

# CO2 Rail Car Blank



## A. New Metric Part.

Step 1. Click File Menu > New.

Step 2. Click **Part Metric** from the list of templates and click OK.

If you are not using SOLIDWORKS templates (you should be) to change units, in the status bar at the bottom right corner of graphics area click Unit System and **MMGS**, **Fig. 1**. Or before 2012, click Options on the Standard toolbar and on the Document Properties tab, select Units.

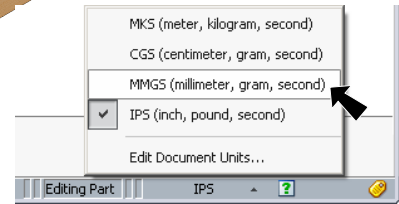




Fig. 1

## B. Body.

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

Step 2. Click **Line**  (L) on the Sketch toolbar.

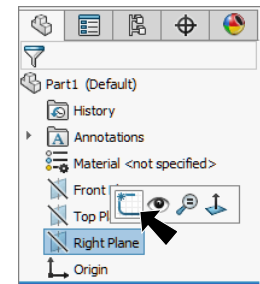



Fig. 2

Step 3. Starting at the Origin  sketch the lines in **Fig. 3**. Use the inferencing line, the dotted line that appears when you draw the lines to keep the side lines vertical and the bottom line horizontal. Do not add any extra lines. If you make a mistake, use Undo, **Ctrl-Z**.

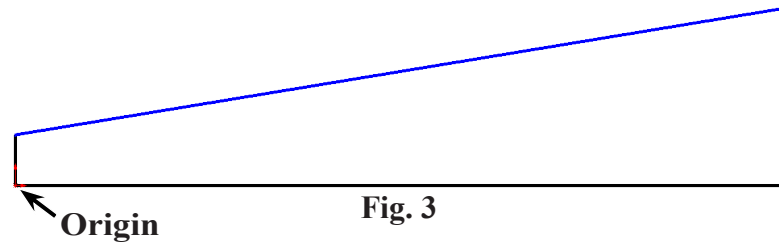



Fig. 3

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

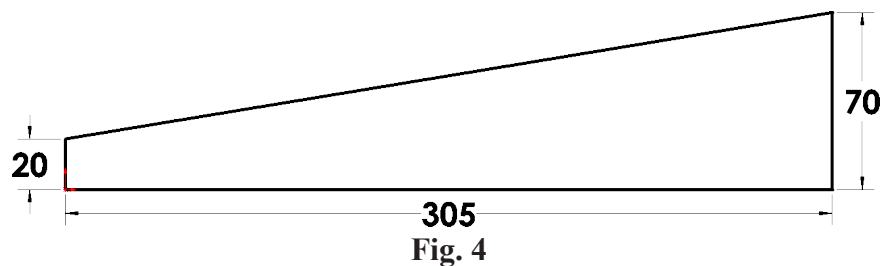


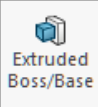
Fig. 4



Step 5. Add dimensions, **Fig. 4**.

To Smart dimension click the line then move the cursor out away from the line and click. Key-in the dimension and press ENTER. Arrange the dimensions as shown in **Fig. 4**.

Step 6. Click **Zoom to Fit**  (F) on the View toolbar.

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. 5**  
 End Condition **Mid Plane**  
**Depth**  42  
 click OK .

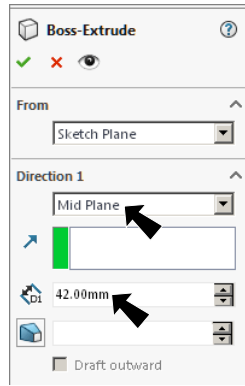


Fig. 5

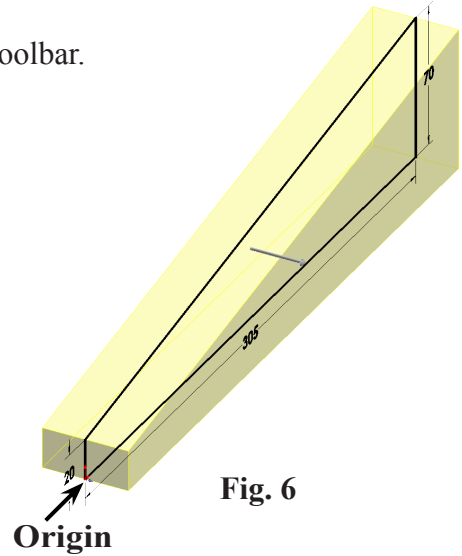


Fig. 6

### C. Save as "BLANK".

Step 1. Click File Menu > Save As.

Step 2. Key-in **BLANK** for filename and press ENTER.  
**Tip:** Create a folder and save all Rail Car files into folder.

Back face 

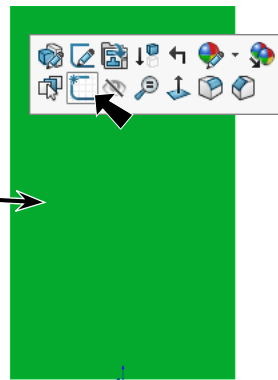


Fig. 7

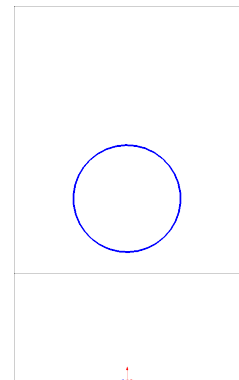



Fig. 8

### D. Cartridge Hole.

Step 1. Click **Back**  on the Standard Views toolbar. (Ctrl-2)

Step 2. Click **back face** and click **Sketch**  on the context toolbar, Fig. 7.

Step 3. Click **Wireframe**  on the View toolbar.

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

Step 5. Draw a circle for cartridge hole, Fig. 8.

Step 6. **Right click graphics area and click Select** from menu to unselect Circle tool.

Ctrl click centerpoint and Origin

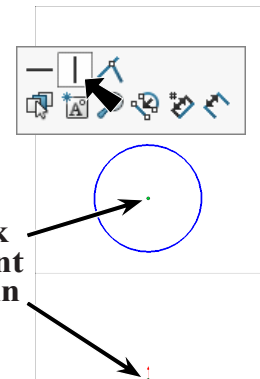



Fig. 9

Step 7. **Ctrl click centerpoint of circle and Origin** to select both, Fig. 9.  
 Release Ctrl key and click **Make Vertical**  on the context toolbar.

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

Step 9. Add dimensions, Fig. 10.

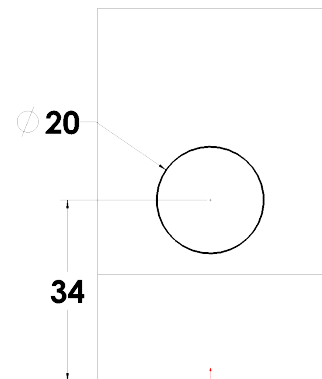



Fig. 10

Step 10. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

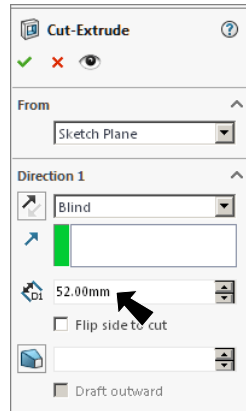
Step 11. Click **Features**  on the Command Manager toolbar.

Step 12. Click **Extruded Cut**  on the Features toolbar.

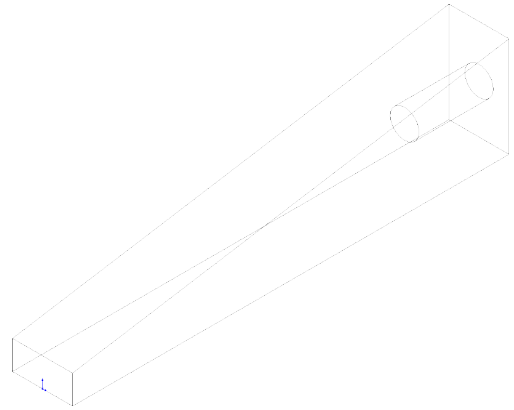
Step 13. In the Property Manager set:  
under Direction 1, **Fig. 11**

**Depth**  **52**  
click **OK** .

Step 14. Save. Use **Ctrl-S**.






**Fig. 11**



**Fig. 12**

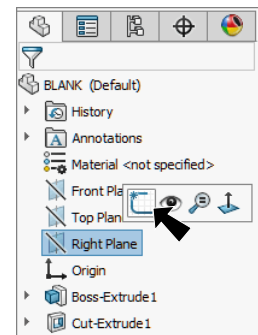
## **E. Axle Holes.**

Step 1. Click **Right Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 13**.

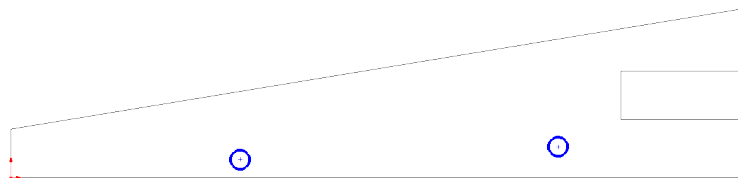
Step 2. Click **Normal To**  on the Standard Views toolbar. (**Ctrl-8**)

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

Step 4. Sketch **two circles** for the axle holes, **Fig. 14**.



**Fig. 13**



**Fig. 14**

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



Step 6. Add dimensions, **Fig. 15**.

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

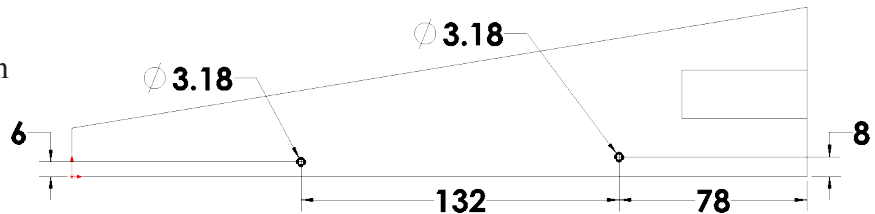
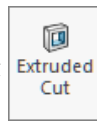


Fig. 15

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



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



Step 10. In the Cut-Extrude Property Manager set:

under Direction 1, **Fig. 16**  
End Condition  
**Through All - Both**  
click OK

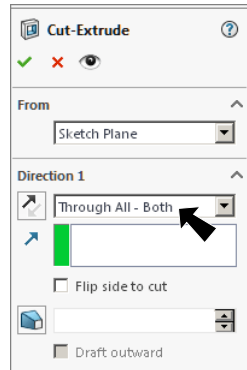


Fig. 16

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

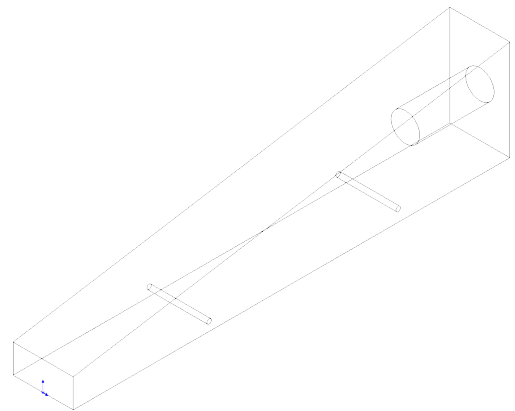


Fig. 17

## F. Rename Features.

Step 1. Click **Shaded With Edges**



on the View toolbar.

Step 2. **Rename Features** in the Feature Manager. To rename, slowly click twice over the Feature name (F2) and key-in new name, **Fig. 18** and **Fig. 19**.

Change:

**Boss-Extrude1 to BODY**  
**Cut-Extrude1 to CARTRIDGE HOLE**  
**Cut-Extrude2 to AXLE HOLES**

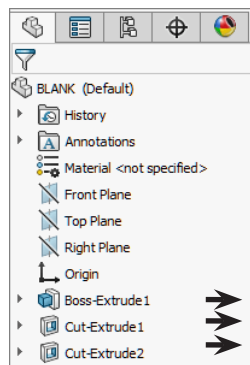


Fig. 18

Change

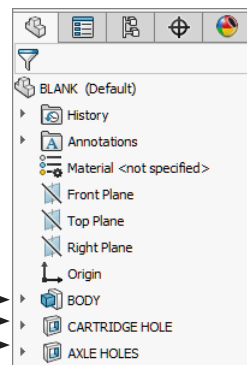



Fig. 19

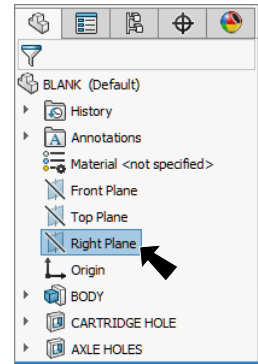
## G. Mate References.

Step 1. Click **Filter Faces**  (X) on the **Selection Filter toolbar** at the bottom of the display, **Fig. 20**. If necessary, use **F5** key to display the toolbar.

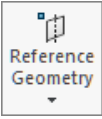



**Fig. 20**

Step 2. Click **Right Plane**  in the Feature Manager to select Plane, **Fig. 21**.



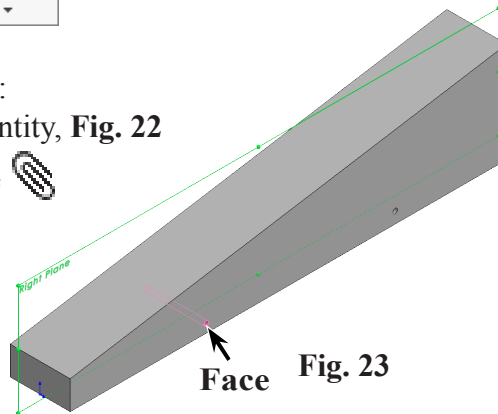
**Fig. 21**

Step 3. Click **Reference Geometry**  on the Features toolbar and **Mate Reference** from the menu.

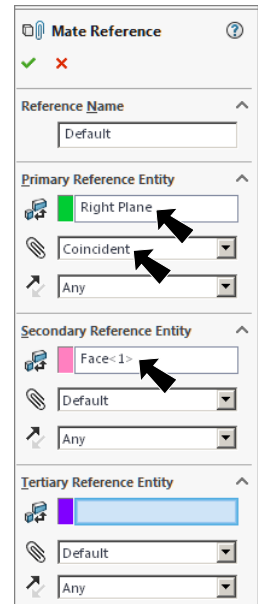
Step 4. In the Mate Reference Manager:  
 under **Primary Reference Entity**, **Fig. 22**  
 set **Mate Reference Type**  **Coincident**

under **Secondary Reference Entity**

click in Entity box   
 and click **inside cylindrical face of front axle hole**, **Fig. 23**  
 click OK .

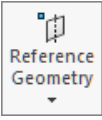



**Face Fig. 23**





**Fig. 22**

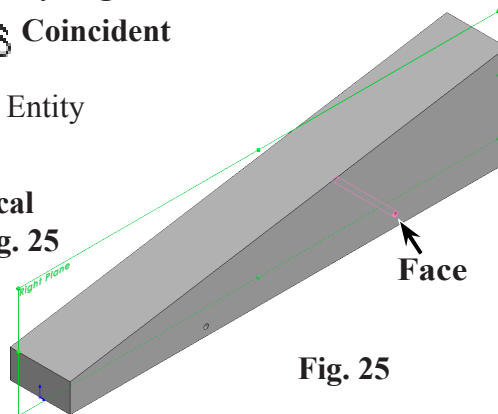
Step 5. Click **Right Plane**  in the Feature Manager to select Plane, **Fig. 21**.

Step 6. Click **Reference Geometry**  on the Features toolbar and **Mate Reference** from the menu.

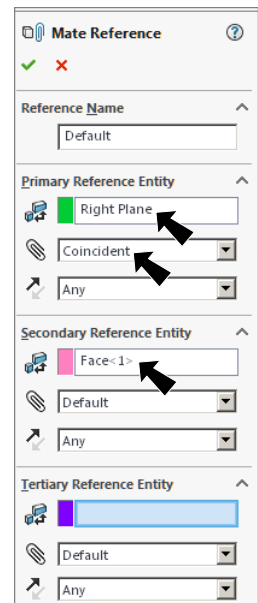
Step 7. In the Mate Reference Manager:  
 under **Primary Reference Entity**, **Fig. 24**  
**Mate Reference Type**  **Coincident**

under **Secondary Reference Entity**


click in Entity box   
 and click **inside cylindrical face of rear axle hole**, **Fig. 25**  
 click OK .



**Face Fig. 25**



**Fig. 24**

Step 8. Turn off **Filter Faces**  (X) on the **Selection Filter toolbar** at the bottom of the display, **Fig. 26**. Or **F6** key to turn off all filters.



**Fig. 26**

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

## H. Material Balsa.

Step 1. Right click **Material**  in the Feature Manager and click **Edit Material**, Fig. 27.

Step 2. Expand **Woods** (click the +) in the material tree and select **Balsa**, Fig. 28. Click **Apply** and **Close**.

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

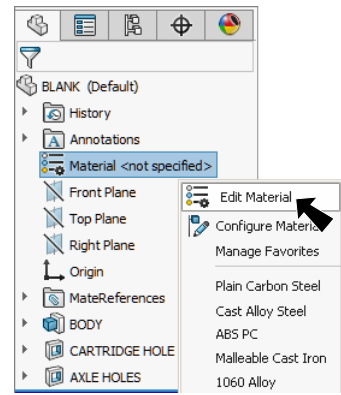


Fig. 27

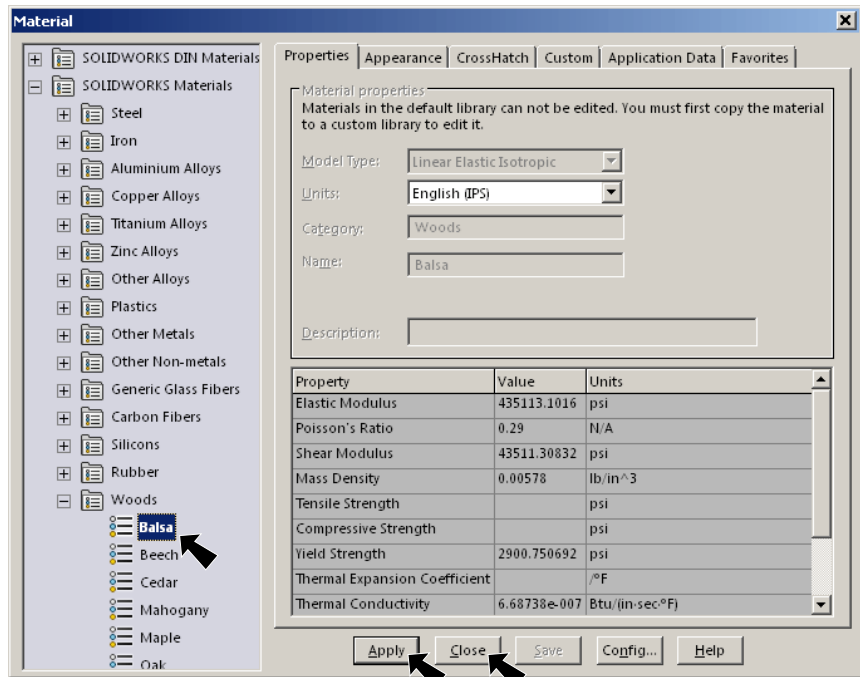


Fig. 28

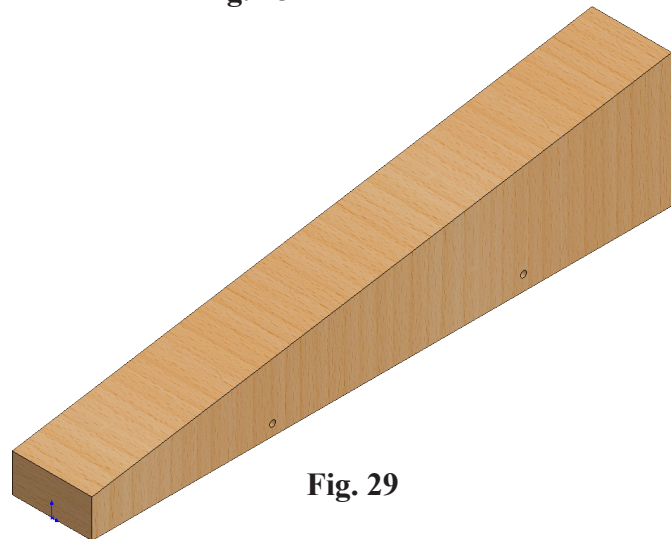



Fig. 29

## I. Enable PhotoView 360.

Step 1. If necessary, turn on PhotoView 360, click the **flyout of Options**  on the Standard toolbar and click **Add-Ins**.

Step 2. In the dialog box for **PhotoView 360** check in the check box under **Active Add-Ins** and **Start-Up**, **Fig. 30**. Click OK.

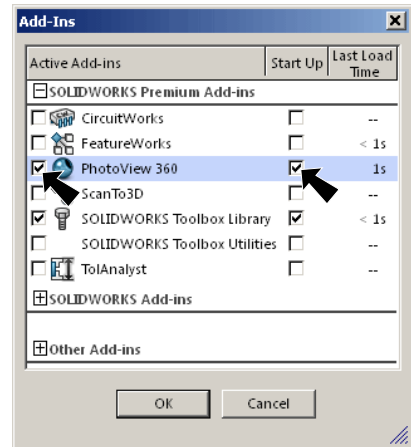


Fig. 30

## J. Rotate Mapping.

Step 1. Click PhotoView 360 Menu > Edit Appearance.

Step 2. In the Property Manager:  
click **Mapping** tab , **Fig. 31**

under Mapping controls

click **Surface mapping**   
**Rotation 90**

click **Small mapping size** 

click OK .

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

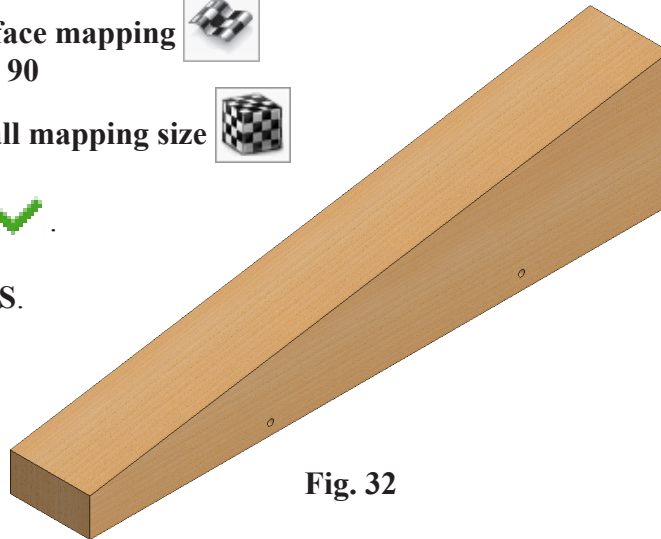


Fig. 32

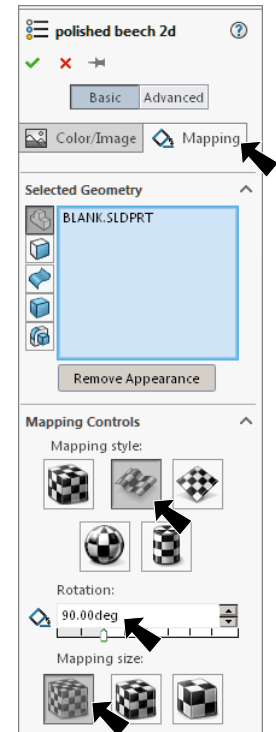


Fig. 31