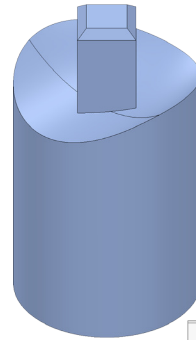
Chapter 15

HAWT

Yaw Ring



A. Extrude1.

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**.

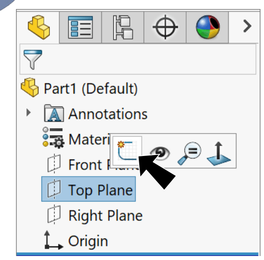


Fig. 1

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

Step 4. Sketch circle at Origin , **Fig. 2**.

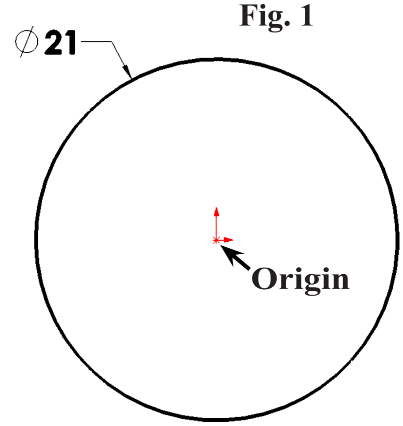


Fig. 2

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

Step 6. Dimension **diameter 21**, **Fig. 2**.

Step 7. Click **Features** on the Command Manager toolbar.

Step 8. Click **Extruded Boss/Base** on the Features toolbar.

Step 9. In the Boss-Extrude Property Manager set:
under Direction 1, **Fig. 3**
End Condition **Blind**
Depth 32
Reverse Direction (down)
click OK .

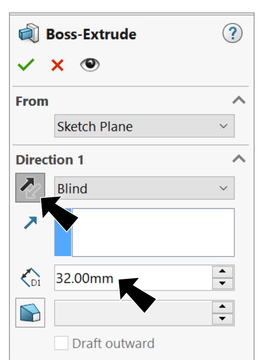


Fig. 3

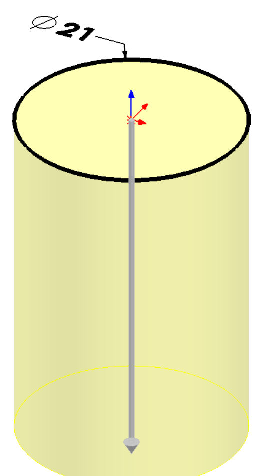


Fig. 4

B. Save as "YAW RING".

Step 1. Click File Menu > Save As.

Step 2. Key-in **YAW RING** for the filename and press ENTER.

C. Cut Revolve.

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

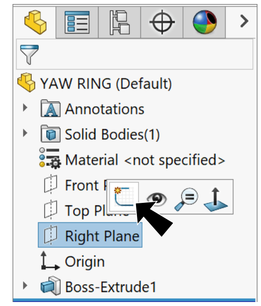


Fig. 5

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

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

Step 4. **Starting at midpoint of bottom edge of part sketch the 4 lines, Fig. 6.**

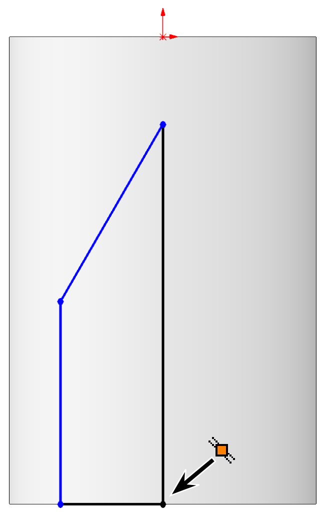


Fig. 6

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

Step 6. Add dimensions, **Fig. 7**.

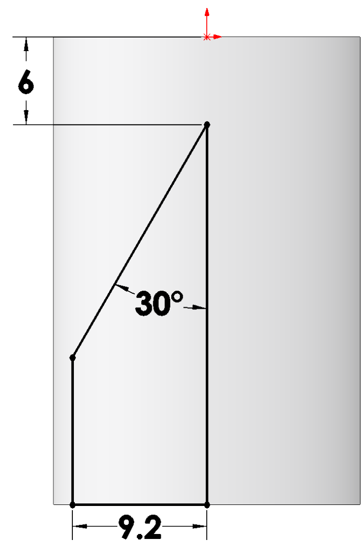


Fig. 7

Step 7. Rotate view slightly to **view bottom**, **Fig. 9**. Use **Up Arrow key** **a couple times**.

Step 8. Click **Features** on the Command Manager toolbar.

Step 9. Click **Revolved Cut** on the Features toolbar.

Step 10. In the Cut-Revolve Property Manger set:

under Axis of Revolution
click **vertical line at midpoint**, **Fig. 9**
click OK .

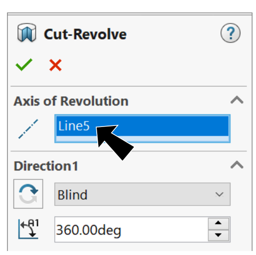


Fig. 8

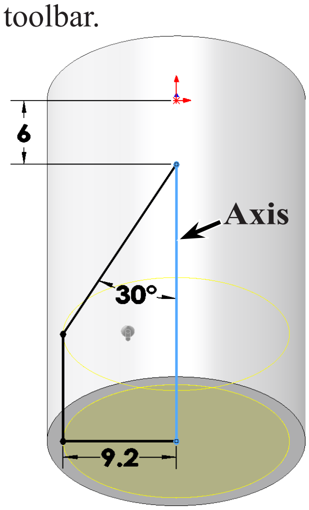


Fig. 9

Fig. 10

D. Appearance: Blue Plastic.

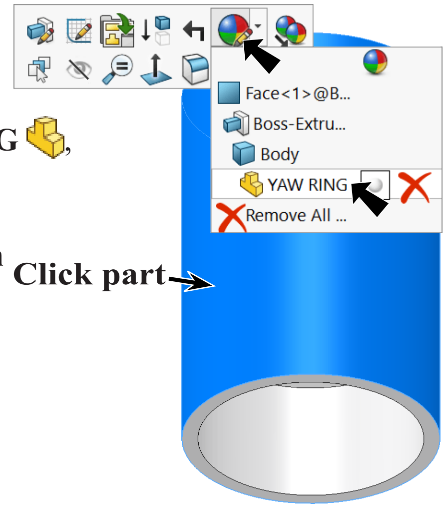


Fig. 11

Step 1. Click the Yaw Ring to select part, click **Appearances Callout** on the context toolbar and click **YAW RING**, **Fig. 11**.

Step 2. In the Appearances Task pane, expand **Plastic**, click **High Gloss** and in the lower pane select **blue high gloss plastic**, **Fig. 12**.

Step 3. In the Appearances Property Manager set:
under Color, **Fig. 13**
set **RGB values**
R 144
G 166
B 209
click OK .

Step 4. Save **(Ctrl-S)**.

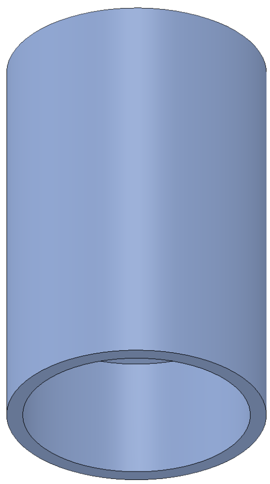


Fig. 14

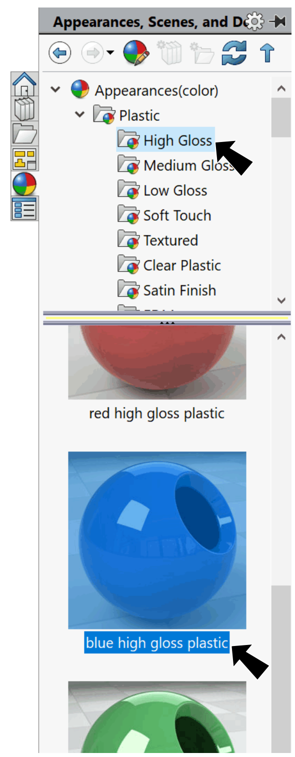


Fig. 12

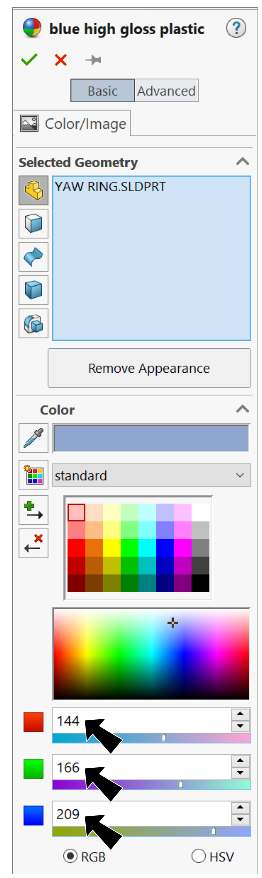


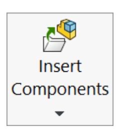
Fig. 13

E. Open Turbine Assembly and Insert Yaw Ring.

Step 1. Open your **Turbine Assembly** file.

Step 2. **Isolate Bottom Nacelle**, **Fig. 15**. To Isolate, **right click Bottom Nacelle component** in the graphics area and click **Isolate** from menu.

Step 2. Click **Insert Components**



on the Assembly toolbar.

Step 3. Select your **YAW RING** file and place your file just below the Bottom Nacelle, **Fig. 15**.

Isolate Bottom Nacelle

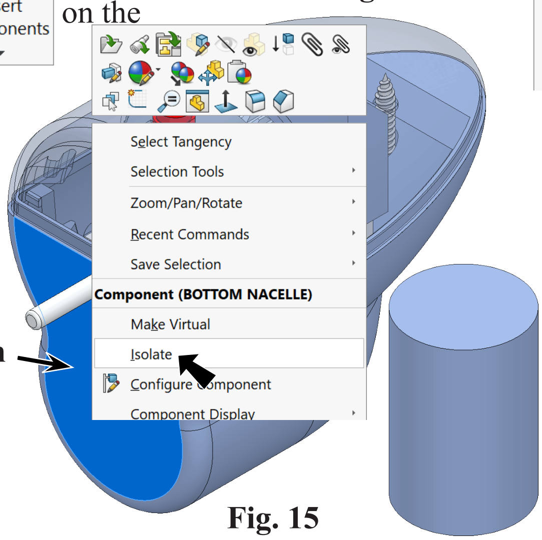


Fig. 15

F. Mate: Yaw Ring.

Step 1. Click **Right Plane** in the Feature Manager and **Mate** on the context toolbar, **Fig. 16**.

Step 2. Expand the flyout Feature Manager design tree, expand **Yaw Ring** and click **Right Plane**, **Fig. 17**.

Step 3. Click Add/Finish Mate to add a **Coincident** mate.

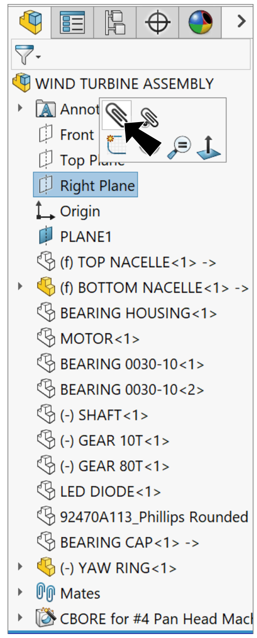


Fig. 16

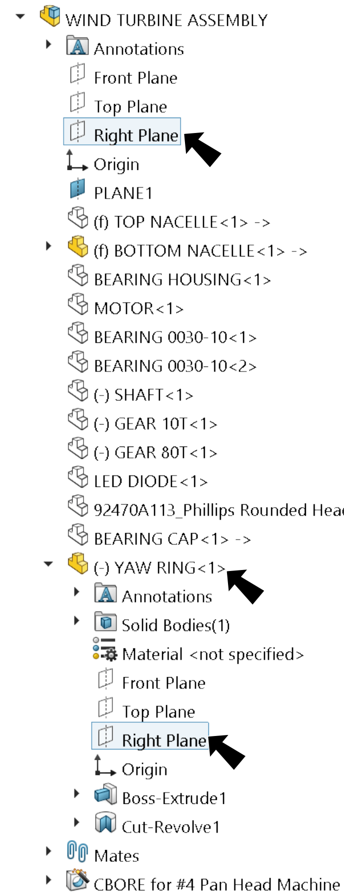


Fig. 17

Right to Right

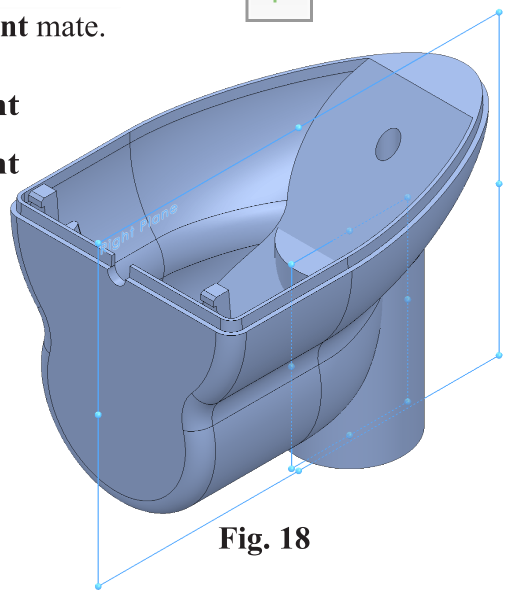


Fig. 18

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

Step 5. In the flyout Feature Manager design tree, click **Front Plane** and expand **Yaw Ring** and click **Front Plane**, **Fig. 19**.

Fig. 19

Step 6. Click **Distance** in Mate pop-up, **Fig. 20**. Set **distance 26** and press ENTER. The Ring should positioned under the Nacelle, **Fig. 21**. If positioned in opposite direction, click **Flip Dimension** in the Mate pop-up. Click Add/Finish Mate to add Distance mate.

Fig. 20

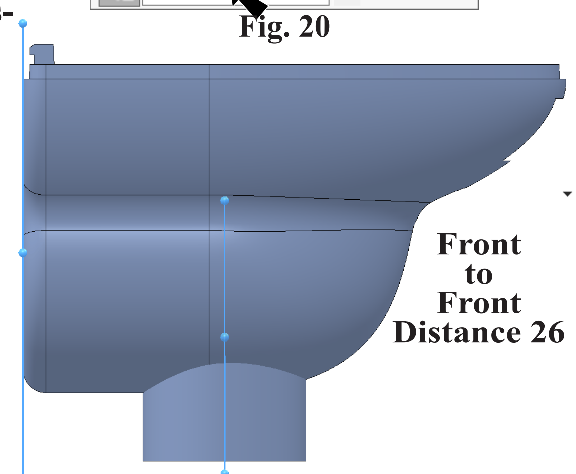


Fig. 21

Step 7. In the flyout Feature Manager design tree, click **Top Plane** and expand **Yaw Ring** and click **Top Plane**, **Fig. 22**.

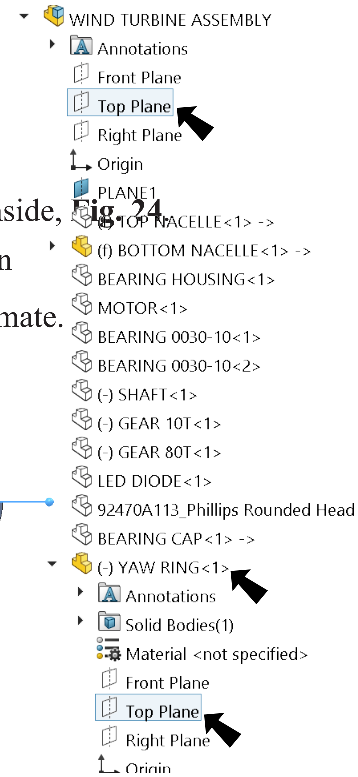


Fig. 22

Step 8. Click **Distance** in Mate pop-up, **Fig. 23**. Set **distance 34** and press ENTER. The top of the Ring should positioned just inside, **Fig. 24**. If positioned in opposite direction, click **Flip Dimension** in the Mate pop-up. Click Add/Finish Mate to add Distance mate.

Step 9. Save **(Ctrl-S)**.

Fig. 23

Top to Top Distance 34

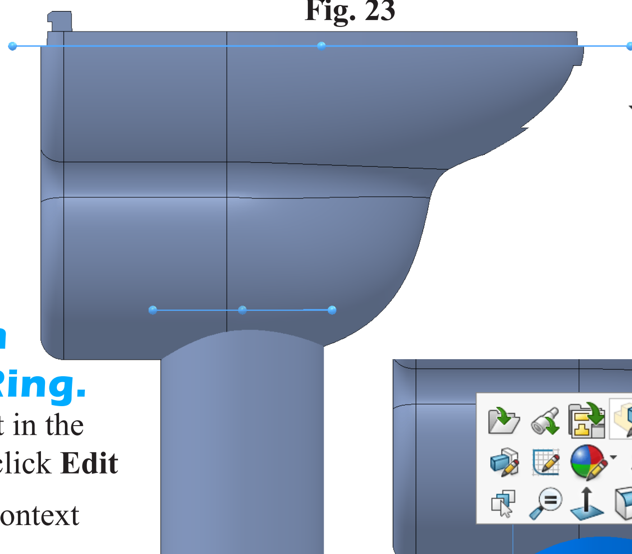


Fig. 24

G. Indent Bottom Nacelle into Ring.

Step 1. Click **Ring** part in the graphics area and click **Edit Part** on the context toolbar, **Fig. 25**.

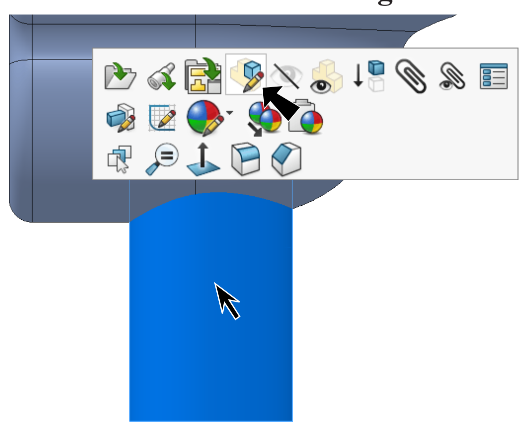


Fig. 25

Step 2. Click Insert Menu > Features > Indent.

Step 3. In the Indent Property Manager:
under Selections, **Fig. 26**
Target body:
click **Ring**, **Fig. 27**
Tool body region:
click **Bottom Nacelle**
check **Cut**
under Parameters
Clearance 0
click OK .

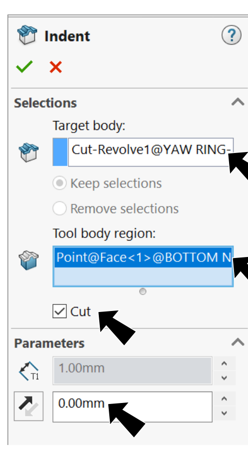


Fig. 26

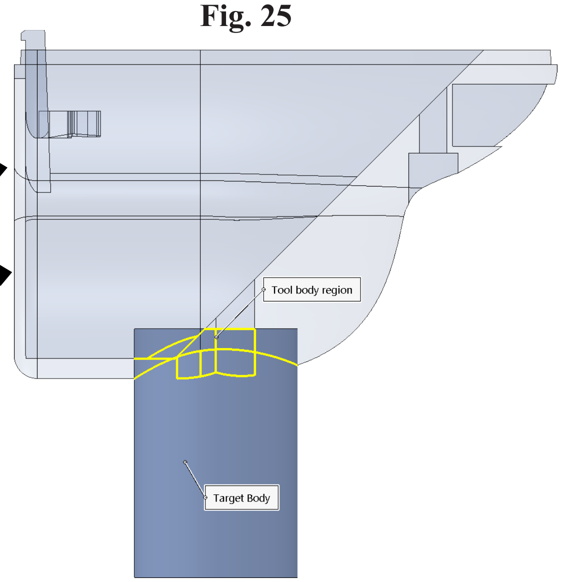


Fig. 27

H. Delete Faces.

Step 1. **Hide BOTTOM NACELLE**, **Fig. 28**. To hide, move cursor over component in graphics area and press **Tab** key to hide.

Step 2. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 3. Click **Surfaces** Surfaces on the Command Manager toolbar.

Step 4. Click **Delete Face** Delete Face on the Surfaces toolbar.

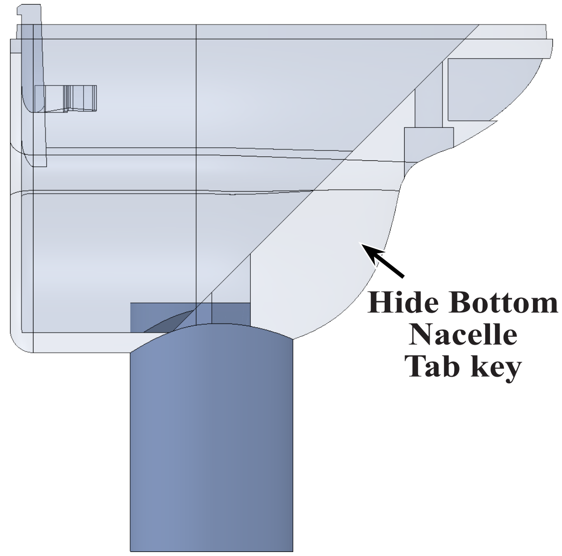


Fig. 28

Step 5. In the Delete Face Property Manager set:

under Selections, **Fig. 29**

click the **top face above the curved surface**, **Fig. 30**

click **All surrounding** **6 Faces** on the Delete Face pop-up

Rotate view and **click 3 other faces** to select all faces above the curved face (total of 10 faces)

under Options

Delete and Patch

click OK .

Step 6. Save (**Ctrl-S**).

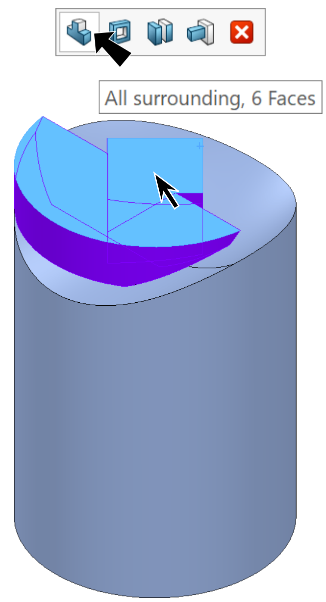


Fig. 30

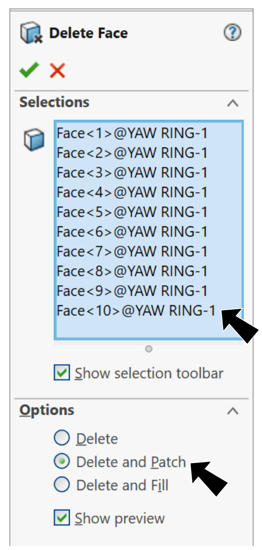


Fig. 29

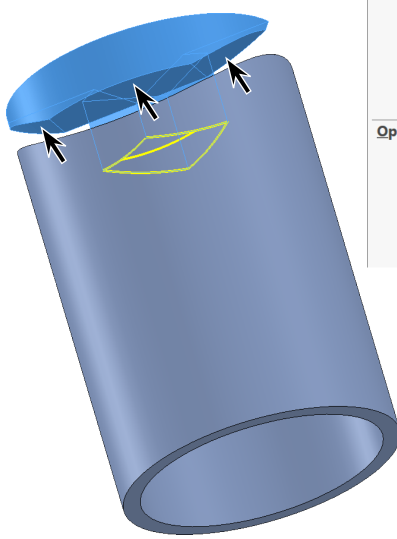


Fig. 31

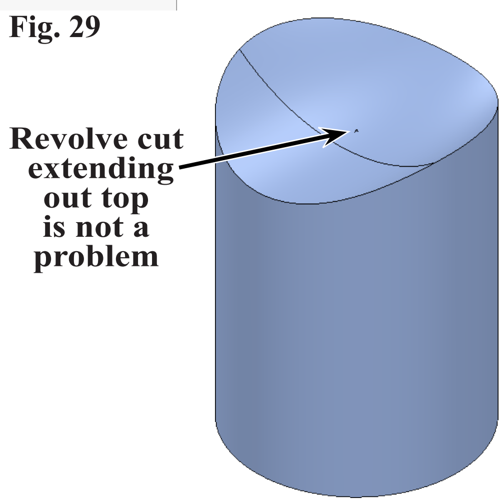


Fig. 32

I. Extrude Post.

Step 1. Click **Top Plane** **of Yaw Ring part** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 33**.

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

Step 3. Click **Polygon** on the Sketch toolbar.

Step 4. In Polygon Property Manager set:
under Parameter, **Fig. 34**
Number of Sides 4

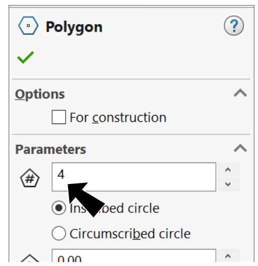


Fig. 34

Step 5. Sketch **polygon** at the Origin , **Fig. 35**.

Step 6. **Unselect Polygon tool**. To unselect, **right click graphics area and click Select** from menu.

Step 7. Click **two opposite vertices of polygon** and click **Make Vertical** on the context toolbar, **Fig. 36**.

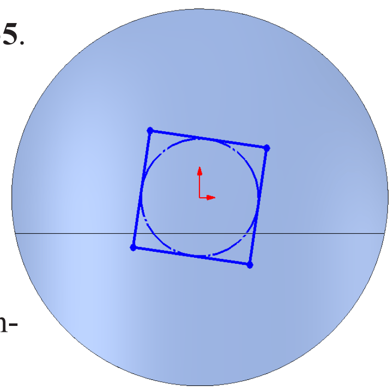


Fig. 35

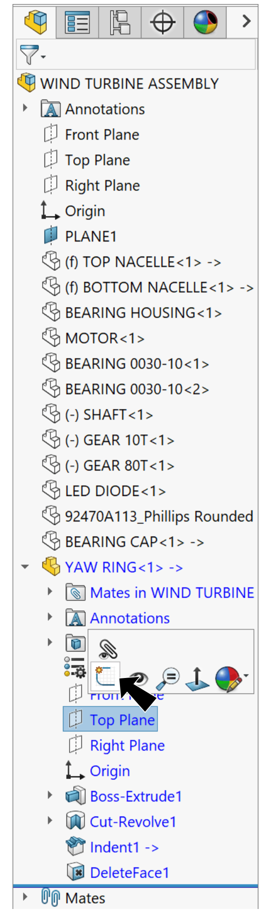


Fig. 33

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

Step 9. Dimension **10 across two opposite vertices**, **Fig. 37**.

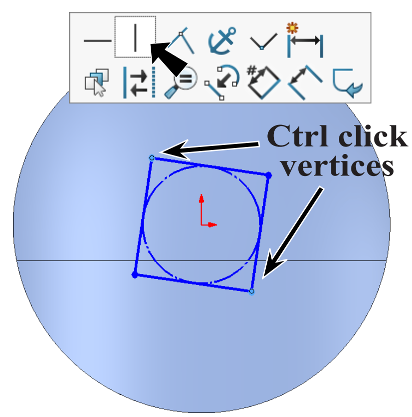


Fig. 36

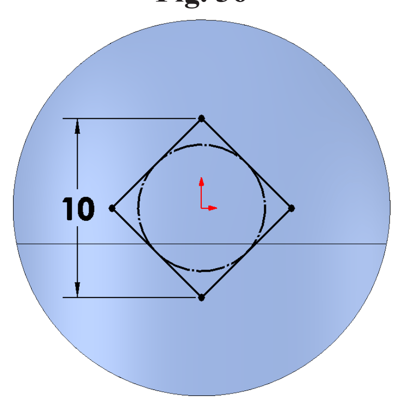


Fig. 37

Step 10. Click **Offset Entities** (Offset Entities) on the Sketch toolbar.

Step 11. In the Offset Entities Property Manager set:

under Parameters, **Fig. 38**

Distance **.25 (clearance of post hole in Bottom Nacelle)**
check **Reverse**
check **Select chain**
uncheck **Bi-directional**

under Construction geometry

check **Base geometry**
click a **segment, Fig. 39**
Yellow offset segments on inside - base geometry (construction) on outside

click OK .

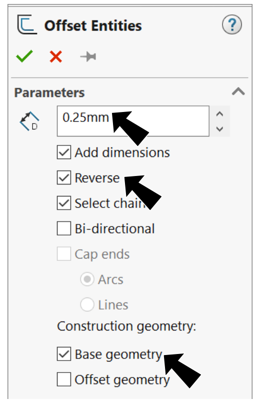


Fig. 38

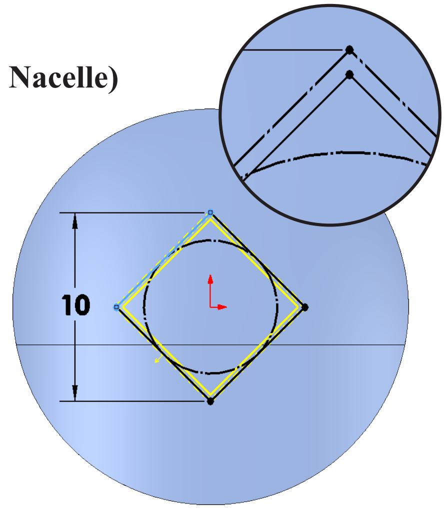


Fig. 39

Step 12. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 13. Click **Features** (Features) on the Command Manager toolbar.

Step 14. Click **Extruded Boss/Base** (Extruded Boss/Base) on the Features toolbar.

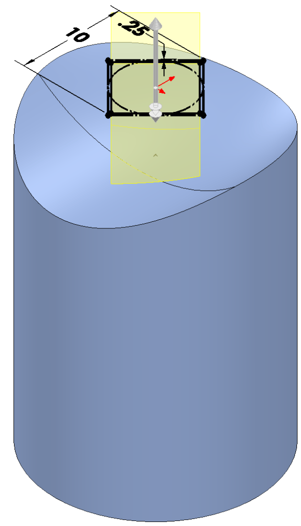


Fig. 41

Step 15. In the Boss-Extrude Property Manager set:

under Direction 1, **Fig. 40**

End Condition **Blind**

Depth **4.5**

under Direction 2

End Condition **Up to Next**

click OK .

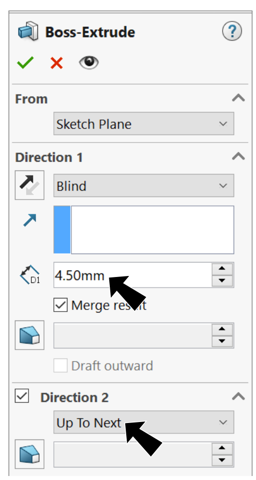


Fig. 40

Step 16. Save (**Ctrl-S**).

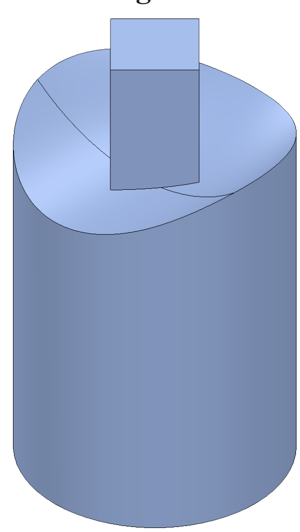


Fig. 42

J. Chamfers.

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

Step 2. In the Chamfer Property Manager set:
under Chamfer Type, **Fig. 43**
select **Angle Distance**
under Chamfer Parameters
Distance **1**
Angle **45º**
under Items To Chamfer
click **top face of post**, **Fig. 44**
click OK .

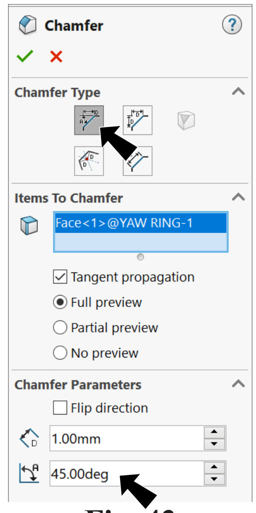


Fig. 43

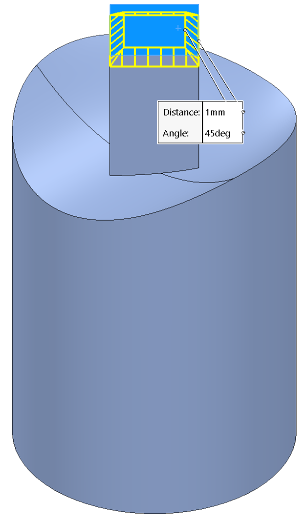


Fig. 44

Step 3. Click **Edit Component** on the Features toolbar to **exit**.

Step 4. Exit Isolate. To Exit, click **Exit Isolate** on the Isolate pop-up toolbar, **Fig. 46**.

Step 5. Save All (**Alt-F L**). File Menu > Save All.

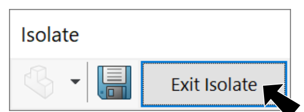


Fig. 46

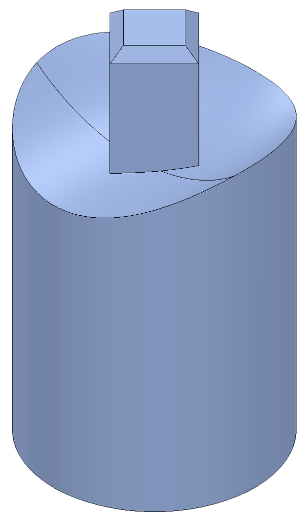


Fig. 45