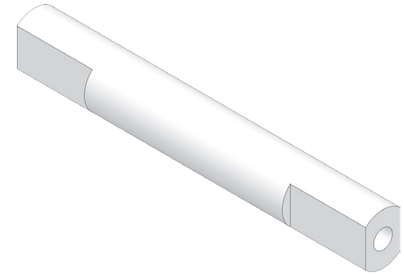
Chapter 16

Cluster Wheel Vehicle
Gearbox Shaft



A. Extrude1.

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

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

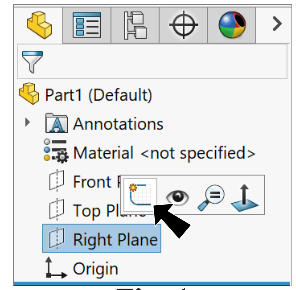


Fig. 1

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

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

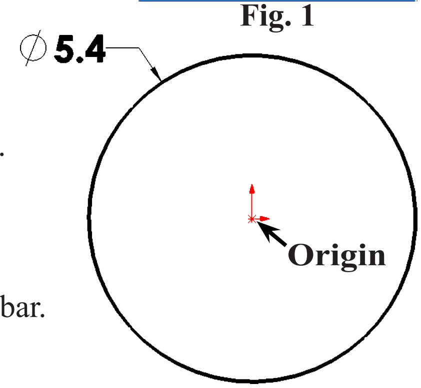


Fig. 2

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

Step 6. Dimension diameter **5.4**, **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 **Mid Plane**
Depth 37
click OK .

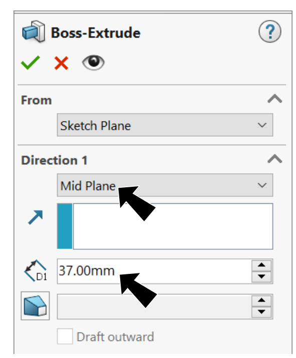


Fig. 3

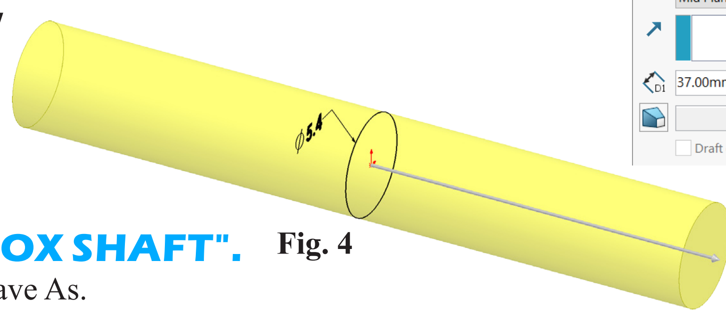


Fig. 4

B. Save as "GEARBOX SHAFT".

Step 1. Click File Menu > Save As.

Step 2. Key-in **GEARBOX SHAFT** for the filename and press ENTER.

C. Cut Extrude1.

Step 1. Click **side face** and click **Sketch** on the context toolbar, **Fig. 5**.

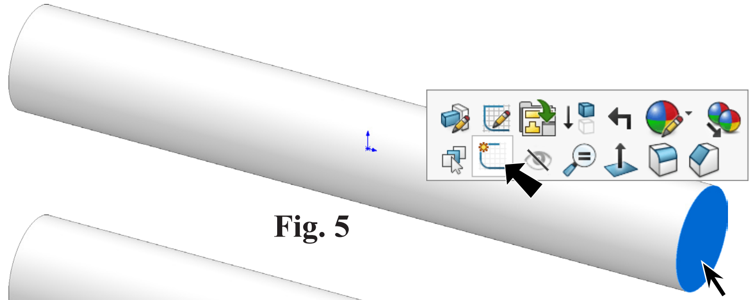


Fig. 5

Step 2. With the face still selected, click **Convert Entities** on the Sketch toolbar, **Fig. 6**.

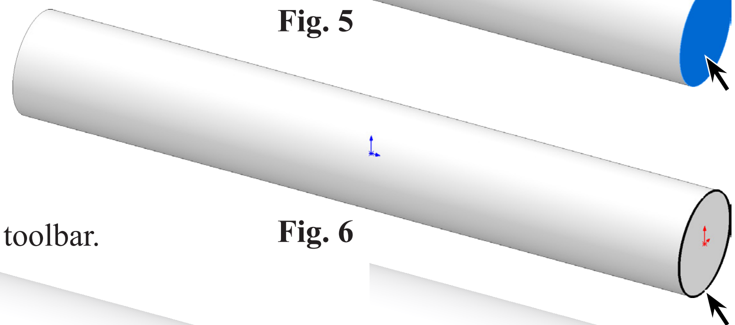


Fig. 6

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

Step 4. Sketch **two vertical lines (chords)** across circle, **Fig. 7**.

Step 5. **Unselect Line tool**. To unselect, right click graphics area and click Select from menu.

Step 6. **Ctrl click both lines** to select both. Release Ctrl key and click **Make Equal** on the context toolbar, **Fig. 8**.

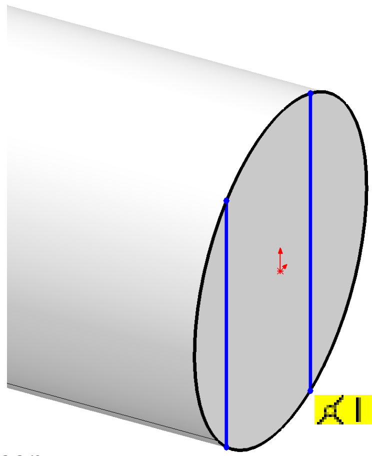


Fig. 7

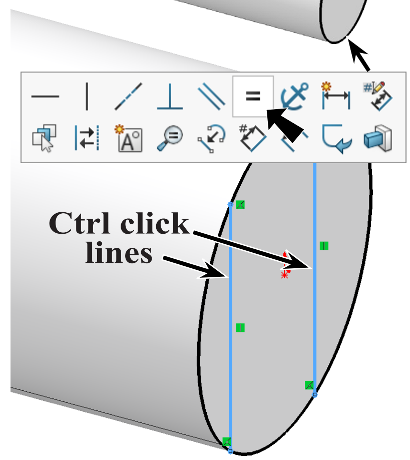
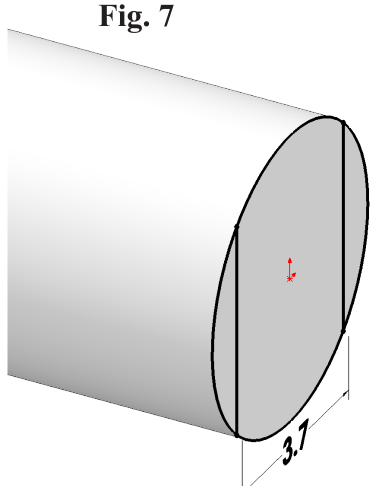


Fig. 8

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

Step 8. Add dimension, **Fig. 9**.

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



Step 10. Click **Extruded Cut** on the Features toolbar.

Fig. 9

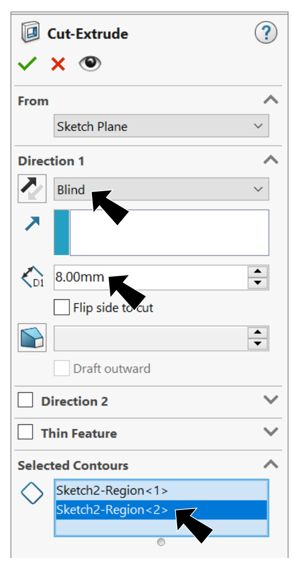


Fig. 10

Step 11. In the Cut-Extrude Property Manager set:

under Direction 1, **Fig. 10**

End Condition **Blind**

Depth 8

under Selected Contours

click **both outside contours**, **Fig. 11**

click OK.

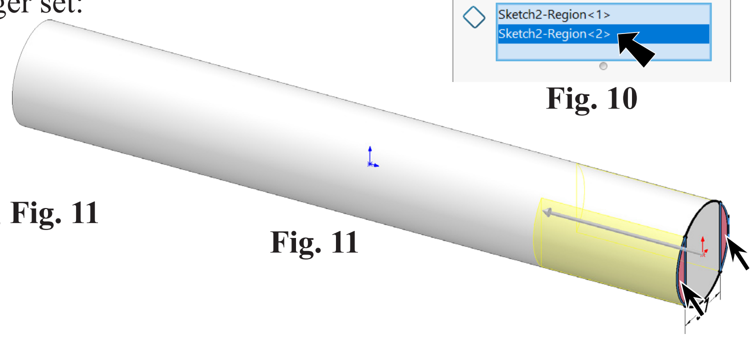


Fig. 11

D. Cut Extrude2.

Step 1. Click **side face** and click **Sketch** on the context toolbar, **Fig. 12**.

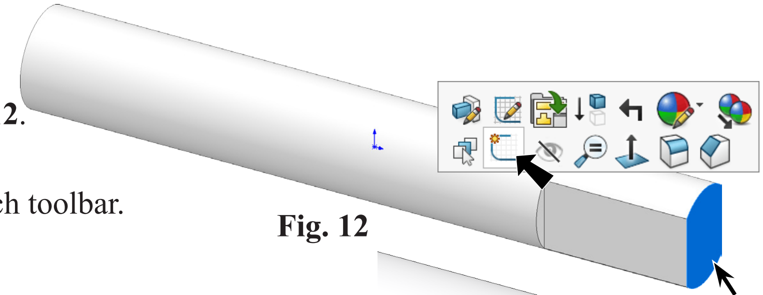


Fig. 12

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

Step 3. Sketch a circle at **Origin** , **Fig. 13**.

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

Step 5. Dimension **diameter 2**, **Fig. 13**.

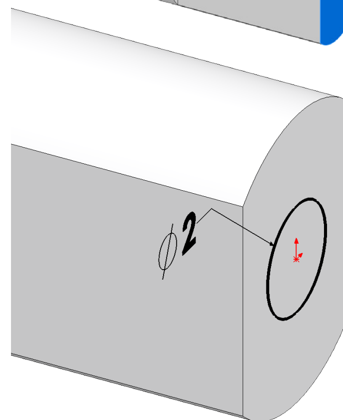


Fig. 13

Step 6. Click **Features** Features on the Command Manager toolbar.

Step 7. Click **Extruded Cut** Extruded Cut on the Features toolbar.

Step 8. In the Cut-Extrude Property Manager set:
under Direction 1, **Fig. 14**

Depth 6

click OK .

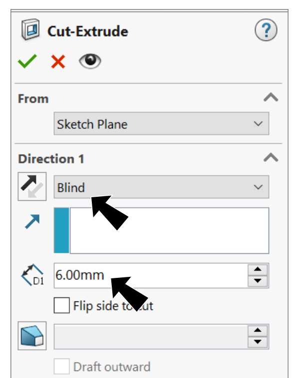


Fig. 14

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

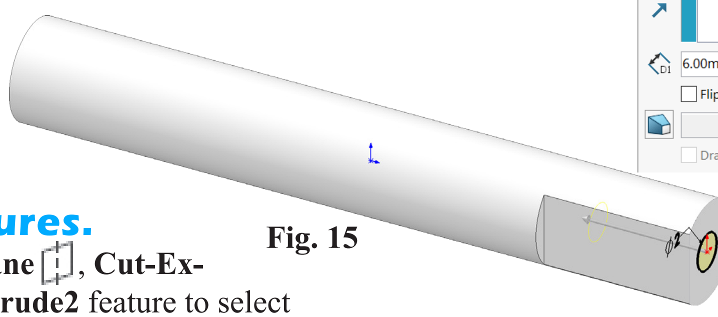


Fig. 15

E. Mirror Cut Features.

Step 1. **Ctrl click Right Plane** , **Cut-Extrude1** and **Cut-Extrude2** feature to select Plane and features, **Fig. 16**.

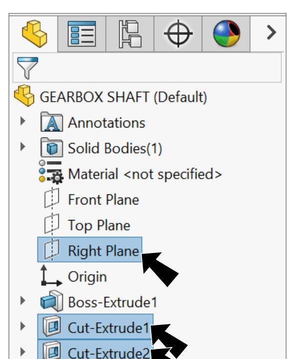


Fig. 16

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

Step 3. In the Mirror Property Manager click OK , **Fig. 17**.

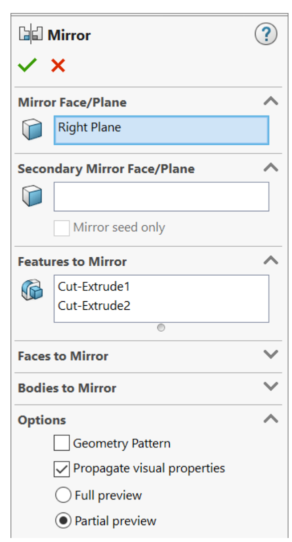


Fig. 17

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

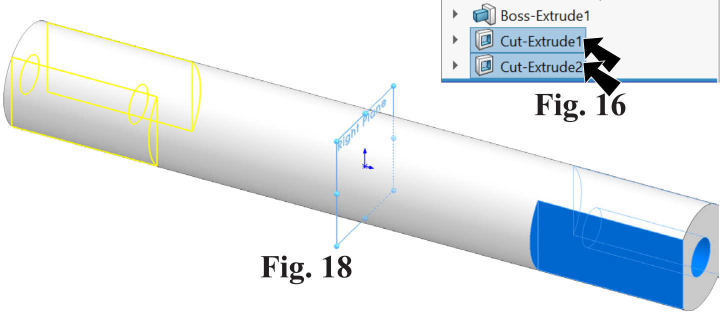


Fig. 18

F. Appearance.

Step 1. Click the Gearbox to select part, click **Appearances Callout** on the context toolbar and click **GEARBOX..**, **Fig. 19**.

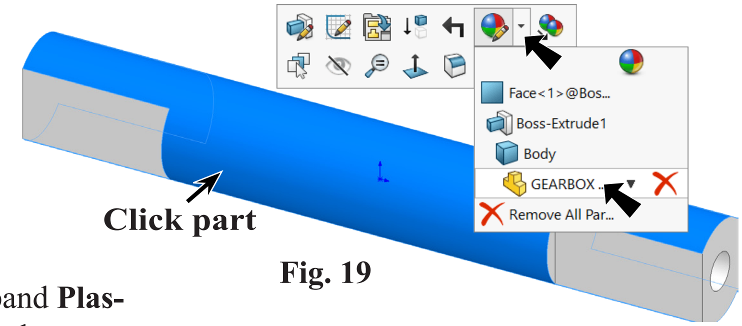


Fig. 19

Step 2. In the Appearances Task pane, expand **Plastic**, click **Medium Gloss** and in the lower pane select **white medium gloss plastic**, **Fig. 20**.

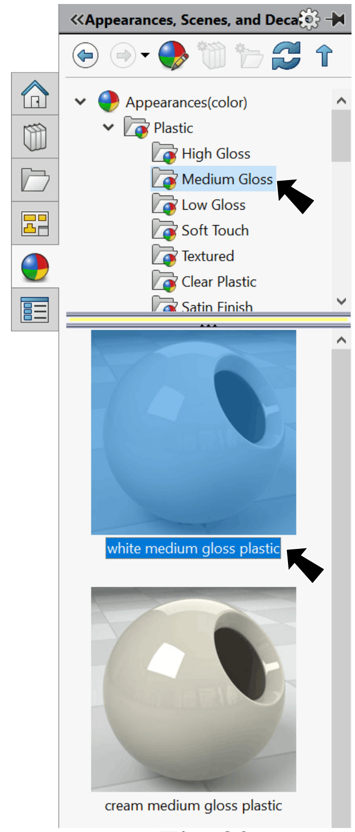


Fig. 20

Step 3. In the Appearances Property Manager click OK .

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

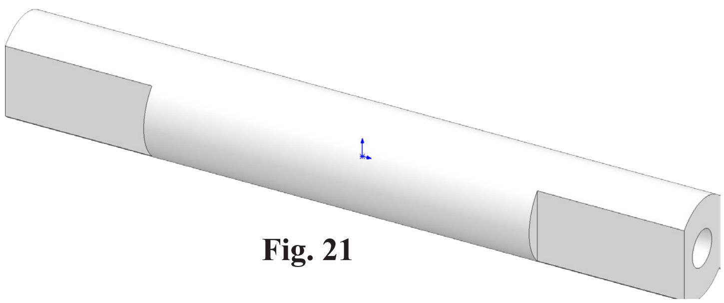


Fig. 21