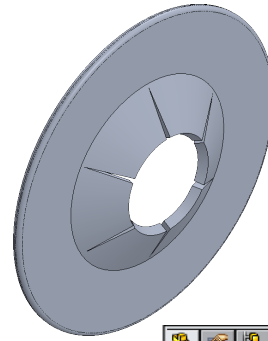




# CO2 Shell Car Axle Retainer



## A. Revolve Thin Feature.

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

Step 2. Click **Front Plane**  in the Feature Manager and click **Sketch**  from the Context toolbar, **Fig. 1**.

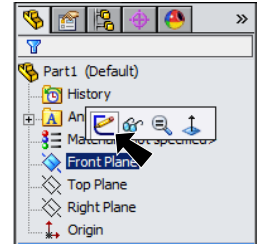

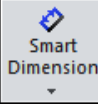




Fig. 1


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

Step 4. Draw a line starting directly above the Origin  but do not draw the line to the Origin, **Fig. 2**. Draw a second line from bottom endpoint of first line at angle to the right. Do not bring the angle line down to Origin.

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

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

Step 7. Click **Centerline**  in the **Line flyout**  on the Sketch toolbar.

Step 8. Sketch a **horizontal centerline** from the Origin , **Fig. 4**.

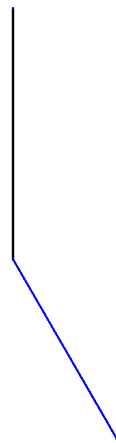


Fig. 2

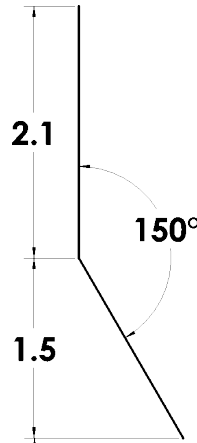


Fig. 3

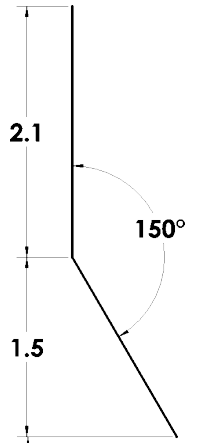


Fig. 4

Step 9. Click **Features**  on the Command Manager toolbar.

Step 10. Click **Revolved Boss/Base**  on the Features toolbar.

Step 11. Click **No** to automatically close sketch, **Fig. 5**.

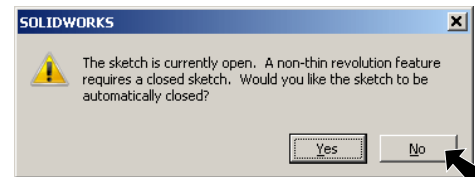


Fig. 5

Step 12. Click **Front**  on the Standard Views toolbar. (Ctrl-1)

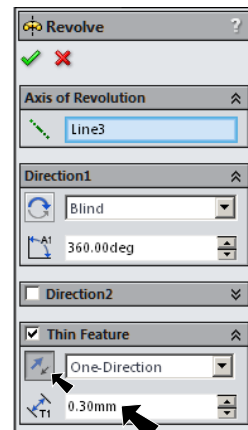
Step 13. In the Revolve Property Manger set:  
under Thin Feature, **Fig. 6**

click **Reverse direction** 

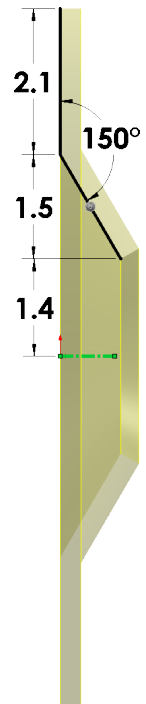
Thin feature should be to **right of sketch**, if in opposite direction, click Reverse direction, **Fig. 7**

**Direction 1 Thickness**  T1 .3

click OK .



**Fig. 6**





**Fig. 7**

## B. Save as "AXLE RETAINER".



Step 1. Click File Menu > Save As.

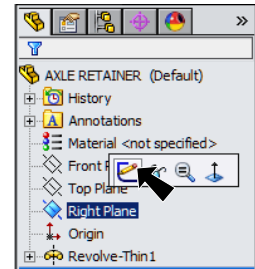
Step 2. Key-in **AXLE RETAINER** for the filename and press ENTER.

## C. Cut.


Step 1. Click **Right Plane**  in the Feature Manager and click **Sketch**  on the Context toolbar, **Fig. 8**.

Step 2. Click **Left**  on the Standard Views toolbar. (Ctrl-3)

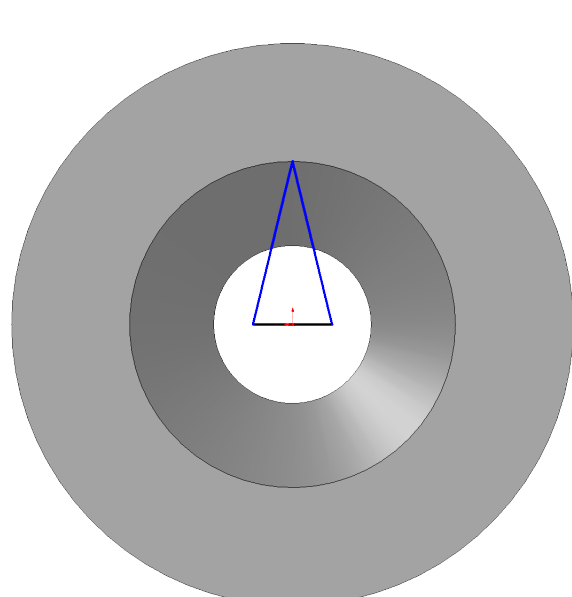
Step 3. Click **Midpoint Line**  in the **Line flyout**  on the Sketch toolbar.





**Fig. 8**

Step 4. Draw a horizontal line out from the Origin  and continue line up to edge of body and back to other endpoint of horizontal line, **Fig. 9**.

Step 5. **Right click graphics area and click Select** from menu to unselect Line tool.

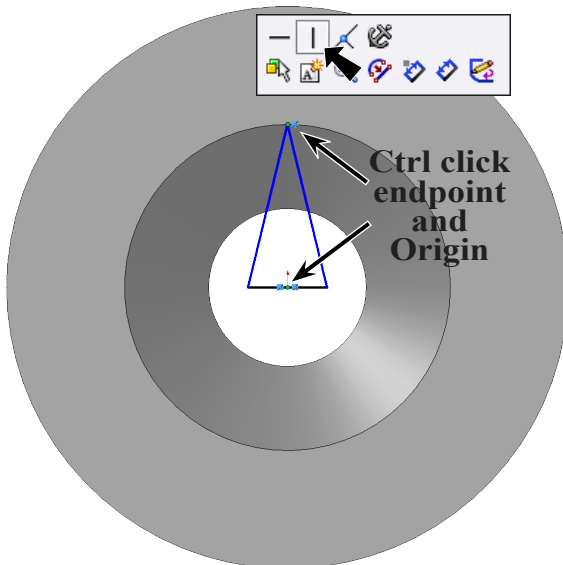


**Fig. 9**

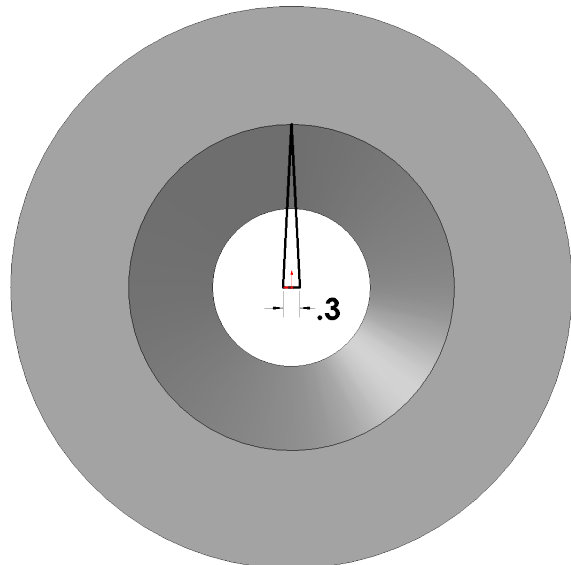
Step 6. **Ctrl click top endpoint of line and Origin**  to select both. Release Ctrl key and click **Make Vertical**  on the Context toolbar, **Fig. 10**.

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

Step 8. Dimension horizontal line **.3**, **Fig. 11**.



**Fig. 10**



**Fig. 11**

Step 9. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

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

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

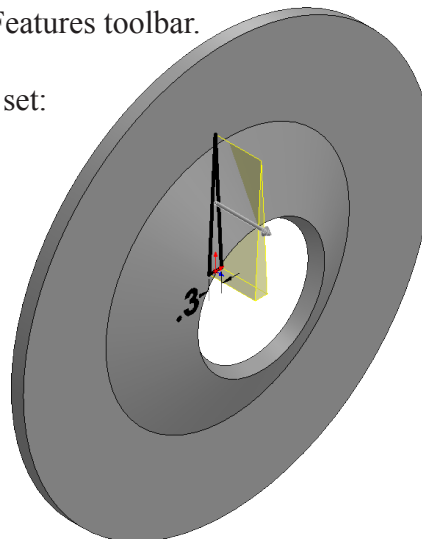
Step 12. In the Cut-Extrude Property Manager set:  
under Direction 1, **Fig. 12**

End Condition **Through All**

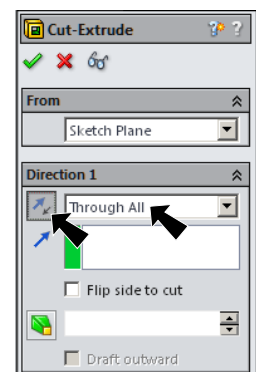
click **Reverse Direction** 

**Direction arrow** should point **to right**, **Fig. 13**

click OK 

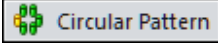
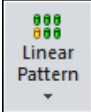


**Fig. 13**



**Fig. 12**

## D. Circular Pattern.

Step 1. Click **Circular Pattern**  in the **Linear Pattern** flyout  on the Features toolbar.

Step 2. In the Circular Pattern Property Manager set:  
under Features and Faces, **Fig. 14**

click **Cut-Extrude1** in graphics area, **Fig. 15**  
under Parameters

click in **Pattern Axes**  box  
click **cylindrical face Retainer**

**Number of Instances**  **6**  
check **Equal spacing**

click OK .

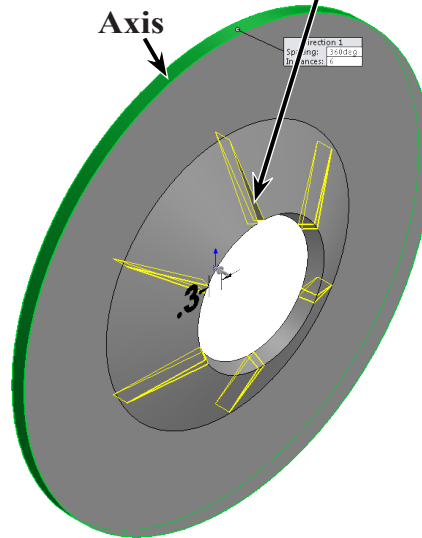


Fig. 15

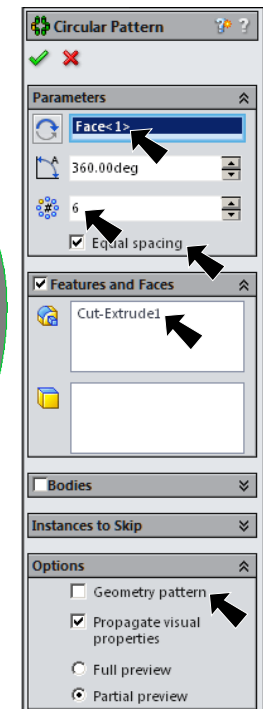




Fig. 14

## E. Fillet.

Step 1. Click **Fillet**  on the Features toolbar.

Step 2. In the Fillet Property Manager:  
select **FilletXpert**, **Fig. 16**

**Radius**  **.13**  
click **outside cylindrical face**, **Fig. 17**  
click OK .

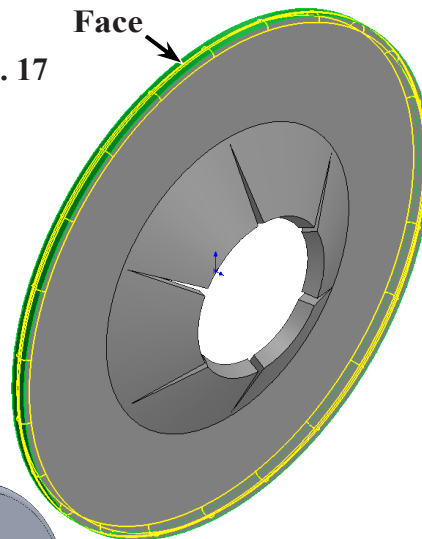


Fig. 17

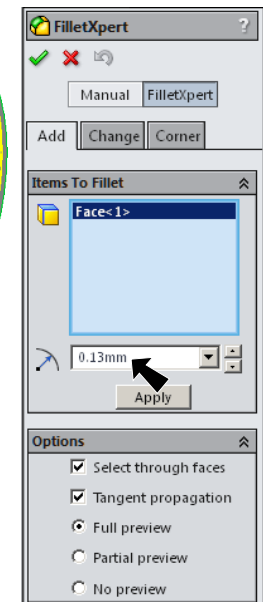



Fig. 16

## F. Material Aluminum.

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

Step 2. **Expand Aluminum Alloys** in the material tree and select **1060 Alloy**.  
Click **Apply** and **Close**.

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

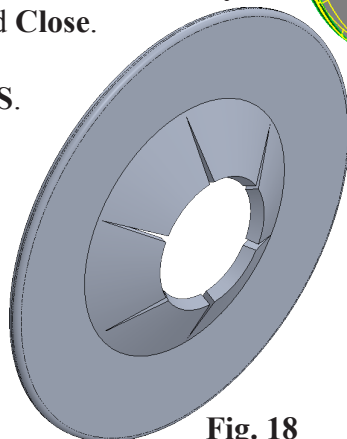


Fig. 18