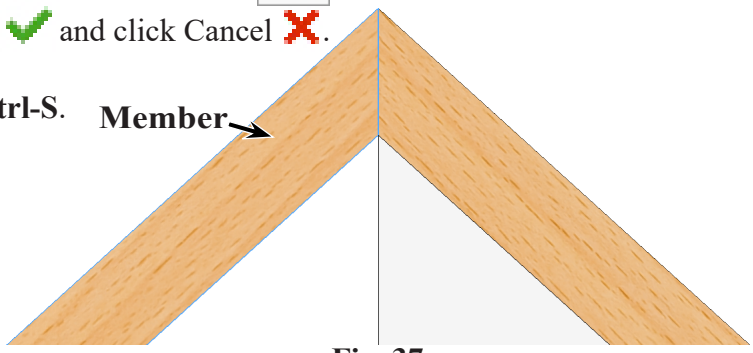

Fig. 37

I. Extruded Cut 1 (Tips).

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

Step 2. Click **bottom face** of sheet metal and click **Sketch** on the context toolbar, **Fig. 38**.

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

Step 4. Sketch line at angle across tip, **Fig. 39**.

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

Step 6. Add the **8** dimensions, **Fig. 40**.

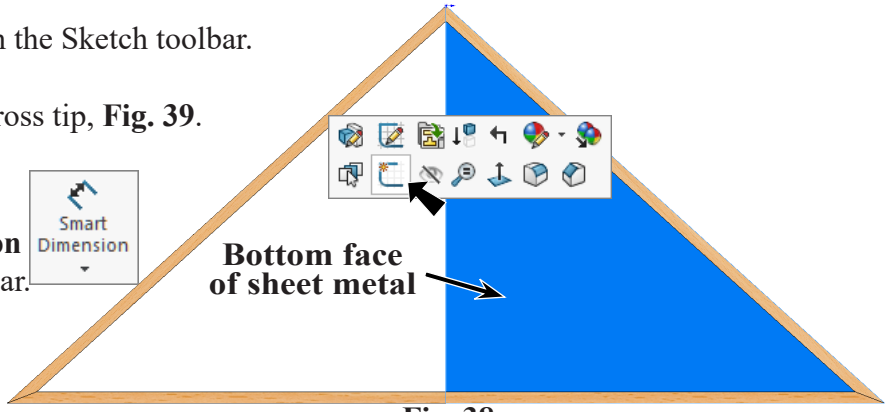

Fig. 38

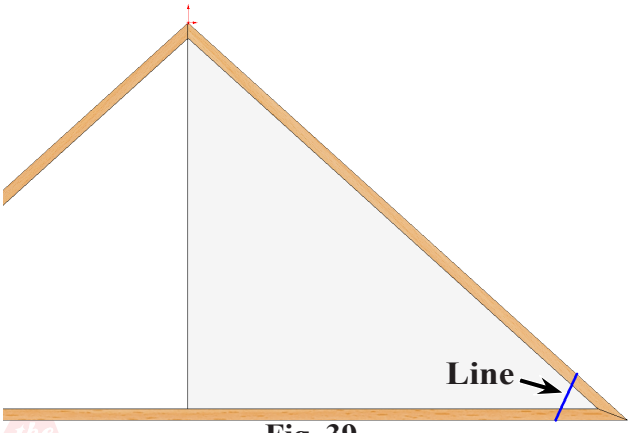

Fig. 39

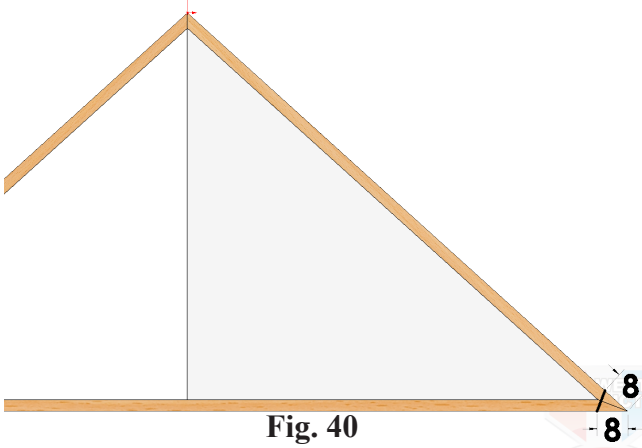

Fig. 40

Step 7. Click **Mirror Entities** on the Sketch toolbar.

Step 8. In the Mirror Property Manager,
under Options, **Fig. 41**
click in Entities to mirror: box
click **Line**, **Fig. 42**
click in **Mirror about:** box
click **vertical edge of sheet metal**
click OK .

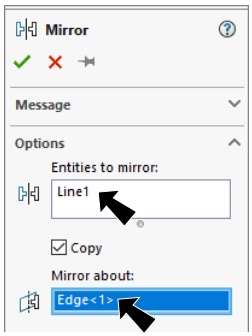

Fig. 41

Step 9. Click **Line** **(L)** on the Sketch toolbar.

Step 10. Sketch **line along bottom edge coincident with endpoint angled lines**, **Fig. 43**.

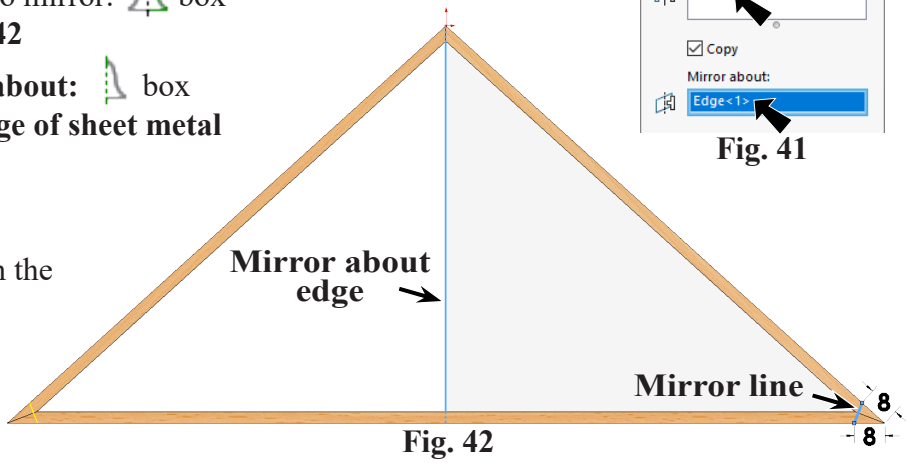

Fig. 42

Step 11. Click **Trimetric** on the Standard Views toolbar.

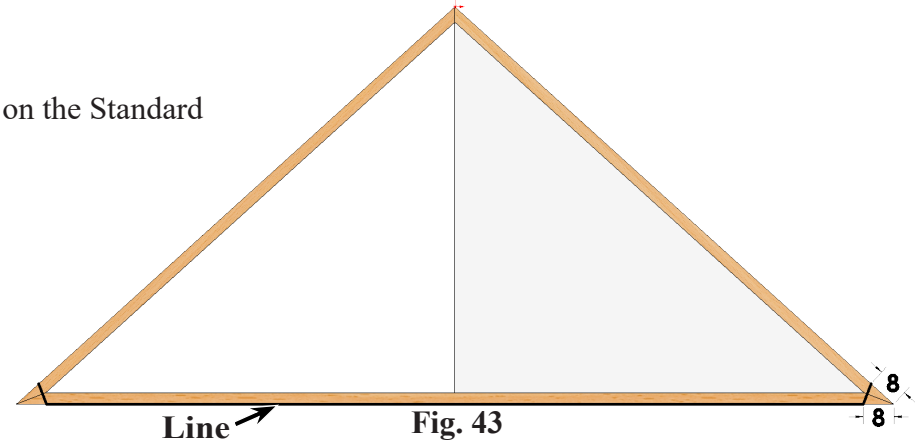

Fig. 43

Step 12. Click **Features** Features on the Command Manager toolbar.

Step 13. Click **Extruded Cut** Extruded Cut on the Features toolbar.

Step 14. In the Cut-Extrude Property Manager set:

under Direction 1, **Fig. 44**

End Condition **Through All**

click **Reverse Direction**

check **Flip side to cut**.

The **Direction arrow should point towards area to be cut away, Fig. 45**.

If arrow is pointing in wrong direction, uncheck **Flip side to cut**

uncheck **Direction 2**

click OK .

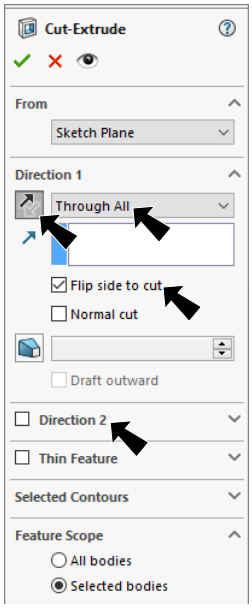

Fig. 44

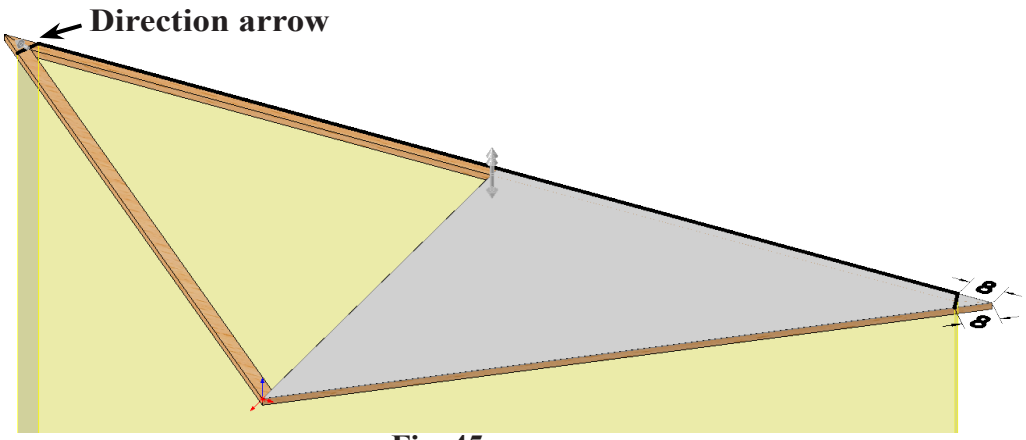

Fig. 45

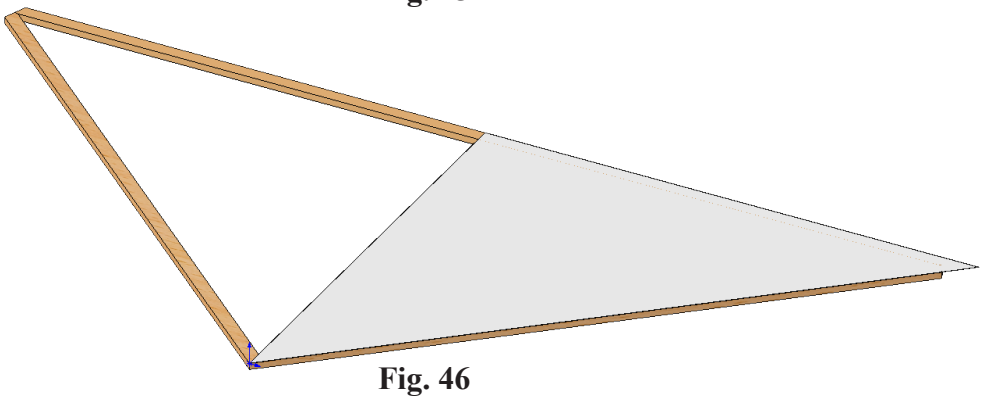

Fig. 46

J. Sketched Bends 1.

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

Step 2. Click **bottom face** of sheet metal and click **Sketch** on the context toolbar, **Fig. 47**.

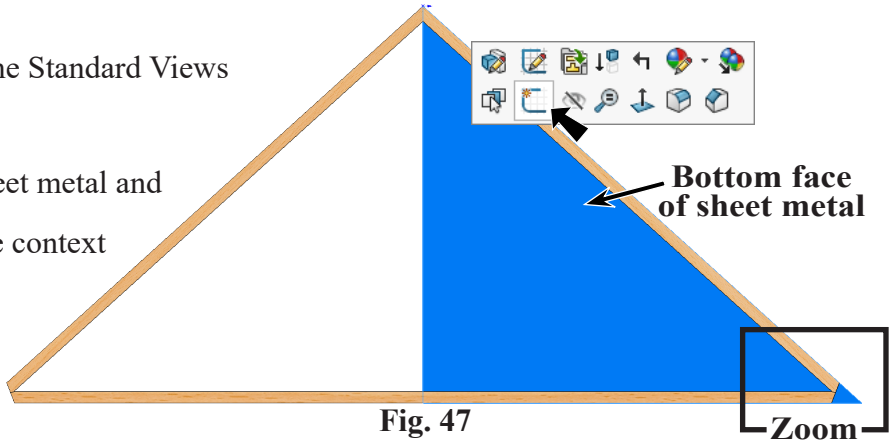

Fig. 47

Step 3. Zoom in around **right tip of H-Stab**, **Fig. 47**. To zoom, place the cursor over the right tip of H-Stab area and spin the wheel on mouse back. While spinning the wheel keep cursor on the area.

Step 4. Click off of face to unselect face.

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

Step 6. In the Convert Entities Property Manager:
click **end edge of cut Member**, **Fig. 49**
click OK .

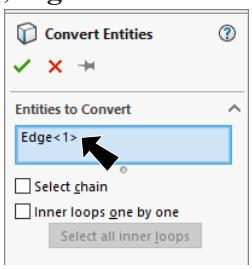

Fig. 48

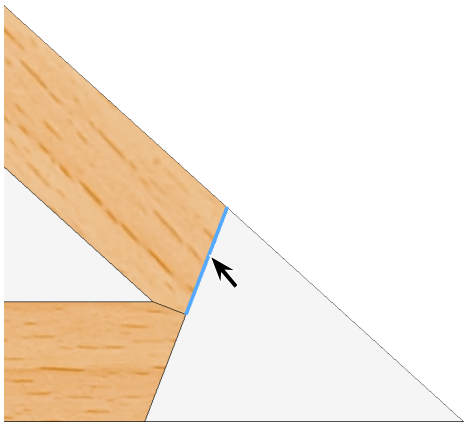
Fig. 49

Step 7. Click **Offset Entities** on the Sketch toolbar.

Step 8. In the Offset Entities Property Manager set:
under Parameters, **Fig. 50**
Distance **1.535**
check **Reverse**
click **converted edge line**, **Fig. 51**.
The yellow offset should on right side of original line, **Fig. 52**. If it is not, uncheck Reverse.
Click **Keep Visible** and OK , **Fig. 51**.

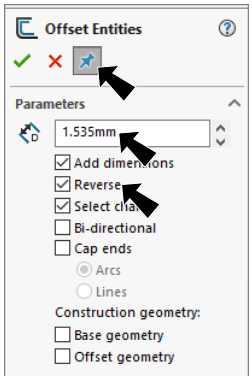

Fig. 50

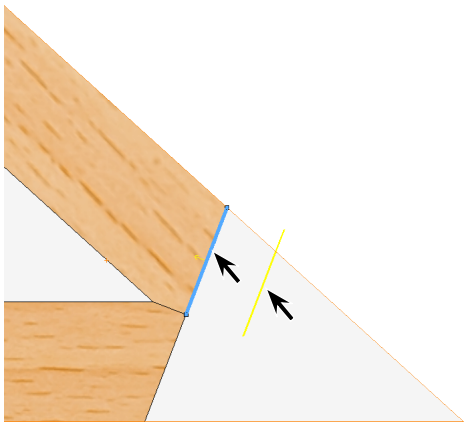
Fig. 51

Step 9. In the Offset Entities Property Manager set:
under Parameters, **Fig. 52**

Distance 3.417
click **offset line**, **Fig. 53**
click OK **twice**.

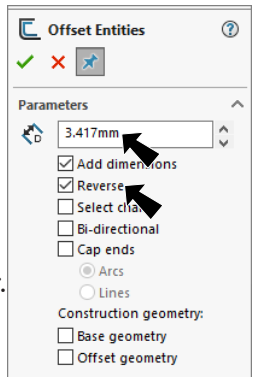

Fig. 52

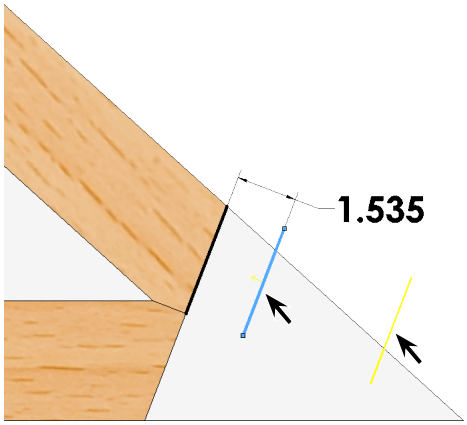

Fig. 53

Step 10. Click **Sheet Metal** Sheet Metal on the Command Manager toolbar.

Step 11. Click **Sketched Bend** Sketched Bend on the Sheet Metal toolbar.

Step 12. In the Sketched Bend Property Manager set:
under Bend Parameters, **Fig. 54**

in the **Fixed Face** box
click **face of sheet metal inboard of bend lines**, **Fig. 55**

Bend position:

Material Outside
Bend Angle 90

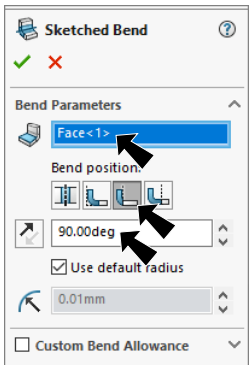

Fig. 54

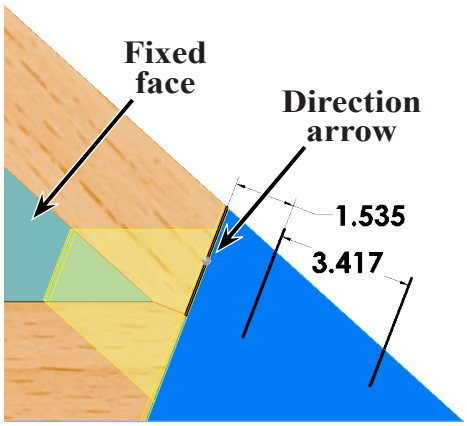

Fig. 55

The Direction arrow should point up.
If arrow is pointing in wrong direction, click
Reverse Direction
Click OK .

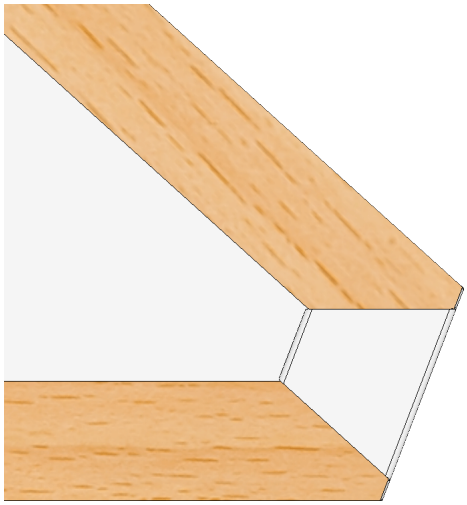
Fig. 56

Step 13. Save. Use **Ctrl-S**.

K. Sketched Bend 2.

Step 1. Rotate view to slight to view **face of bend on inside, Fig. 57**. Hold down middle mouse button and drag.

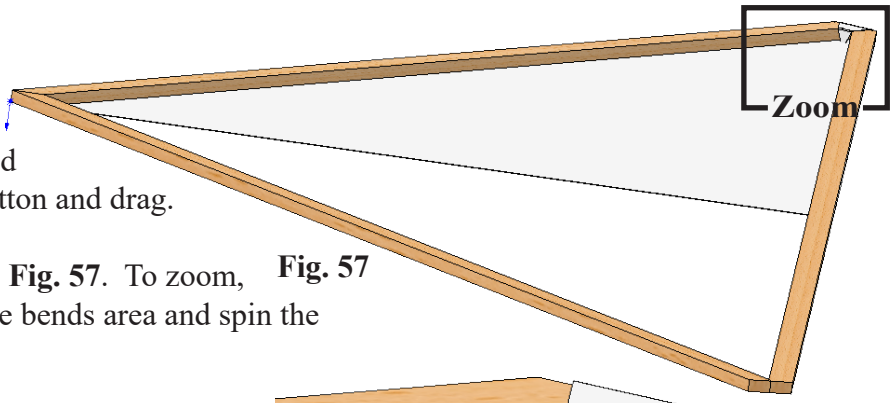

Fig. 57

Step 2. Zoom in around **bends**, **Fig. 57**. To zoom, place the cursor over the bends area and spin the wheel on mouse back.

Step 3. Click **face inside** of sheet metal and click **Sketch** on the context toolbar, **Fig. 58**.

Step 4. Click off of face to unselect face.

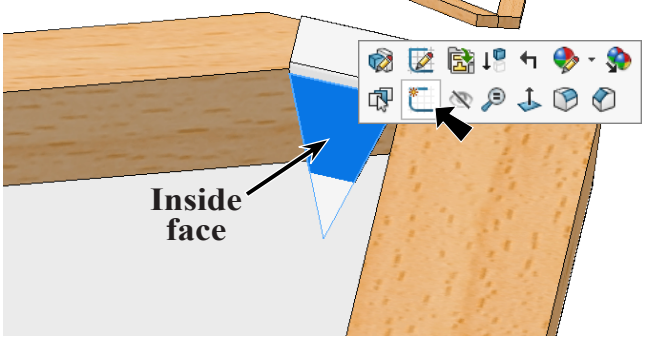

Fig. 58

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

Step 6. In the Convert Entities Property Manager:
under Entities to Convert, **Fig. 59**
click **bottom edge on left Member**, **Fig. 60**
click OK .

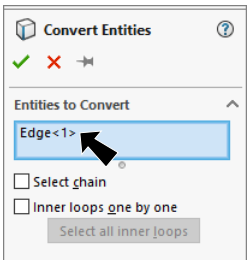

Fig. 59

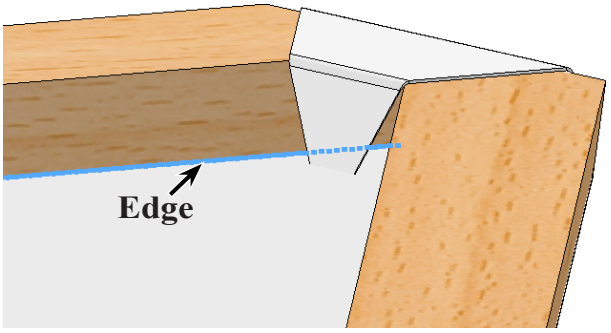

Fig. 60

Step 7. Click **Sketched Bend** Sketched Bend on the Sheet Metal toolbar.

Step 8. In the Sketched Bend Property Manager:
under Bend Parameters, **Fig. 61**
in the **Fixed Face** box,
click **face of bend on inside**, **Fig 62.**
Bend position: **Material Inside**
Bend Angle 90
click OK .

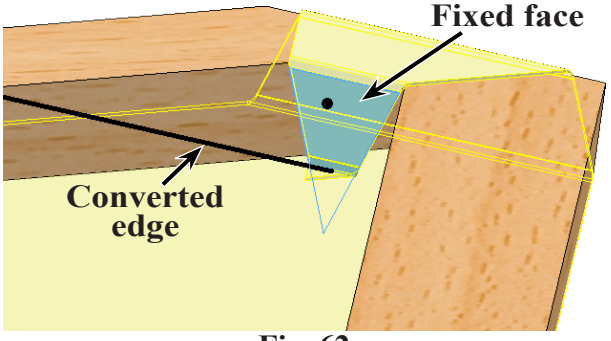

Fig. 62

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

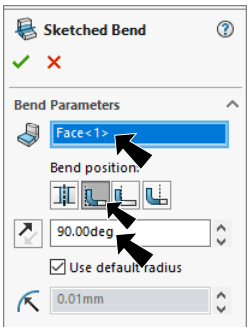

Fig. 61

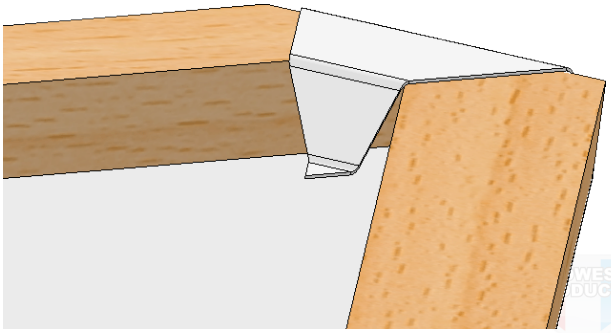
Fig. 63

L. Mirror Sheet Metal.

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

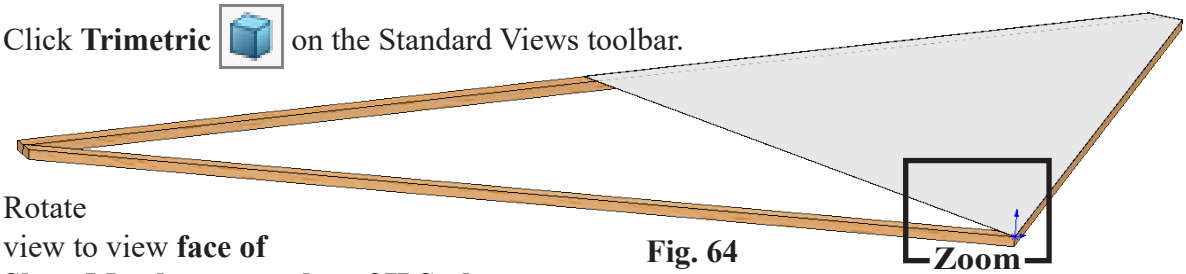

Fig. 64

Step 2. Rotate view to view **face of Sheet Metal on root edge of H Stab, Fig. 64**. Hold down middle mouse button (wheel) and drag.

Step 3. Zoom in on **face of sheet metal at root edge and leading edge, Fig. 64**.

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

Step 5. Click **Mirror** Mirror on the Features toolbar.

Step 6. In the Mirror Property Manager set:
- under Mirror Face/Plane, **Fig. 65**
  - click **root face of sheet metal, Fig. 66**
  - **be sure to select thin face of sheet metal and not an edge**
- expand Bodies to Mirror
  - click **sheet metal**
- under Options
  - check **Merge solids**
- click OK ✔.

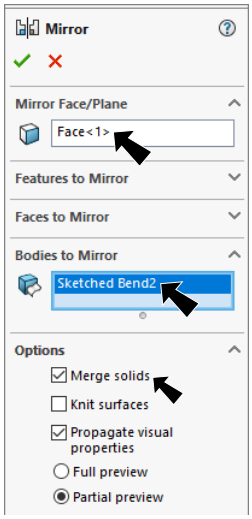

Fig. 65

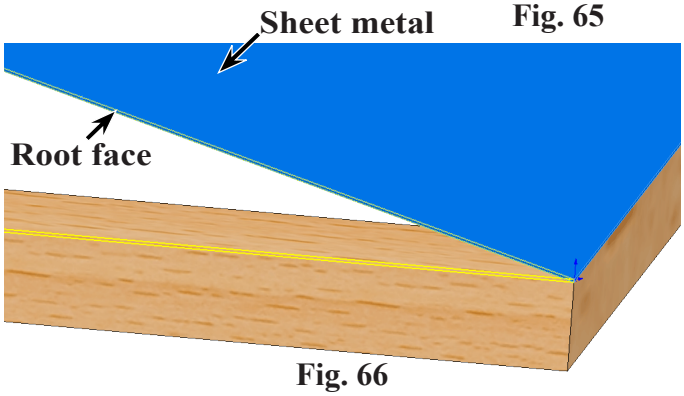

Fig. 66

Step 7. Click **Trimetric** on the Standard Views toolbar.

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

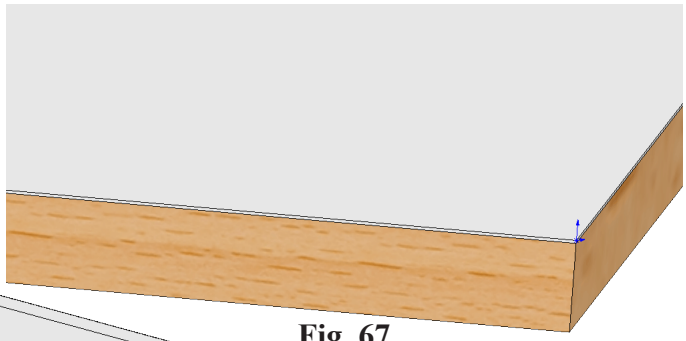

Fig. 67

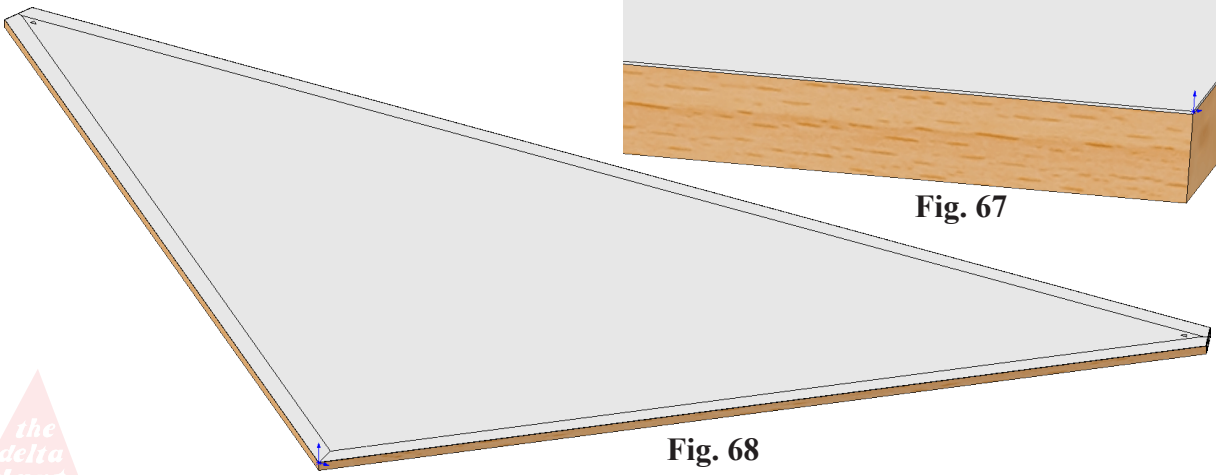

Fig. 68