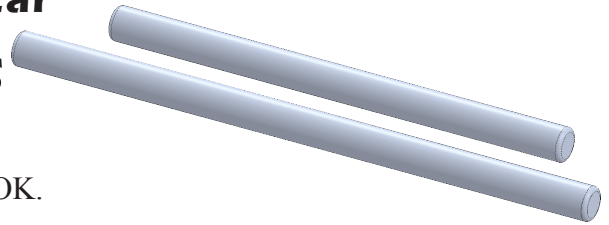




CO2 Rail Car Axles



A. Axle.

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**.

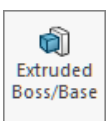
Step 3. Click **Circle**  (S) on the Sketch toolbar.



Step 4. Draw a circle starting at the Origin , **Fig. 2**.

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

Step 6. Dimension circle **diameter 3.18**, **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 Property Manager set:
under Direction 1, **Fig. 3**
End Condition **Mid Plane**
Depth  **56**
click OK .

Step 10. Click Zoom to Fit  (F) on the View toolbar.

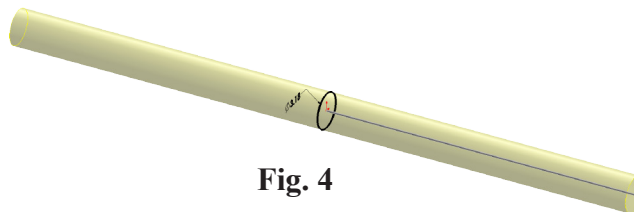


Fig. 4

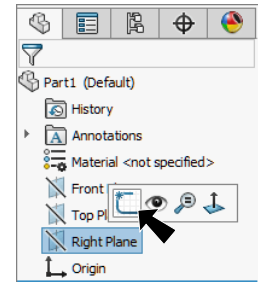


Fig. 1

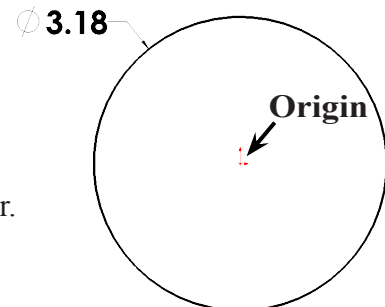


Fig. 2

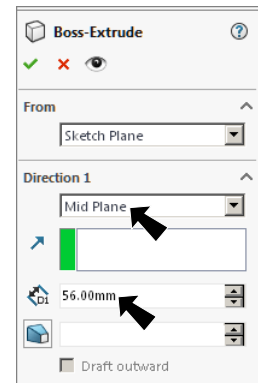


Fig. 3

B. Save as "FRONT AXLE".

Step 1. Click File Menu > Save As.

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

C. Fillet Edges.

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

Step 2. In the Fillet Property Manager set:
select **FilletXpert**, Fig. 5

set **Radius**  .4

click **cylindrical axle face**, Fig. 6

click OK .

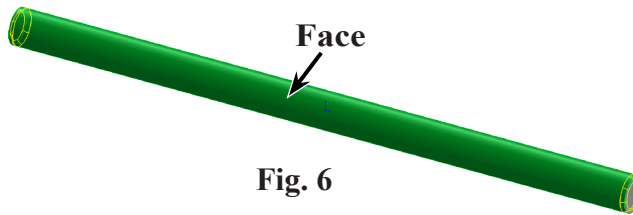


Fig. 6

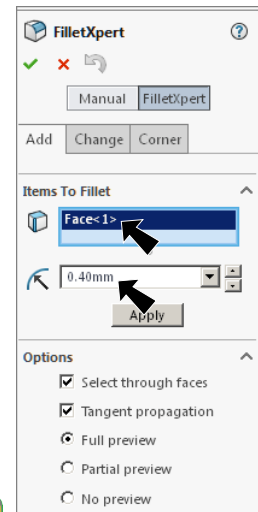


Fig. 5

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

D. Mate References.

Step 1. Click **Right Plane**  in the Feature Manager to select the Plane, Fig. 7.

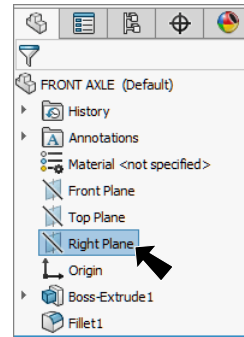
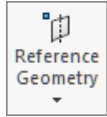


Fig. 7

Step 2. Click **Reference Geometry**  on the Features toolbar and **Mate Reference** from the menu.

Step 3. In the Mate Reference Manager set:
under **Primary Reference Entity**, Fig. 8

Mate Reference Type  **Coincident**

under **Secondary Reference Entity**

click in Entity box 

and click **cylindrical face of axle**, Fig. 9

click OK .

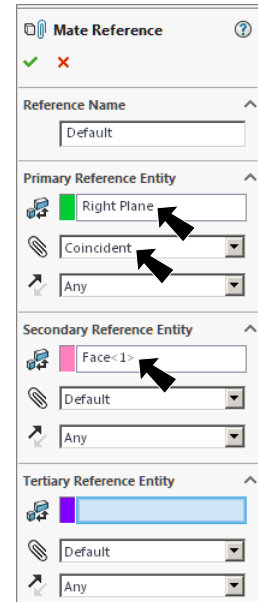


Fig. 8

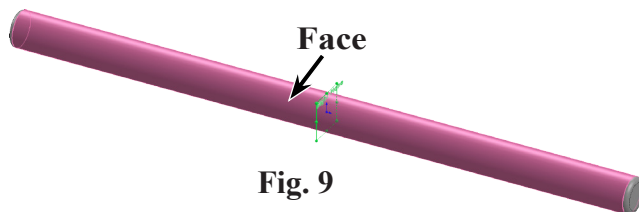



Fig. 9

E. Material Aluminum.

- Step 1. Right click Material  in the Feature Manager and click Edit Material, Fig. 10.
- Step 2. Expand Aluminum Alloys in the material tree and select 1060 Alloy, Fig. 11. Click Apply and Close.

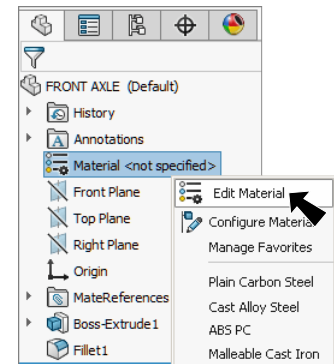


Fig. 10

F. Save as "REAR AXLE".

- Step 1. Save.
Use **Ctrl-S** to save FRONT AXLE. **Very important to save here.**
- Step 2. Click File Menu > Save As.
- Step 3. Key-in **REAR AXLE** for the filename.
You now have two axle files, FRONT and REAR. Next, we change length of REAR axle.

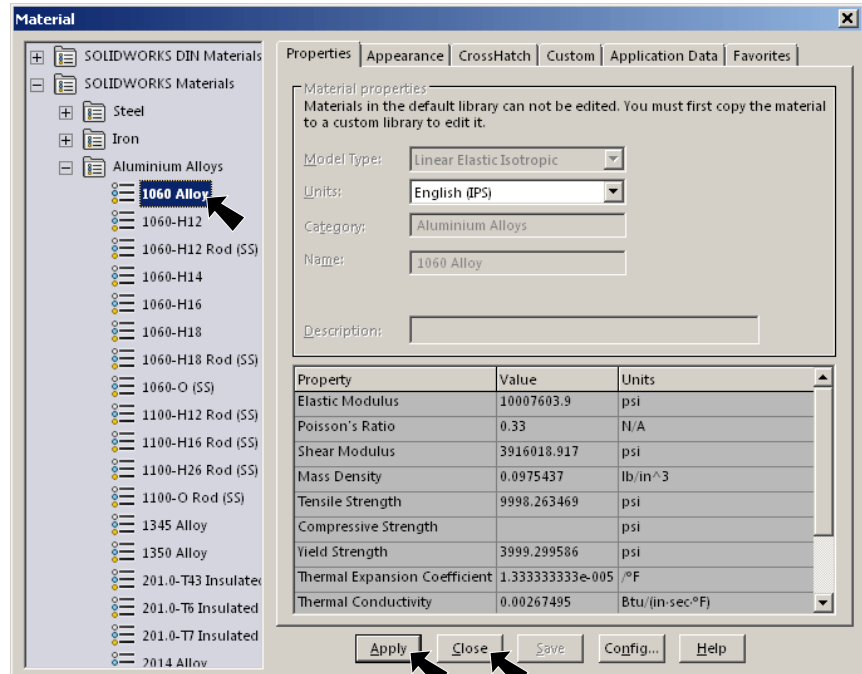



Fig. 11

G. Change Extrude Depth.

- Step 1. Click **Boss-Extrude1** in the Feature Manager and click **Edit Feature**  in the menu, Fig. 12.

- Step 2. In the Property Manager change:
Depth  **44**
click OK , Fig. 13.

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

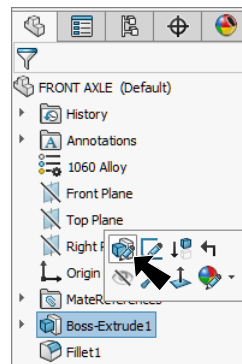


Fig. 12

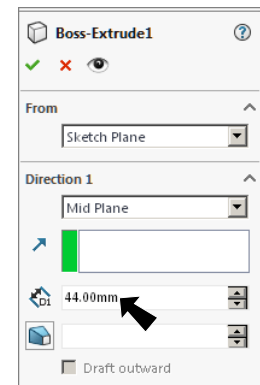


Fig. 13

- You should have 2 axles:
FRONT 56
REAR 44

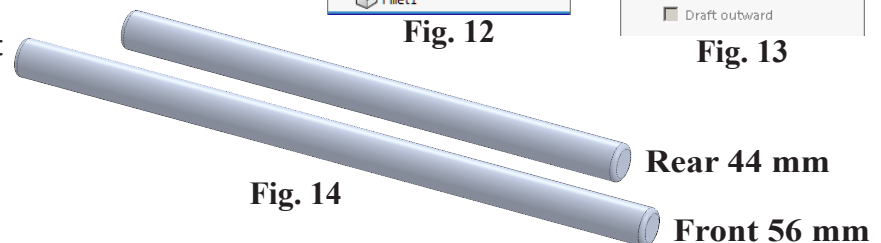


Fig. 14