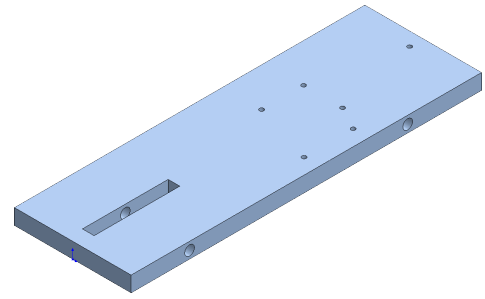


Solar Car Chassis



A. New Part.

Step 1. Click File Menu > New.

Step 2. Click **Part** from the list and click OK, Fig. 1.

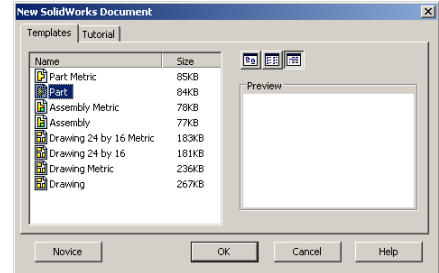





Fig. 1

B. Sketch Chassis.

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

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

Step 3. Draw a rectangle starting at the Origin , Fig. 3.

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

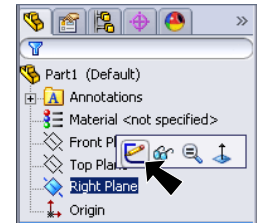


Fig. 2

Step 5. Add dimensions as shown in 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.

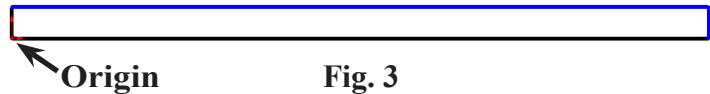


Fig. 3

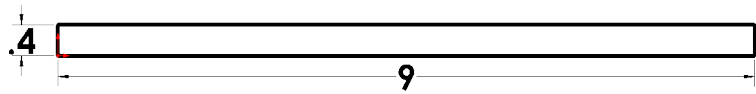
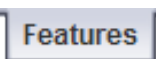


Fig. 4

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  D1 3

click OK , Fig. 6.

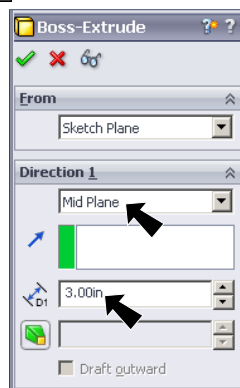


Fig. 5

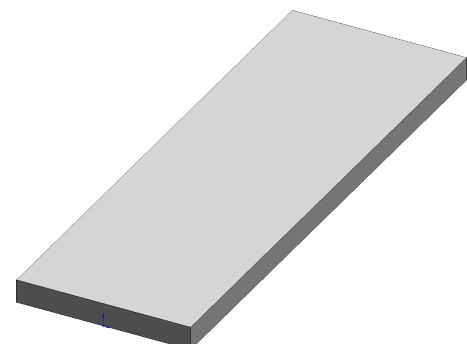




Fig. 6

C. Save as "CHASSIS".

Step 1. Click File Menu > Save As.

Step 2. Key-in CHASSIS for filename and press ENTER.

D. Axle Holes.

Step 1. Click **Right Plane**  in the Feature Manager and click **Sketch**  from the Content toolbar, **Fig. 7**.

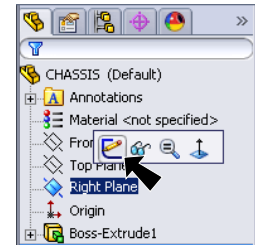


Fig. 7

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

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

Step 4. Draw two circles for the axle holes, **Fig. 8**.



Fig. 8

Step 5. **Right click drawing and click Select** from menu to unselect Circle tool.


Step 6. **Ctrl click both circles** to select both, **Fig. 9**. Release Ctrl key and click **Make Equal**  on the Content menu.



Fig. 9


Step 7. **Ctrl click center of both circles** to select both centers, **Fig. 10**. Release Ctrl key and click **Make Horizontal**  on the Content menu.



Fig. 10

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

Step 9. Add dimensions as shown in **Fig. 11**. To Smart dimension circle, click the circle then move the cursor out away from circle and click. Key-in **.25** for diameter and press ENTER. To add other dimensions, click circle and edge of body, move cursor just off of body and click. Key in dimension and press ENTER. Arrange the dimensions as shown in **Fig. 11**.

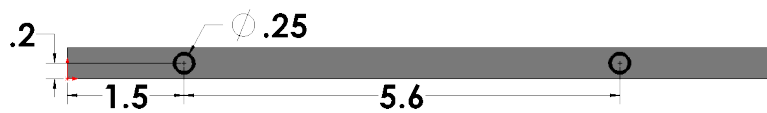


Fig. 11

Step 10. **Right click drawing and click Select** from menu to unselect Smart Dimension.

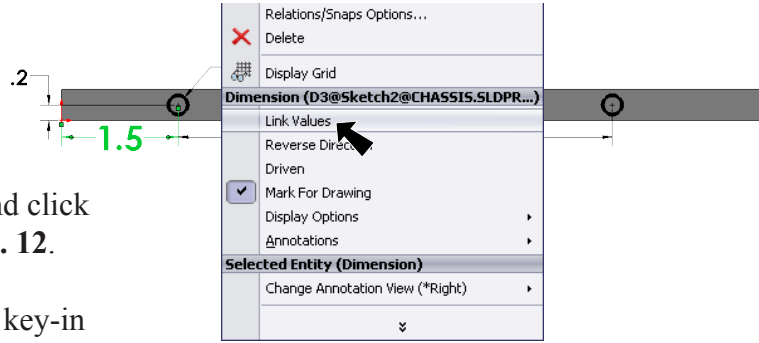


Fig. 12

Step 11. **Right click the 1.5 dimension and click Link Values** from the menu, Fig. 12.

Step 12. In the Shared Values dialog box, key-in **Axle From Front** for the Name and click OK, Fig. 13.



Fig. 13


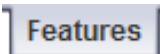



Step 13. **Linked Values**  icon appears next to the dimension, Fig. 14. Later when we create the cut in the Chassis for the Front Wheel we will link this dimension. Changes made to Linked Values causes the other to change.



Fig. 14

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

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

Step 16. In the Property Manager set:
 under Direction 1, Fig. 15
 End Condition **Mid Plane**
Depth  **3**
 click OK , Fig. 16.

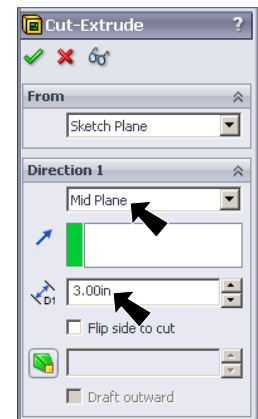


Fig. 15



Fig. 16

Step 17. Save. Use **Ctrl-S**.

E. Panel Support Pin Hole.


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



Fig. 17

Step 2. Click the **back face** of the body and click **Sketch**  on the Content menu, Fig. 17.

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

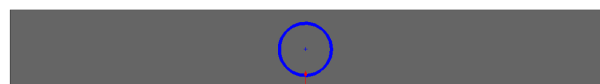



Fig. 18

Step 4. Draw a circle for the panel support pin hole, Fig. 18.

Step 5. **Right click drawing and click Select** from menu to unselect Circle tool.

Step 6. **Ctrl click center point of circle and Origin** to select both, **Fig. 19**.

Release Ctrl key and click **Make Vertical**  on the Content menu.

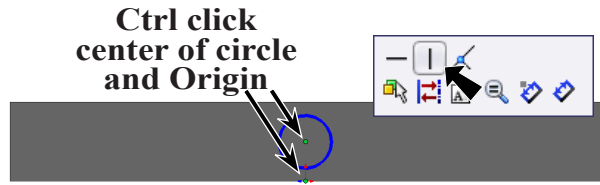


Fig. 19

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

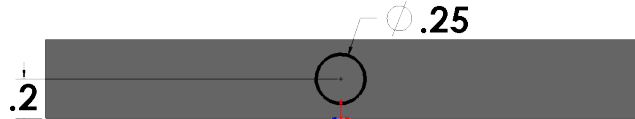
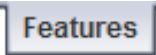
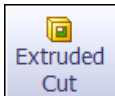


Fig. 20

Step 8. Add dimensions as shown in **Fig. 20**.

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

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

Step 11. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

Step 12. In the Property Manager set: under Direction 1, **Fig. 21**

Depth  **.3**
click **OK** , **Fig. 22**.

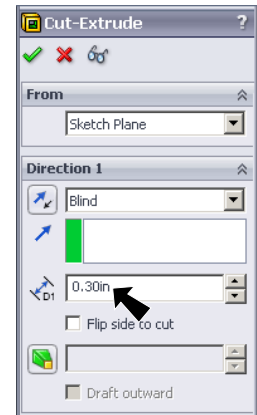


Fig. 21

Step 13. Save. Use **Ctrl-S**.

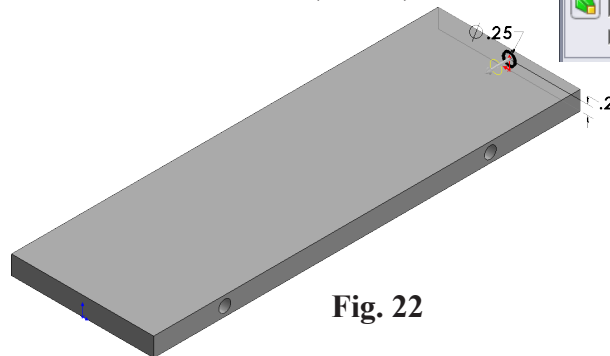

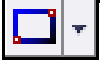


Fig. 22

F. Cut Front Wheel Well Slot.

Step 1. Click the **top face** of base and click **Sketch**  on the Content menu, **Fig. 23**.

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

Step 3. Click **Center Rectangle**  (S) in the **Rectangle flyout**  on the Sketch toolbar.

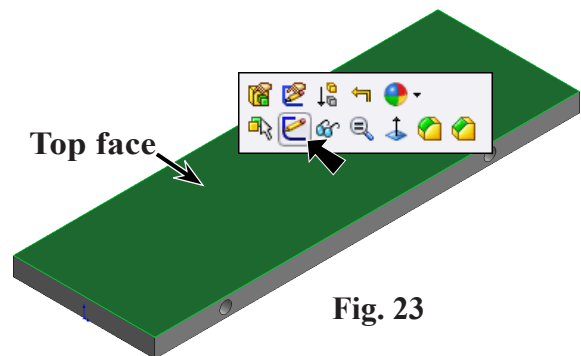




Fig. 23

Step 4. Draw a rectangle on the chassis, **Fig. 24**.

Step 5. **Right click drawing and click Select** from menu to unselect Center Rectangle tool.

Step 6. **Ctrl click center point of rectangle and Origin** to select both, **Fig. 25**.
Release Ctrl key and click **Make Vertical**  on the Content menu.

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

Step 8. Add dimensions as shown in **Fig. 26**.

Step 9. **Right click drawing and click Select** from menu to unselect Smart Dimension.

Step 10. **Right click the 1.5 dimension and click Link Values** from the menu, **Fig. 27**.

Step 11. In the Shared Values dialog box for Name select **Axle From Front** and click OK, **Fig. 28**.


Step 12. **Linked Values**  icon appears next to the dimension, **Fig. 29**. Now, with the Linked Values, if you adjust the position of the axle this cut position will change by changing either Linked Value.



Fig. 24

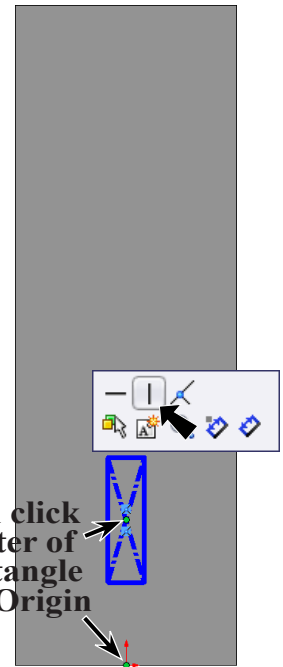


Fig. 25

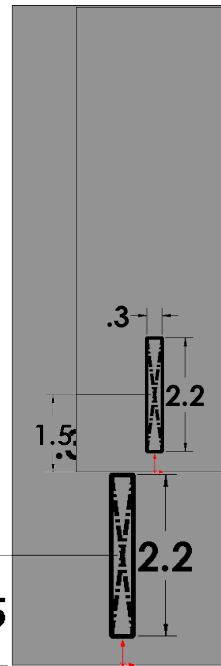


Fig. 26

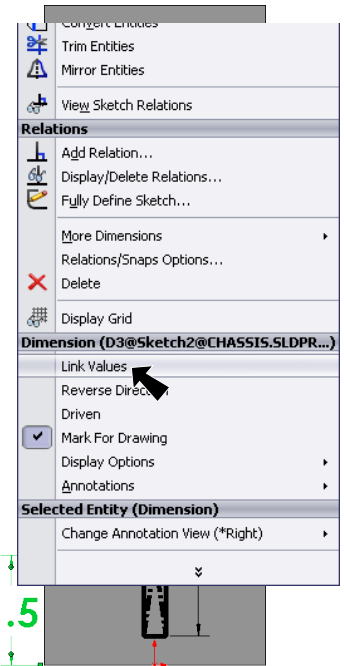


Fig. 27



Fig. 28

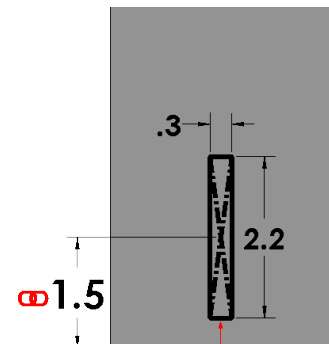
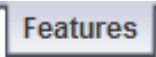




Fig. 29

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. 30**
End Condition **Through All**
click OK , **Fig. 31**.

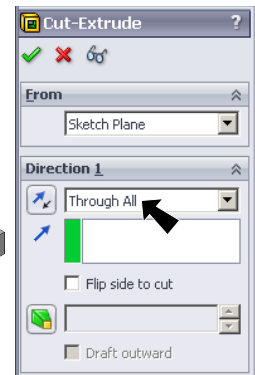


Fig. 30

Step 16. Save. Use **Ctrl-S**.

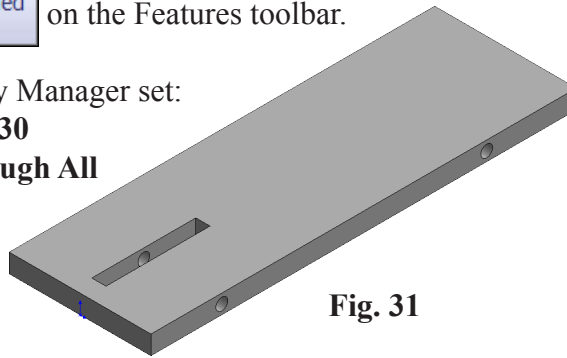




Fig. 31

G. Hole Wizard for Sheet Metal Parts.

Step 1. Click **Top**  on the View toolbar. (**Ctrl-5**)

Step 2. Click **Hole Wizard**  on the Features toolbar.

Step 3. In the Property Manager, on the Type tab set:
under Hole Type:
click **Hole** , **Fig. 32**
under Standard:
select **ANSI Inch**
under Type:
select **Fractional Drill Sizes**
under Size:
select **7/64**
under End Condition:
select **Through All**

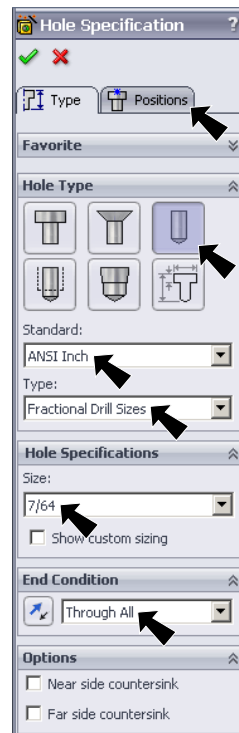


Fig. 32

Step 4. Click **Positions** tab  at top of Property Manager.

Step 5. Click to place 6 hole approximately as shown in **Fig. 33**.

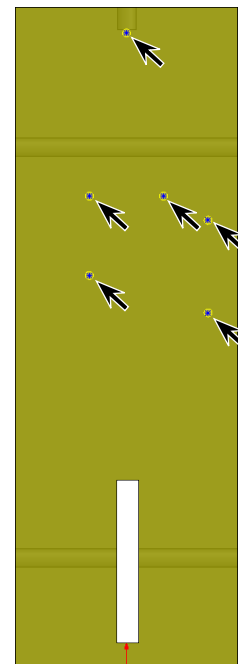



Fig. 33

Step 6. **Right click drawing and click Select** from menu to unselect Point tool.

Step 7. **Ctrl click the two top Points** to select both. **Release Ctrl key** and click **Make Horizontal**  on the Content menu, **Fig. 34**.

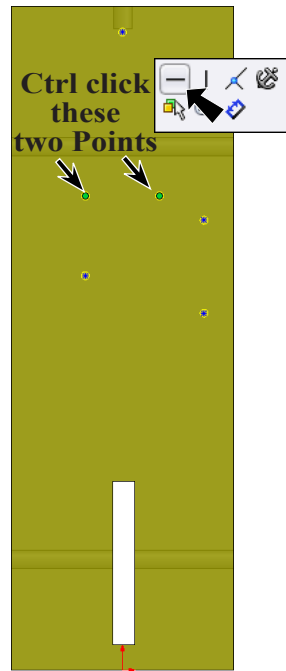



Fig. 34

Step 8. **Ctrl click the two Points on left** to select both, **Fig. 35**. **Release Ctrl key** and click **Make Vertical**  on the Content menu.

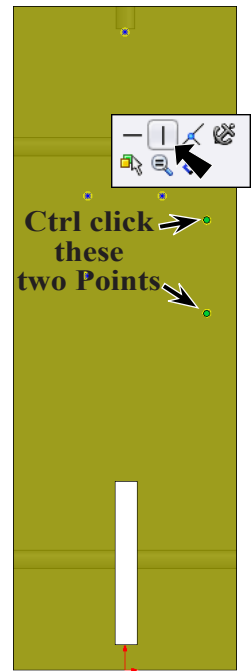




Fig. 35

Step 9. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 10. Dimension as shown in **Fig. 36**.

Step 11. Click OK  in the Dimension Property Manager and OK  in the Hole Wizard Property Manager.

Step 12. Save. Use **Ctrl-S**.

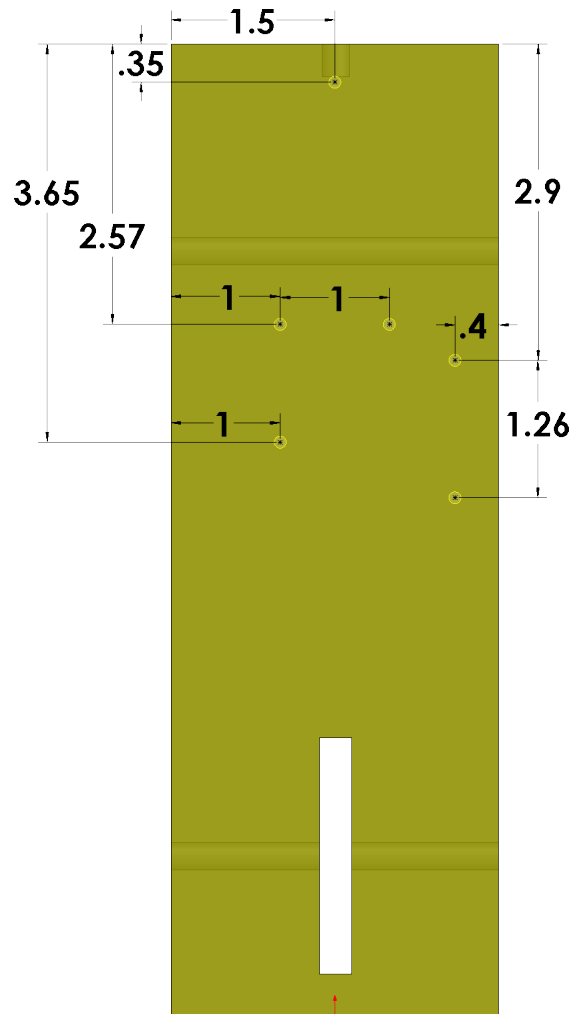



Fig. 36

H. Mate References.

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

Step 2. Click **Right Plane**  in the Feature Manager to select Plane, **Fig. 37**.

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

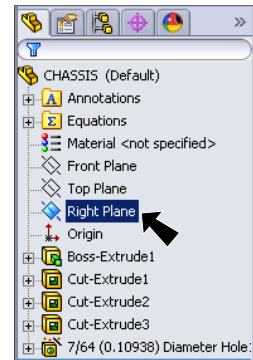


Fig. 37

Step 4. In the Mate Reference Manager:
under **Primary Reference Entity**, **Fig. 38**

set **Mate Reference Type**  **Coincident**

under **Secondary Reference Entity**

click in Entity box 

and click **inside cylindrical face of front axle hole**, **Fig. 39**

click OK .

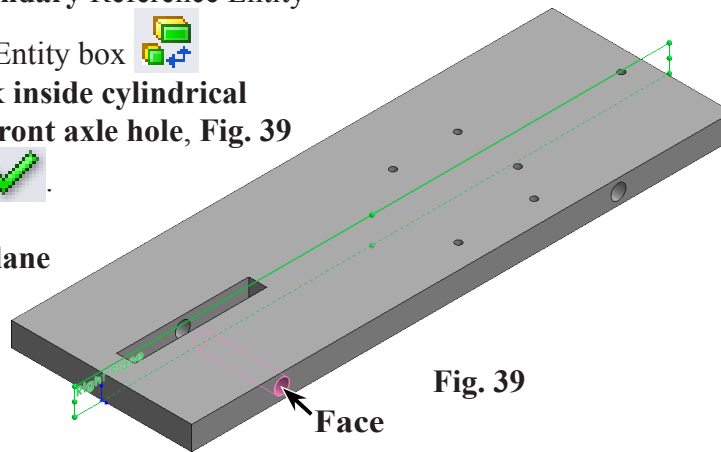


Fig. 39

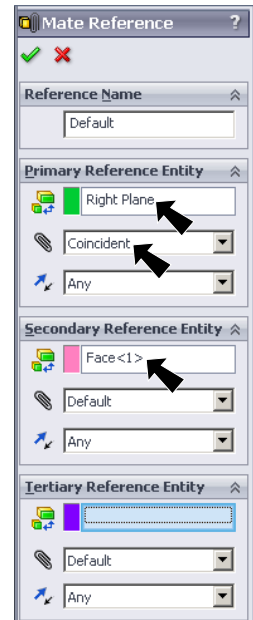




Fig. 38

Step 5. Click **Right Plane**  in the Feature Manager to select Plane, **Fig. 40**.

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. 38**

set **Mate Reference Type**  **Coincident**

under **Secondary Reference Entity**

click in Entity box 

and click **inside cylindrical face of rear axle hole**, **Fig. 41**

click OK .

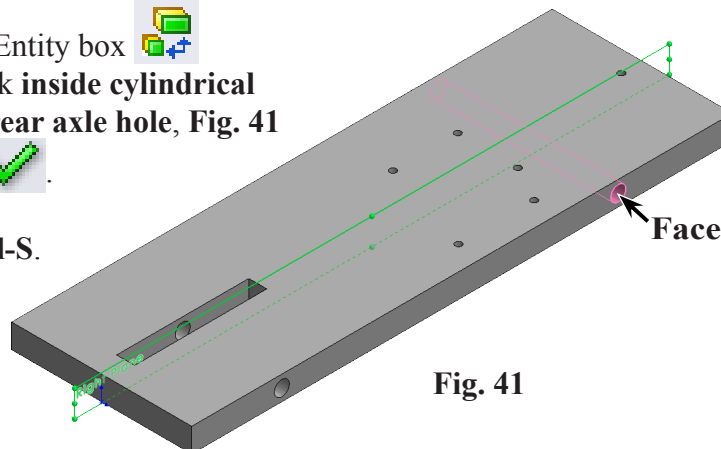


Fig. 41

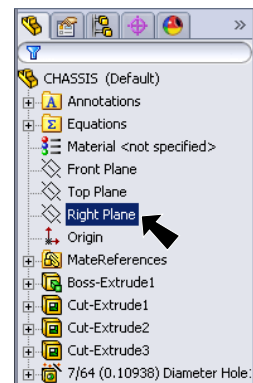




Fig. 40

Step 8. Save. Use **Ctrl-S**.

I. Material PS HI (Polystyrene).

Step 1. Right click Material  in the Feature Manager and click Edit Material , Fig. 42.

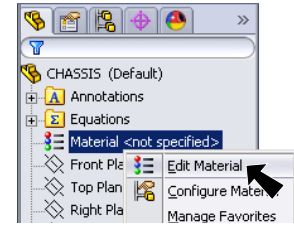


Fig. 42

Step 2. Expand Plastics (click +) in the material tree and select PS HI, Fig. 43. Click Apply and Close, Fig. 43.

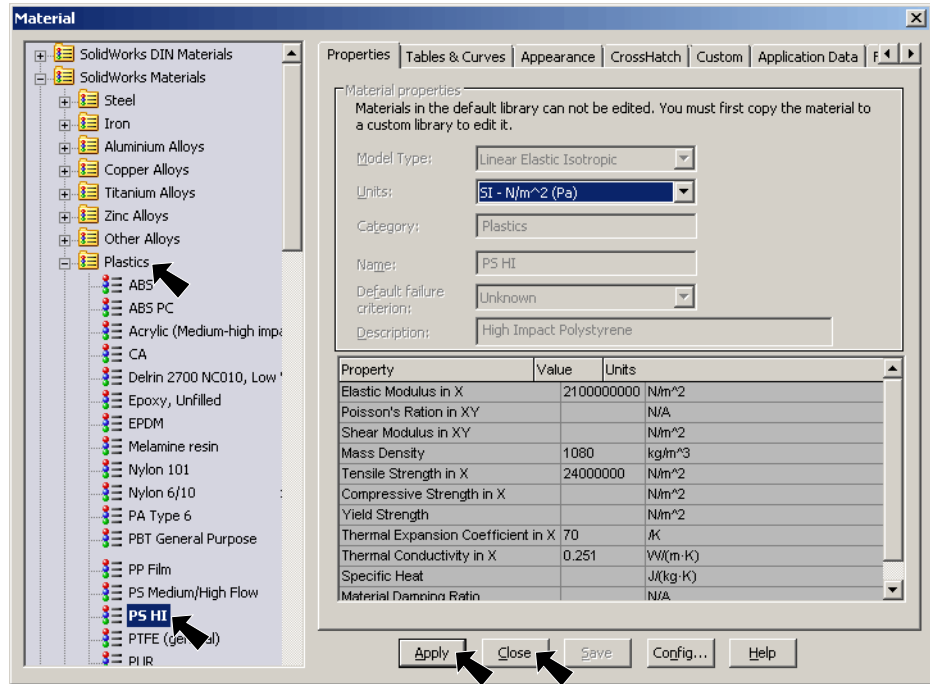





Fig. 43

J. Appearance Color.

Step 1. Click the Chassis, click Appearance Callout  on the Content toolbar and click CHASSIS , Fig. 44.

Step 2. In the Appearances Property Manager, Fig. 45

under Color:
set RGB values
R 180
G 212
B 255
click OK .

Step 3. Save. Use Ctrl-S.

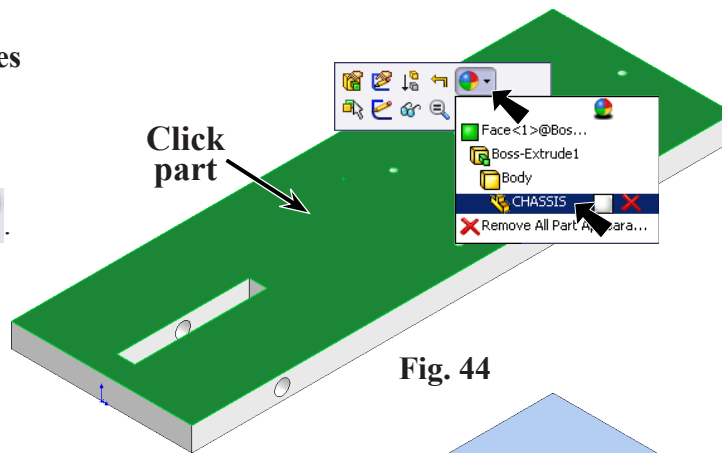


Fig. 44

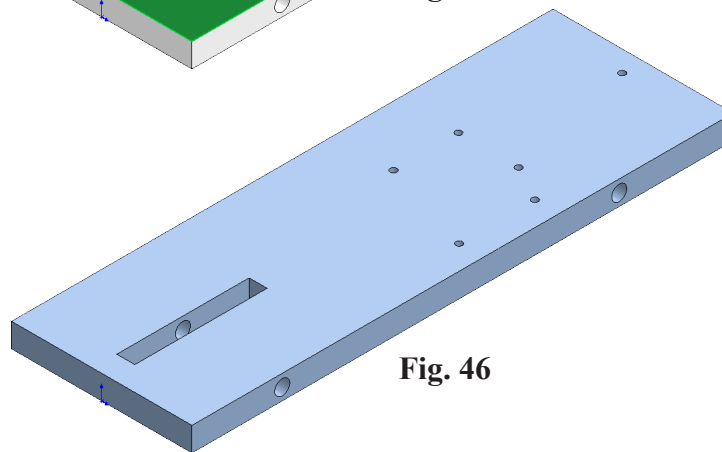


Fig. 46

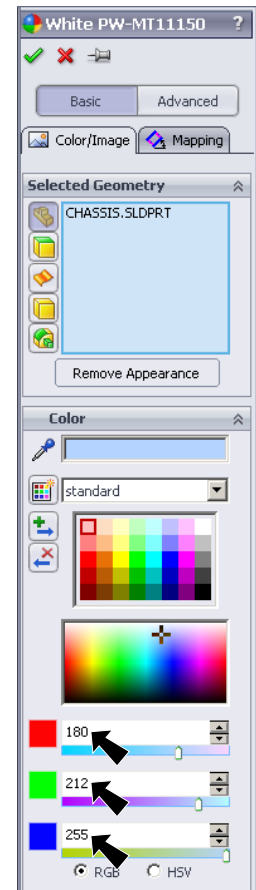


Fig. 45