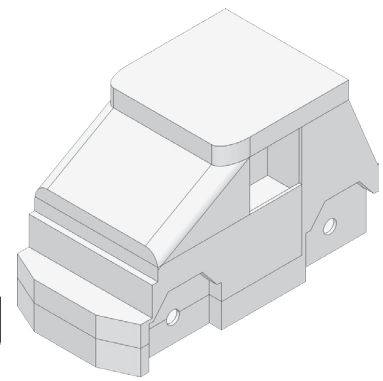




# E's Small Car Master Model





## A. Extrude1 Sketch1 Body.

Step 1. Click **New**  on the Standard toolbar, click **Part Metric**  and OK.

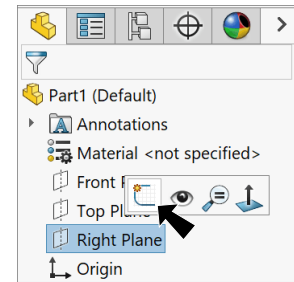
Step 2. Click **Right Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 1**.

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

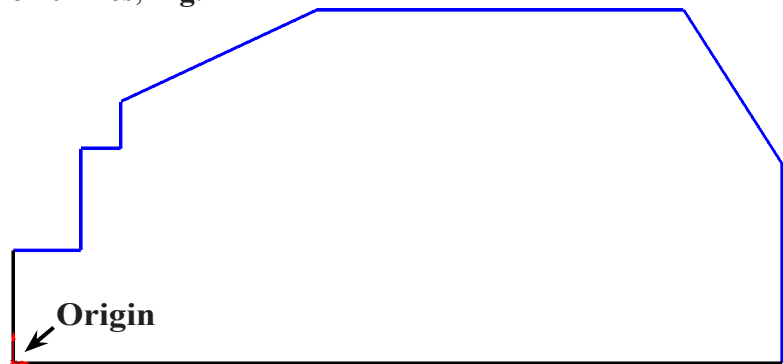
Step 4. Starting at Origin  sketch the 10 lines, **Fig. 2**.

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

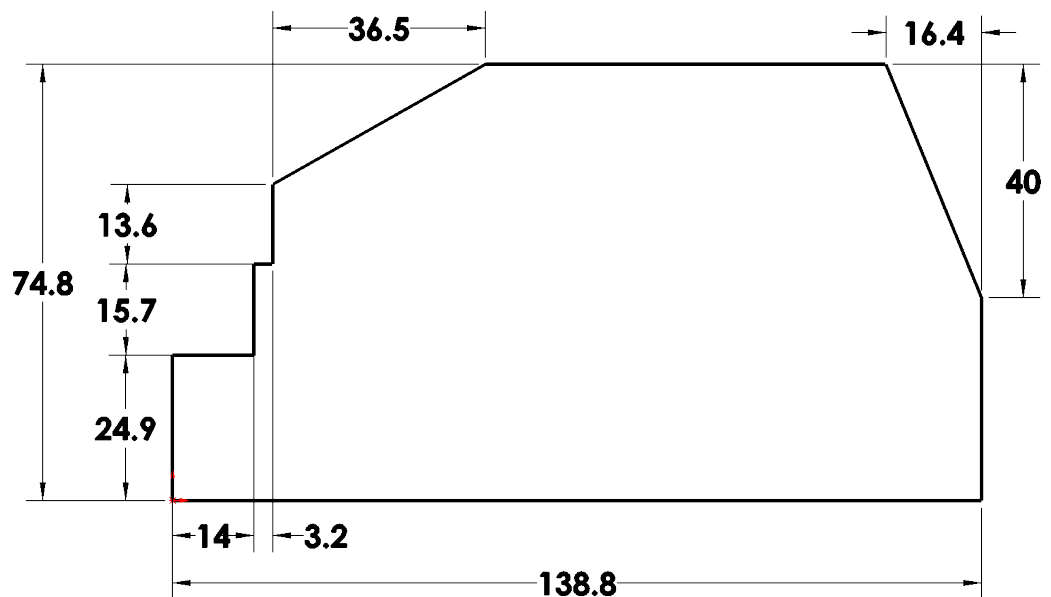
Step 6. Add dimensions, **Fig. 3**.




**Fig. 1**



**Fig. 2**



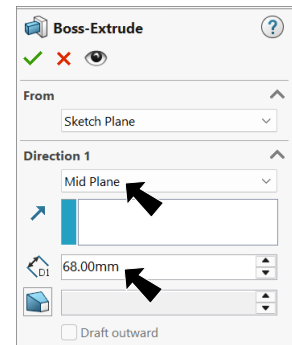
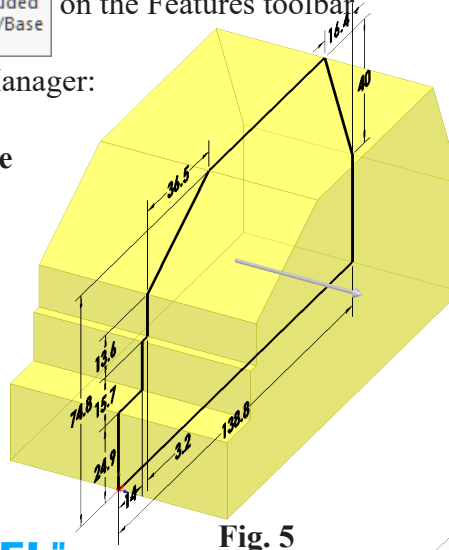
**Fig. 2**

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:  
under Direction 1, **Fig. 4**  
End Condition **Mid Plane**

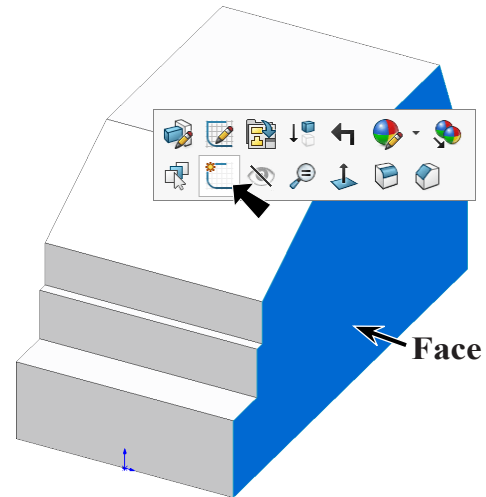
**Depth**  **68**  
click OK .




## B. Save as "MASTER MODEL".


Step 1. Click File Menu > Save As.

Step 2. Key-in **MASTER MODEL** for the filename and press ENTER.



## C. Extruded Cut1 Sketch2 Wheel Wells.

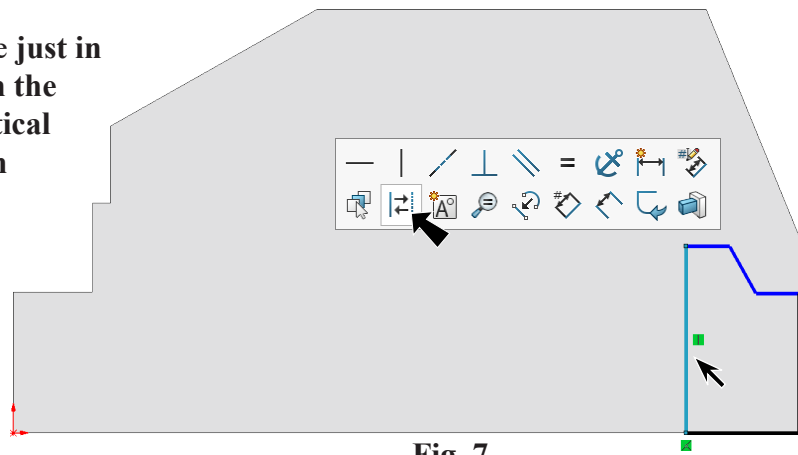
Step 1. Click the **side face** and click **Sketch**  on the context toolbar, **Fig. 6**.

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

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

Step 4. Starting a line on bottom edge **just in from the rear corner**, sketch the **6 lines**. After sketching vertical line down click **Construction**

**Geometry**  on the context toolbar, **Fig. 7**.



Step 5. Drag a selection to select all geometry, Fig. 8.

Step 6. Click **Mirror Entities**  on the Sketch toolbar.

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

Step 8. Add dimensions, Fig. 9.

Step 9. **Unselect Smart Dimension.** To unselect, right click graphics area and click **Select**  from menu.

Step 10. Drag a selection to select all lines, Fig. 10.

Step 11. Click **Linear Sketch Pattern**  on the Sketch toolbar.

Step 12. In the Linear Pattern Property Manager set:





- under Entities to Pattern, Fig. 11
- entities preselected
- under Direction 1
- Direction X-axis
- Spacing  86.5
- uncheck Dimension X spacing
- Number of Instances  2
- Angle  180
- uncheck Display instance count
- click OK .



Fig. 8

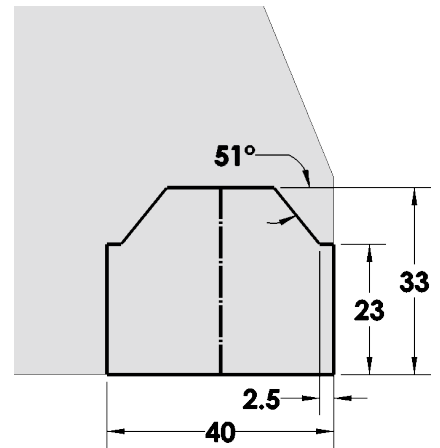


Fig. 9

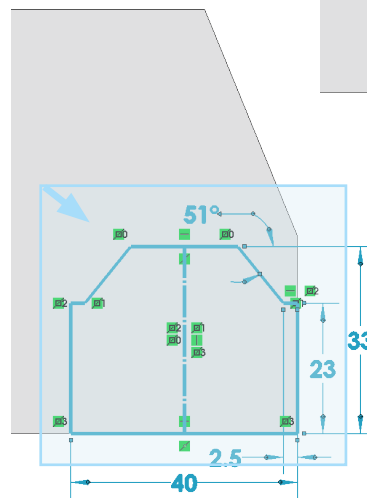


Fig. 10

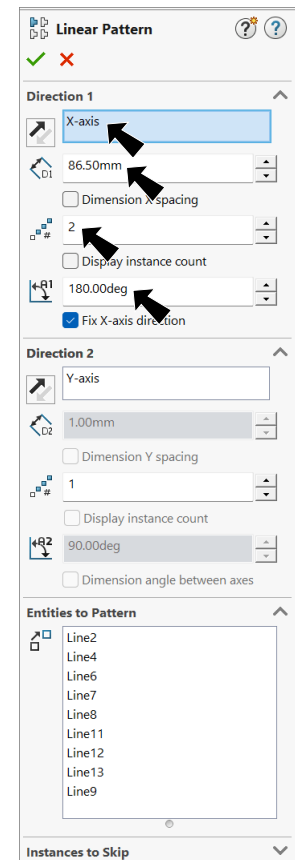


Fig. 11

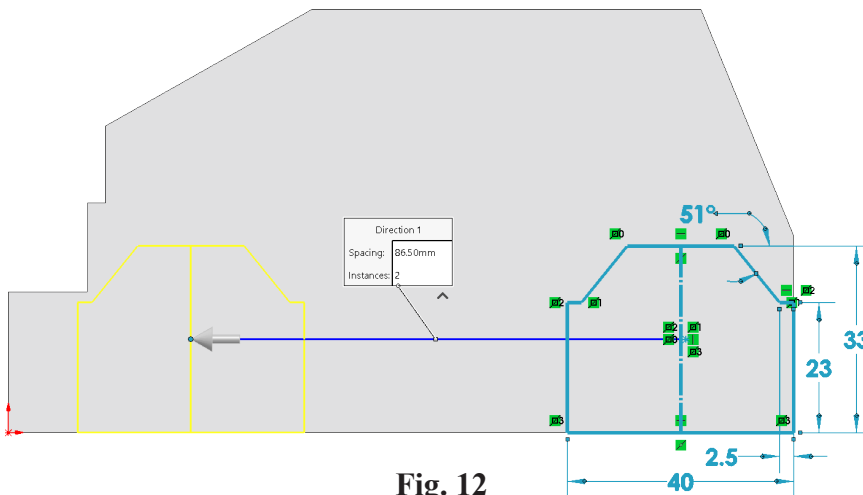

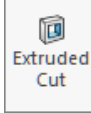




Fig. 12

Step 13. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

Step 14. Click **Features**  on the Command Manager toolbar.

Step 15. Click **Extruded Cut**  on the Features toolbar.

Step 16. In the Cut-Extrude Property Manager set:  
under Direction 1, **Fig. 13**  
End Condition **Blind**  
Depth  6.8  
click OK .

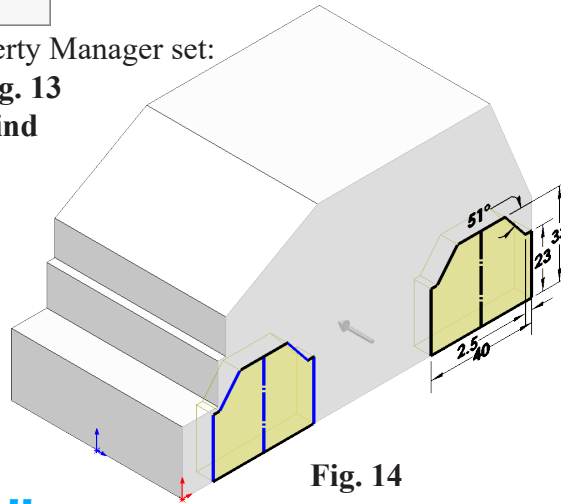


Fig. 14

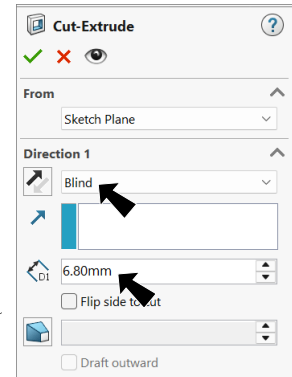


Fig. 13

## D. Mirror1 Wheel Wells.

Step 1. **Ctrl click** **Right Plane**  and **Cut-Extrude1**  feature to select plane and feature, **Fig. 15**.

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

Step 3. In Mirror Property Manager click OK .

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

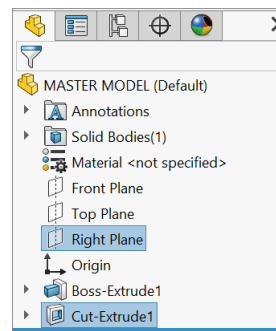


Fig. 15

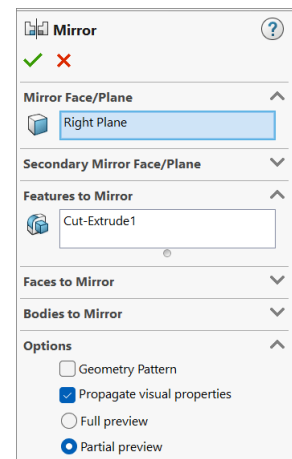


Fig. 16

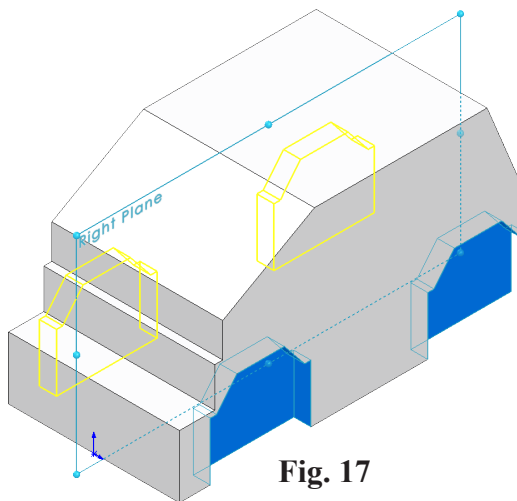




Fig. 17

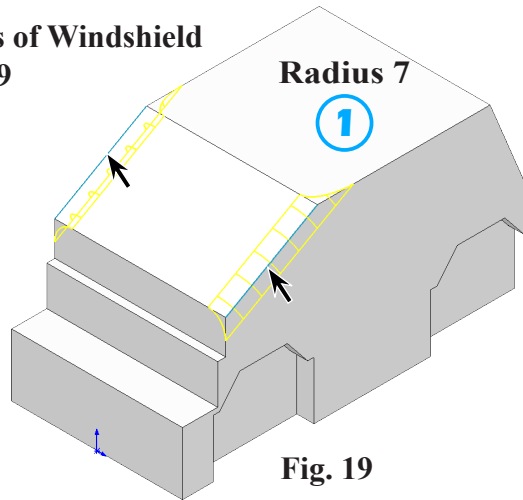
## E. Fillet1.

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

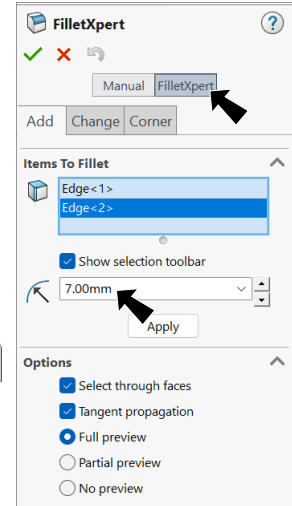
Step 2. In the Fillet Property Manager set:  
select **FilletXpert**, **Fig. 18**

① **Radius**  7  
click front side edges of Windshield  
both sides (2), **Fig. 19**  
click OK .

Step 3. Save  (Ctrl-S).





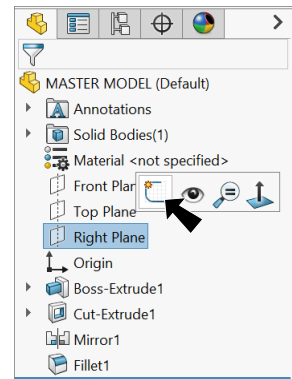
**Fig. 19**




**Fig. 18**



## F. Extruded Cut2 Sketch3 Side Windows.

Step 1. Click **Right Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 20**.

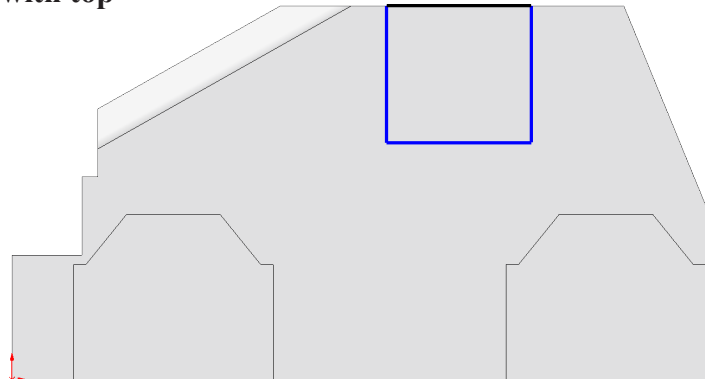


**Fig. 20**


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

Step 3. Click **Corner Rectangle**  in the **Rectangle flyout**  on the Sketch toolbar.

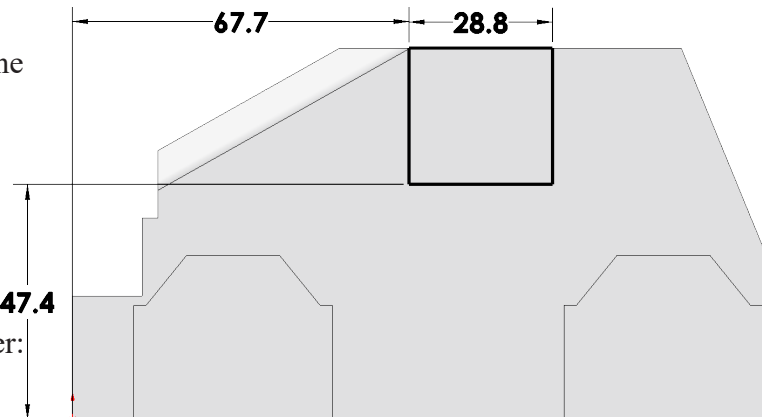
Step 4. Sketch **corner rectangle coincident with top edge**, **Fig. 21**.




**Fig. 21**

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

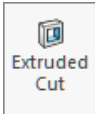
Step 6. Add dimensions, **Fig. 22**.



**Fig. 22**

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

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

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

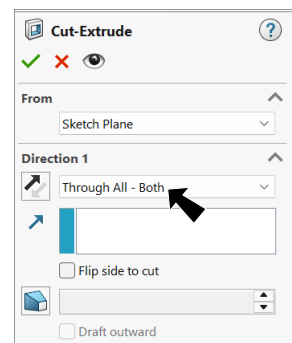
Step 10. In Cut-Extrude Property Manager:

under **Direction 1**, **Fig. 23**

**End Condition**

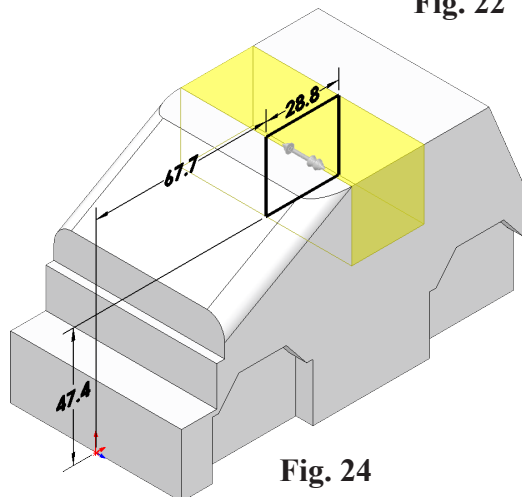
**Through All - Both**

click **OK** .





**Fig. 23**


Step 11. Save  (**Ctrl-S**).



**Fig. 24**

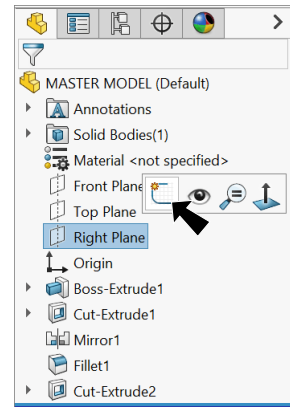
## G. Split1 Sketch4.

Step 1. Click **Right Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 25**.

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

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

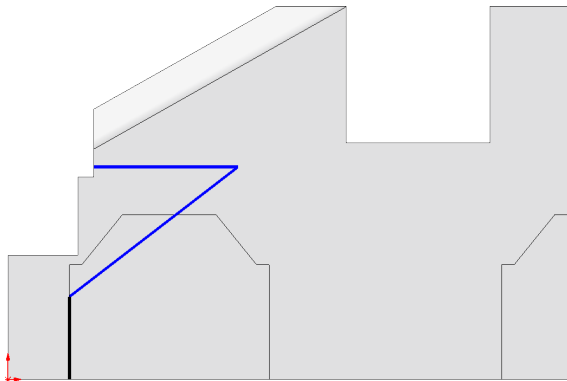
Step 4. Sketch the **3 lines starting at bottom front vertex of front wheel well**, **Fig. 26**.



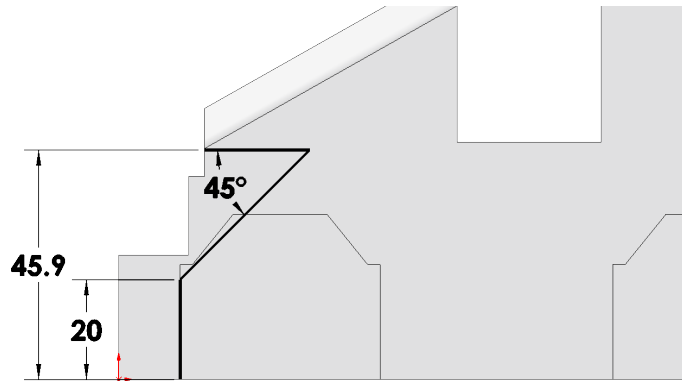
**Fig. 25**

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

Step 6. Add dimensions, **Fig. 27**.

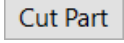


**Fig. 26**



**Fig. 27**

Step 7. Click Insert Menu > Features > Split.

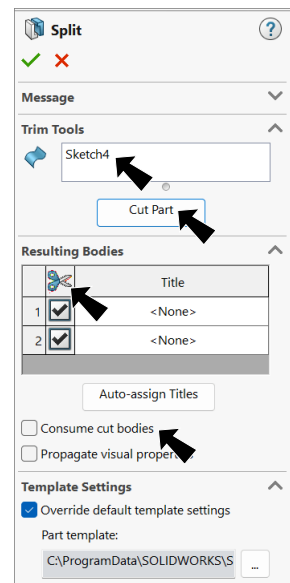
Step 8. In the Split Property Manager:  
 under Trim Tools, **Fig. 28**  
**Sketch4** was preselected  
 click **Cut Part**  button  
 under Resulting Bodies

click **Select All** 

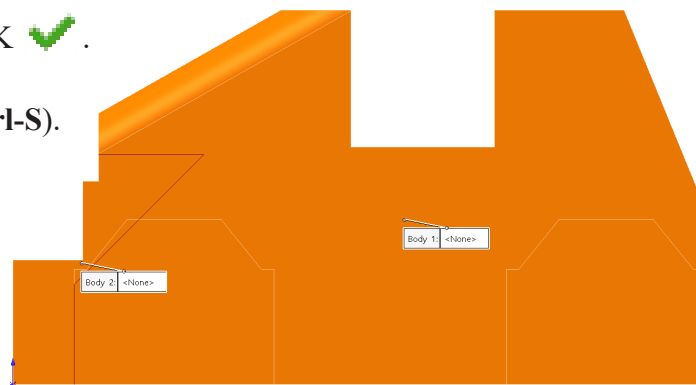
uncheck **Consume cut bodies**

click **OK** .

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







**Fig. 28**




**Fig. 29**

## H. Shell.

Step 1. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)

Step 2. **Hide Sketch4** . To hide, click **Sketch4**  in the Feature Manager and **Hide**  on the context toolbar, Fig. 30.

Step 3. Click **Shell**  on the Features toolbar.

Step 4. In the Shell Property Manager set:  
under Parameters, Fig. 31

**Distance**  1.5

under Faces to Remove 

click **top rear face**, and **3 faces of window cut**, Fig. 32

Use **Left Arrow key**  to view front face of window cut.

click **OK** .

Step 5. Save  (Ctrl-S).

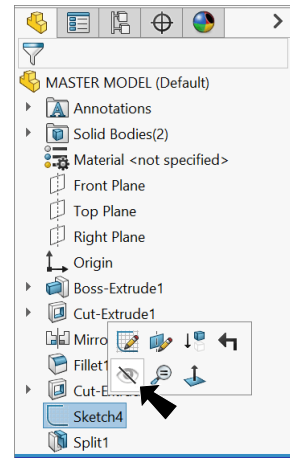


Fig. 30

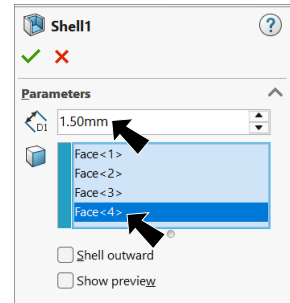


Fig. 31

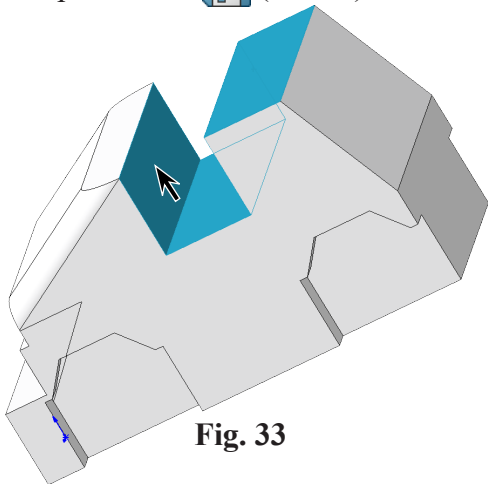


Fig. 33

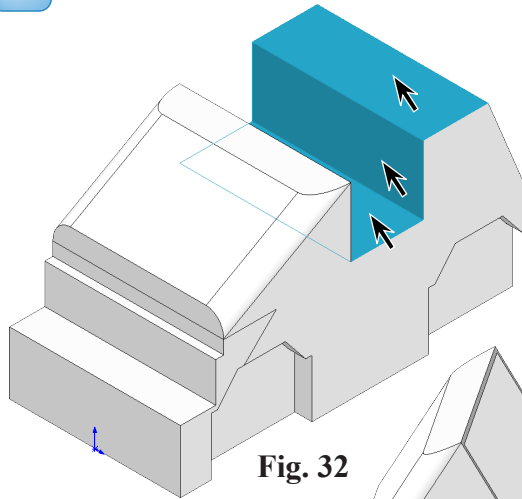


Fig. 32

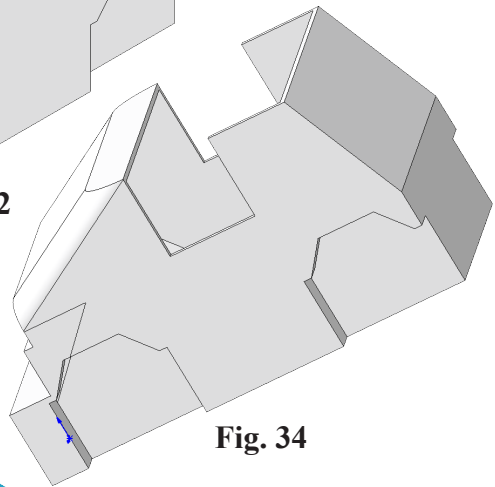


Fig. 34

## I. Combine Bodies.

Step 1. Click **Isometric**  on the Standard Views toolbar.

Step 2. Click Insert Menu > Features > Combine.

Step 3. In the Combine Property Manager:  
under Operation Type, Fig. 35

select **Add**

**drag a selection** to select **both bodies**, Fig. 36

click **OK** .

Step 4. Save  (Ctrl-S).

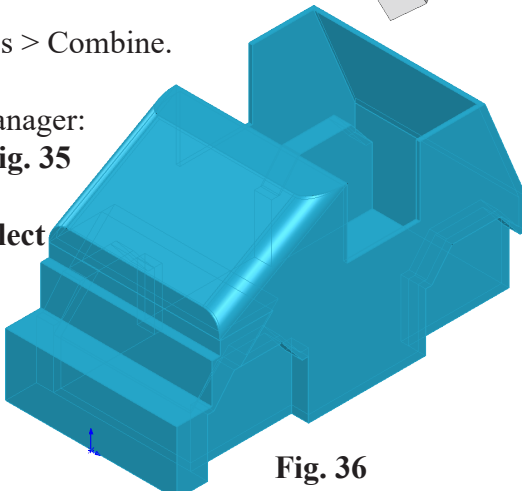


Fig. 36

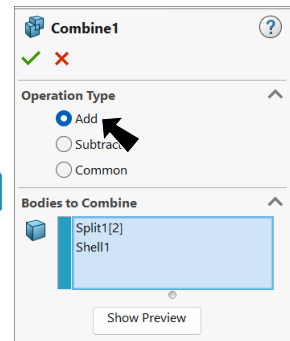




Fig. 35


## J. Extrude2 Sketch5 Roof.

Step 1. Click the **top face of windshield** and click **Sketch**  on the context toolbar, **Fig. 37**.

Step 2. **Unselect** the face.

Step 3. Click **Convert Entities**  on the Sketch toolbar.

Step 4. In the Convert Entities Property Manager: under Entities to Convert, **Fig. 38** click **outside edged around the windshield (3)** and **outside edges at rear (3)**, **Fig. 39** click OK .

Step 5. Click **Trim Entities**  (S) on the Sketch toolbar.

Step 6. In the Trim Property Manger:

select **Corner** , **Fig. 40**

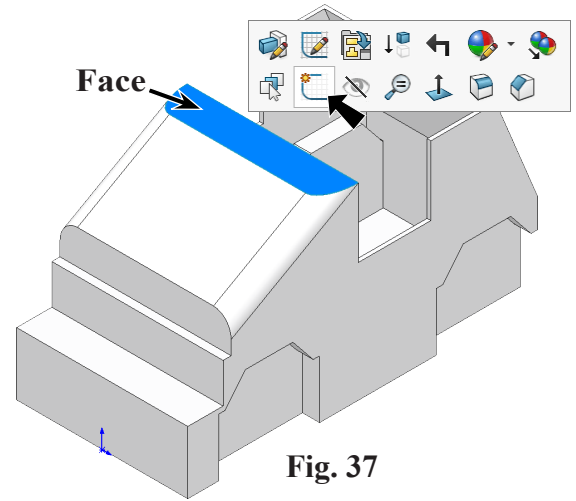
Trim the two entities to close the gap, **Fig. 41**.

Click entities to trim.

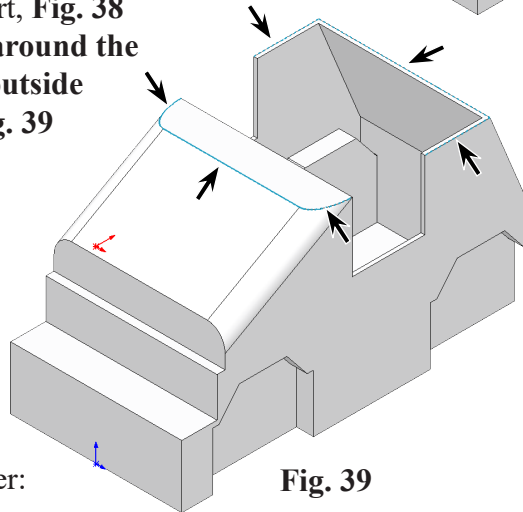
Results shown in **Fig. 42**.

Trim both sides.

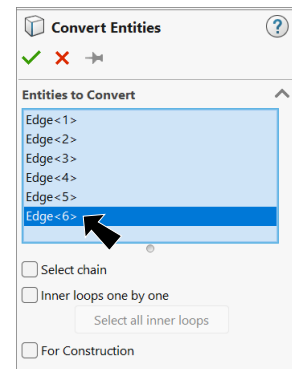
Click OK  when done.



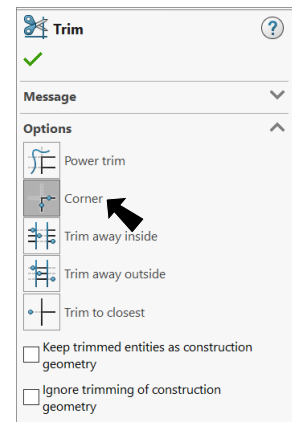
**Fig. 37**



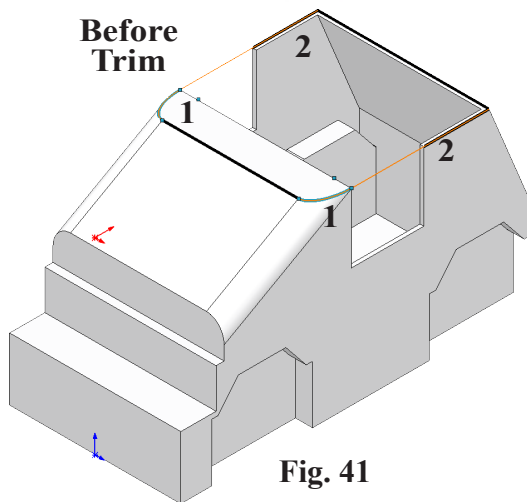
**Fig. 39**



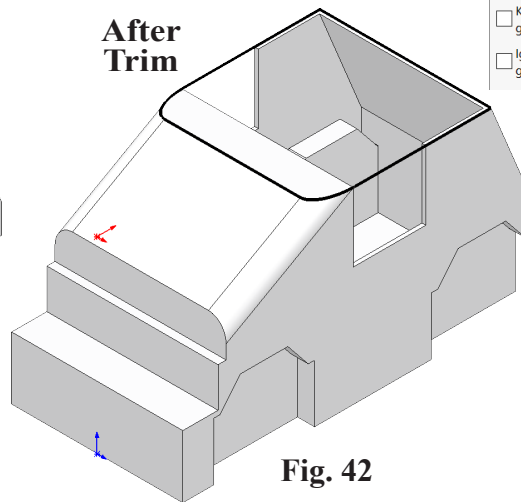
**Fig. 38**




**Fig. 40**





**Fig. 41**



**Fig. 42**

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. 43**  
End Condition **Blind**  
**Depth**  **9.5**  
uncheck **Merge result**  
click **OK** .

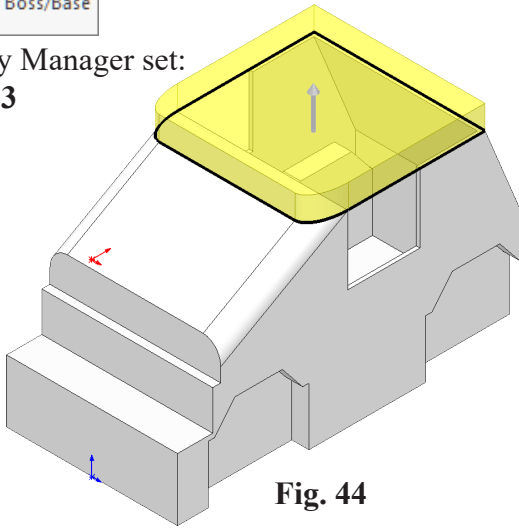


Fig. 44

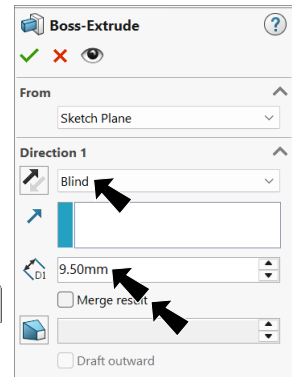






Fig. 43

### K. Extruded Cut3 Sketch6 Bumper Cut.

Step 1. Click **Top Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 45**.

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

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

Step 4. Sketch lines on corner edges to create a triangle, **Fig. 46**.

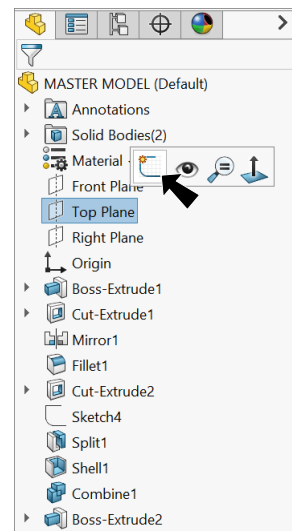


Fig. 45

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

Step 6. Add dimensions, **Fig. 47**.



Fig. 46

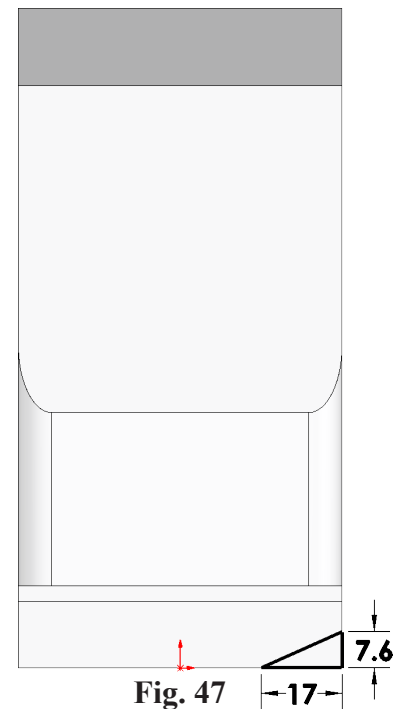




Fig. 47

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

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. 48**  
End Condition **Through All**  
click OK .

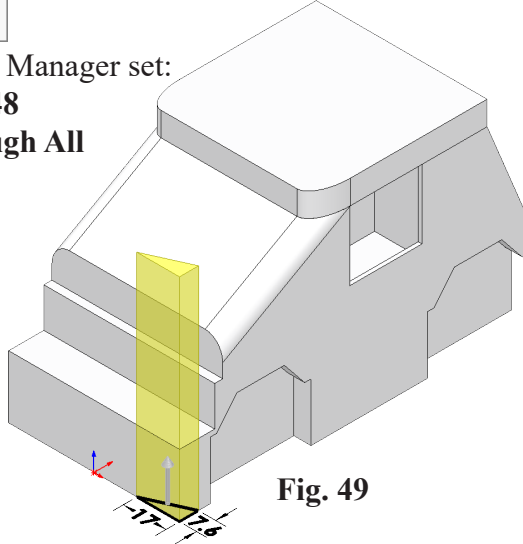


Fig. 49

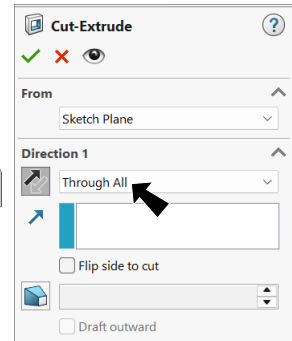


Fig. 48

## L. Mirror2 Bumper Cut.

Step 1. **Ctrl click Right Plane** and **Cut-Extrude3** features to select Plane and feature, **Fig. 50**.

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

Step 3. In the Mirror Property Manager click OK .

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

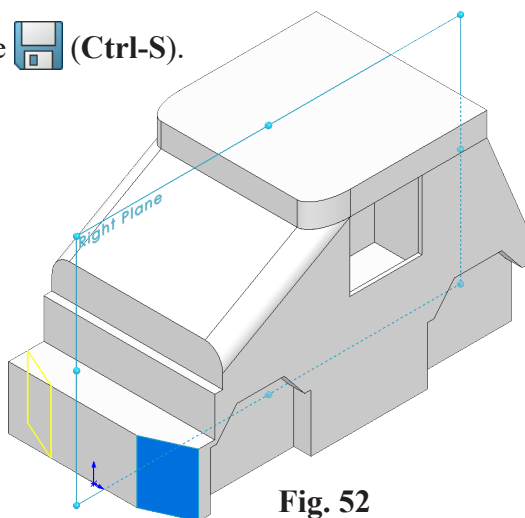


Fig. 52

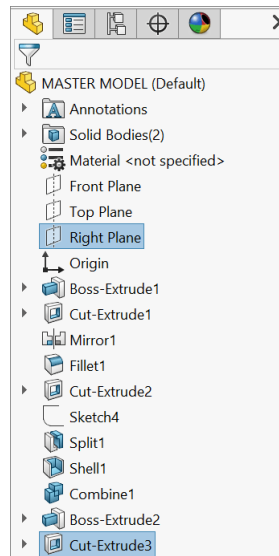


Fig. 50

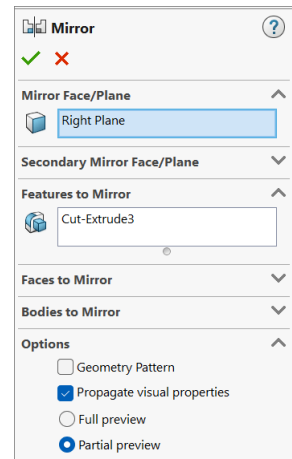





Fig. 51

## M. Extruded Cut4 Sketch7 Axle Holes.


Step 1. Click **Right Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 53**.

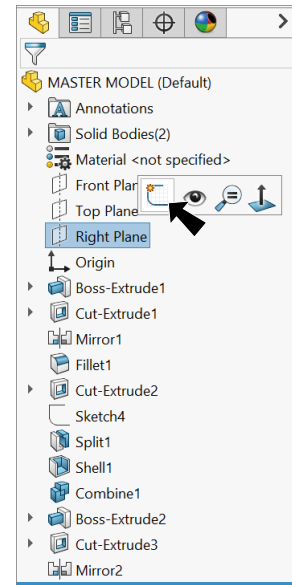
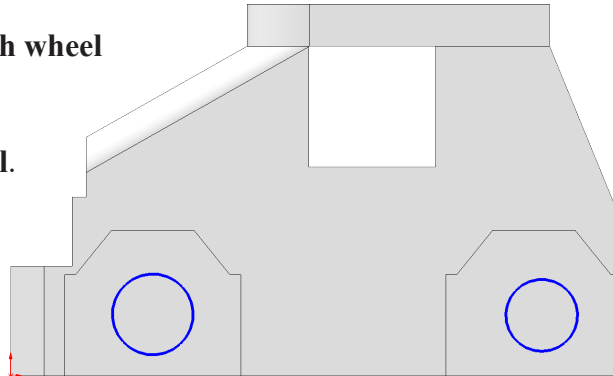
Step 2. Click **Normal To**  on the Standard Views toolbar. (**Ctrl-8**)

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


Step 4. Sketch **circle in each wheel well**, **Fig. 54**.


Step 5. **Unselect Circle tool.**

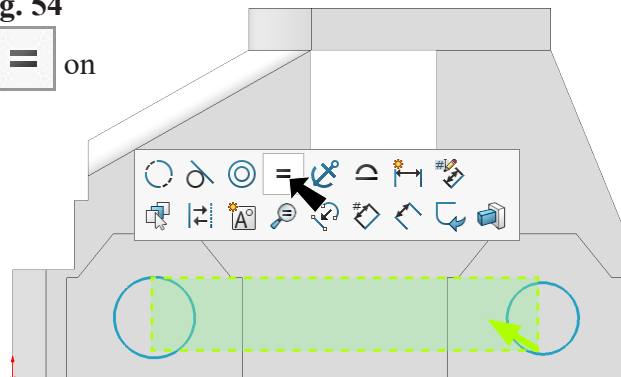
To unselect, right click graphics area and click **Select**  from menu.




**Fig. 53**

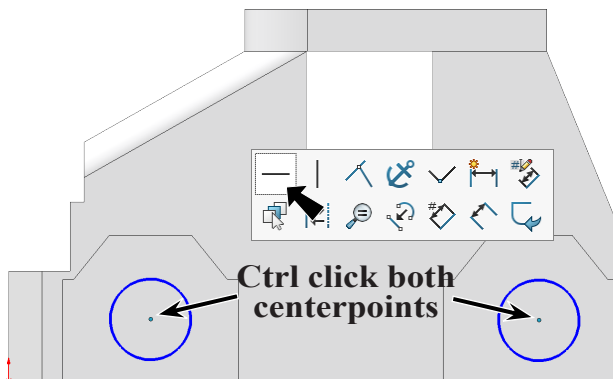
Step 6. **Drag selection to** **Fig. 54** **select both circles** and click **Make Equal**  on the context toolbar, **Fig. 55**.

Step 7. **Ctrl click both circle centerpoints** to select both. Release Ctrl key and click **Make Horizontal**  on the context toolbar, **Fig. 56**.

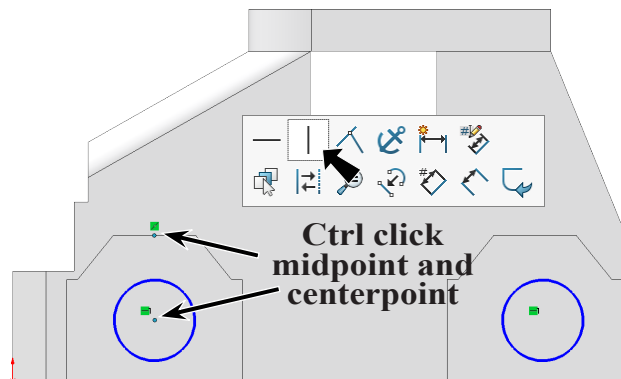


**Fig. 55**


Step 8. **Ctrl click midpoint of horizontal edge of Wheel Well** and **centerpoint of its circle** to select both. Release Ctrl key and click **Make Vertical**  on the context toolbar, **Fig. 57**.



**Fig. 56**




**Fig. 57**

Step 9. **Ctrl click midpoint of horizontal edge of other Wheel Well and centerpoint of its circle to select both.** Release Ctrl key and click **Make Vertical**  on the context toolbar, **Fig. 58**.


Step 10. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 11. Add dimensions, **Fig. 59**.

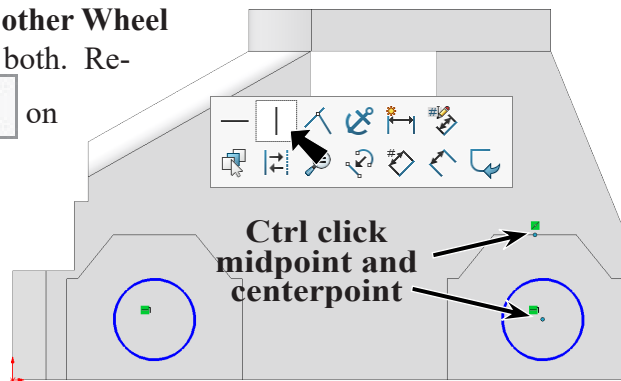
Step 12. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)

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

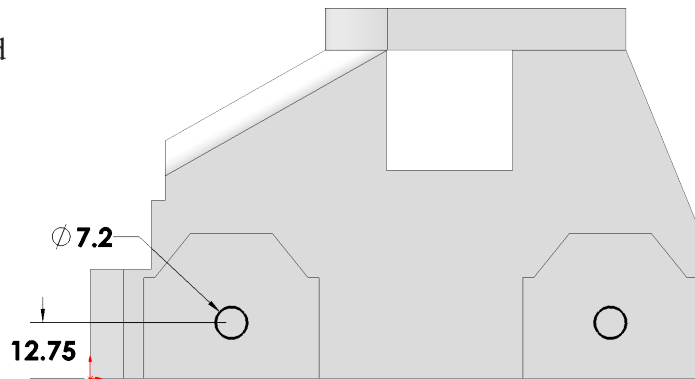
Step 14. Click **Extruded Cut**  on the Features toolbar.

Step 15. In the Cut-Extrude Property Manager set: under Direction 1, **Fig. 60**  
End Condition **Through All - Both**  
click OK .

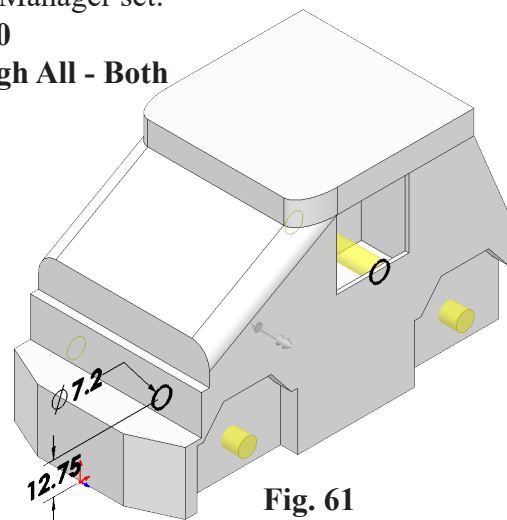
Step 16. Save  (Ctrl-S).



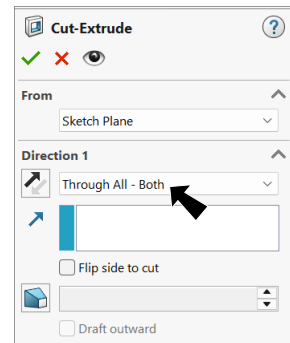
**Fig. 58**



**Fig. 59**





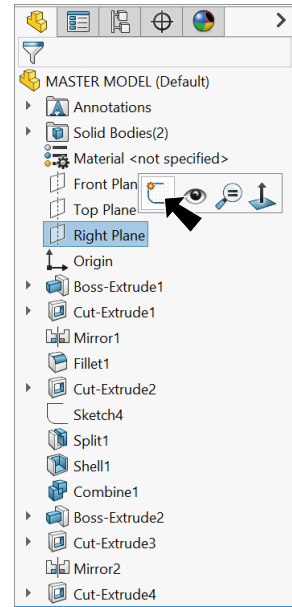
**Fig. 61**




**Fig. 60**

## N. Split2 Sketch8 Hatch, Chassis and Windshield Bodies.

Step 1. Click **Right Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 62**.

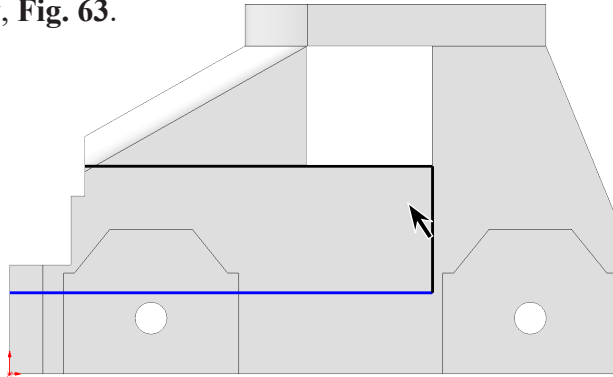


**Fig. 62**

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

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

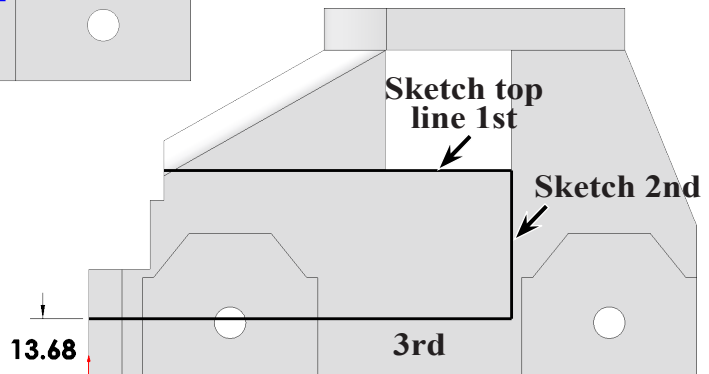
Step 4. Sketch the **3 lines**. Start from the **bottom rear vertex of side window**, **Fig. 63**.



**Fig. 63**

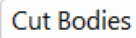
Step 5. Click **Smart Dimension**  (**S**) on the Sketch toolbar.

Step 6. Add dimension, **Fig. 64**.

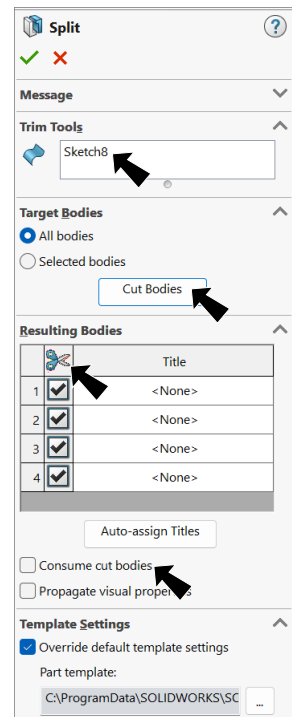


**Fig. 64**

Step 7. Click Insert Menu > Features > Split.

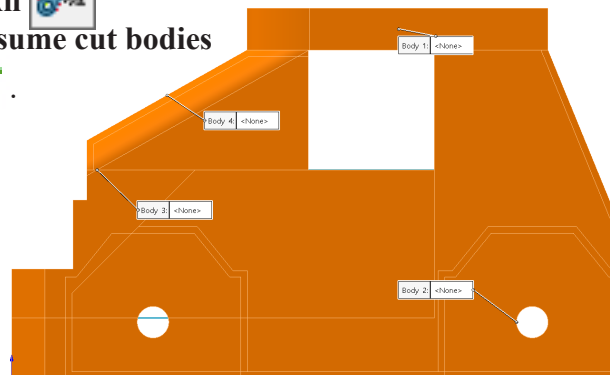
Step 8. In the Split Property Manager:  
 under Trim Tools, **Fig. 65**  
**Sketch8** was preselected  
 click **Cut Bodies**  button  
 under Resulting Bodies

click **Select All**   
 uncheck **Consume cut bodies**  
 click **OK** .














**Fig. 65**

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



**Fig. 66**

## O. Rename Bodies.

- Step 1. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)
- Step 2. **Hide Sketch8** . To hide, click **Sketch8**  in the Feature Manager and **Hide**  on the context toolbar, **Fig. 67**.
- Step 3. **Rename bodies CHASSIS** , **HATCH** , **WINDSHIELD**  and **ROOF** , **Fig. 68**. To rename, expand **Solid Bodies**  folder in the Feature Manager. Slowly click twice over Split2(1)  and key-in **CHASSIS** or use the F2 key. Repeat and rename, **HATCH, WINDSHIELD and ROOF**.
- Step 4. Save  (Ctrl-S).

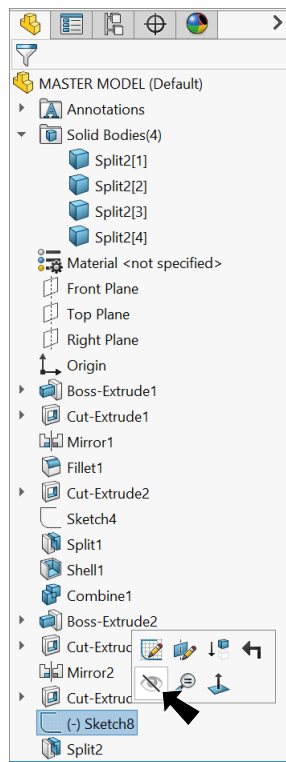


Fig. 67

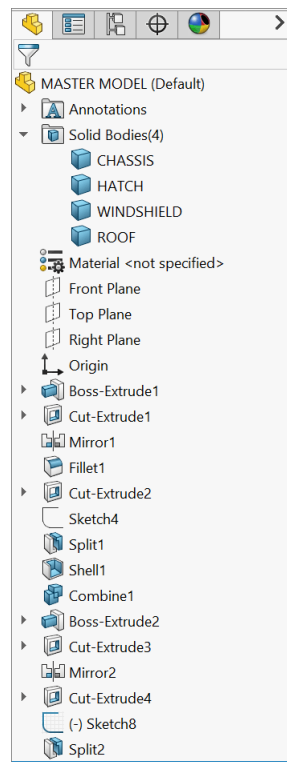






Fig. 68

## P. Appearance: White Plastic.

- Step 1. Click part, click **Appearance Callout**  on context toolbar and click **RIM** , **Fig. 69**.
- Step 2. In the Appearances Task pane, expand **Plastic**, click **Medium Gloss** and in the lower pane select **white medium gloss plastic**, **Fig. 70**.
- Step 3. Click OK  in the Property Manager.
- Step 4. Save  (Ctrl-S).

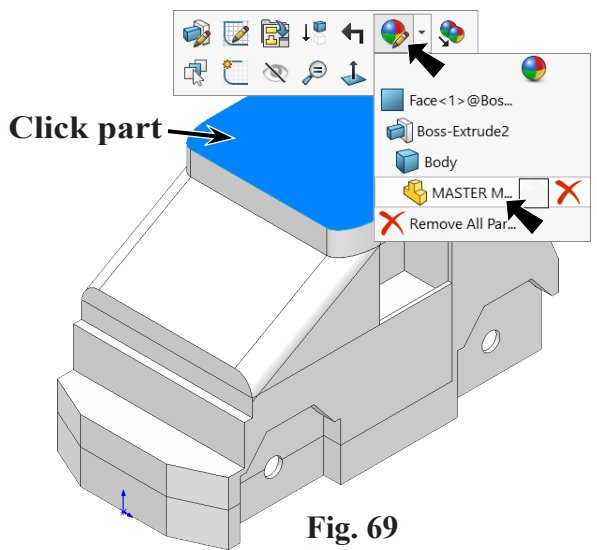


Fig. 69

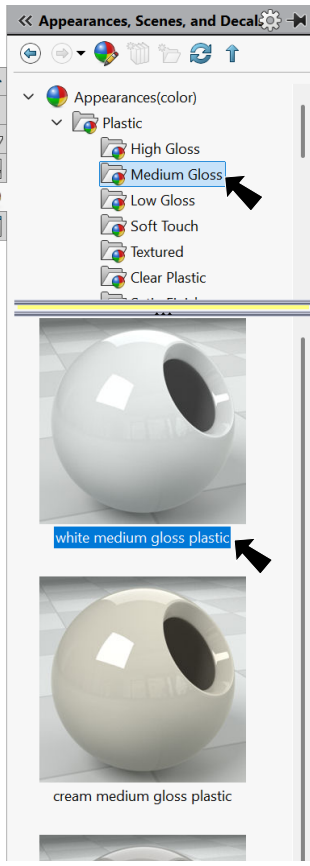


Fig. 70

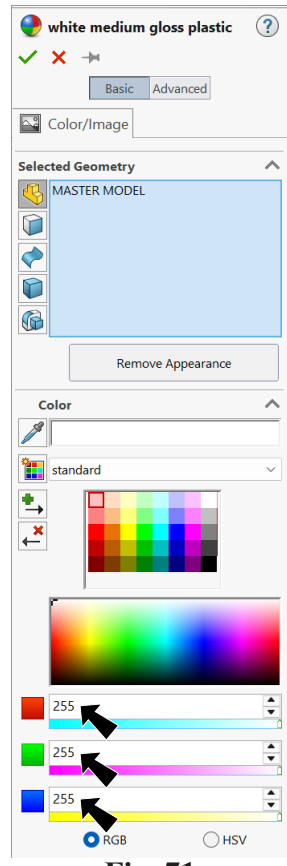


Fig. 71

## Q. Save Bodies.

Step 1. Click Insert Menu > Features > Save Bodies.

Step 2. In the Save Bodies Property Manager:

under Create Assembly, **Fig. 72**

click **Browse** button

in the Save As dialog box, **Fig. 73**

key in **ESCar ASSEMBLY** for file name

navigate to **My Documents/Tech Ed 25-26/ESCar** folder

click **Save**

under Template Settings

set **Part and Assembly template preference to your Metric**

templates

under Resulting Parts

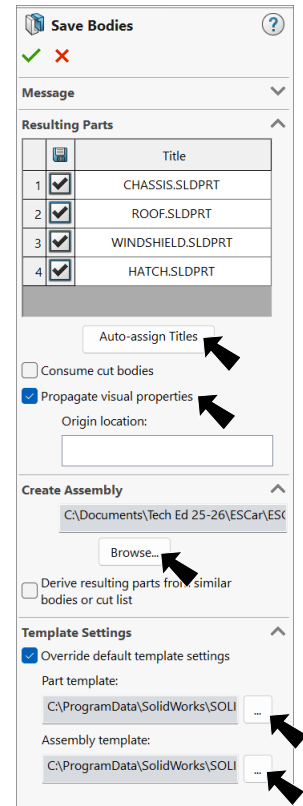
click **Auto-assign Titles** **Auto-assign Titles** button

check **Propagate visual properties**

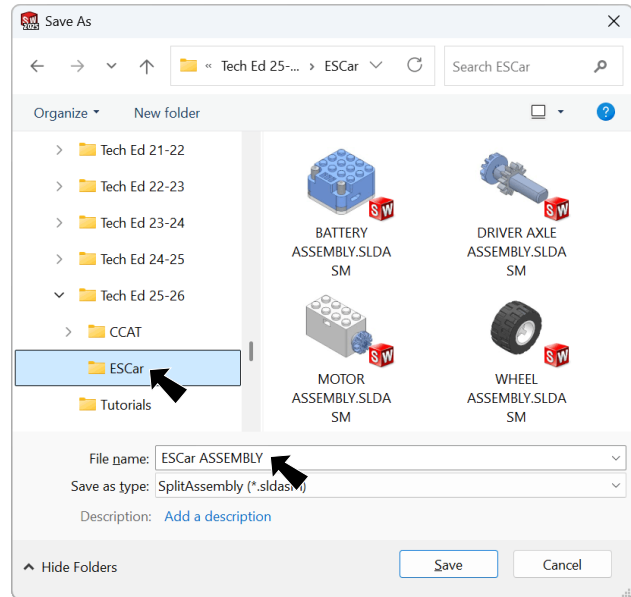
click **OK** .

SOLIDWORKS creates the **Part files and Assembly file.**

Step 3. Save  (**Ctrl-S**).



**Fig. 72**



**Fig. 73**