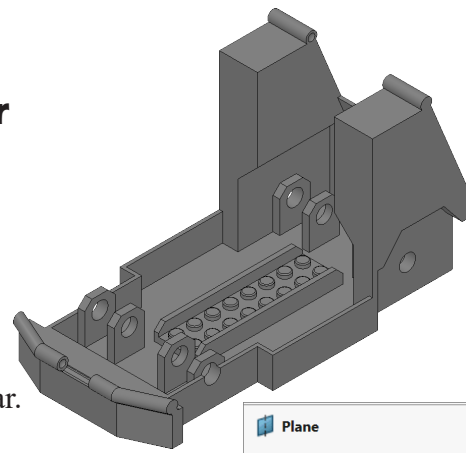


# E's Small Car Chassis

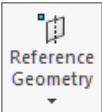


## A. Create Plane1.

Step 1. Open your Chassis part file.

Step 2. Click **Isometric**  on the Standard Views toolbar.

Step 3. Click **Features**  on the Command Manager toolbar.

Step 4. Click **Reference Geometry**  on the Features toolbar and **Plane** from the menu.

Step 5. In the Plane Property Manager set:  
under First Reference, **Fig. 1**  
click **outside face of Chassis**, **Fig. 2**

**Distance**  17

check **Flip offset**

The new plane should be towards passenger's side of face.

Click OK .

Step 6. Save  (Ctrl-S).

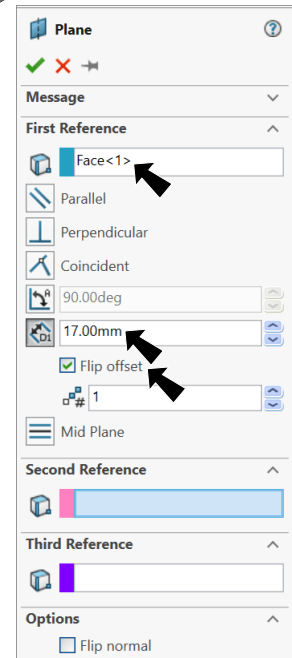


Fig. 1

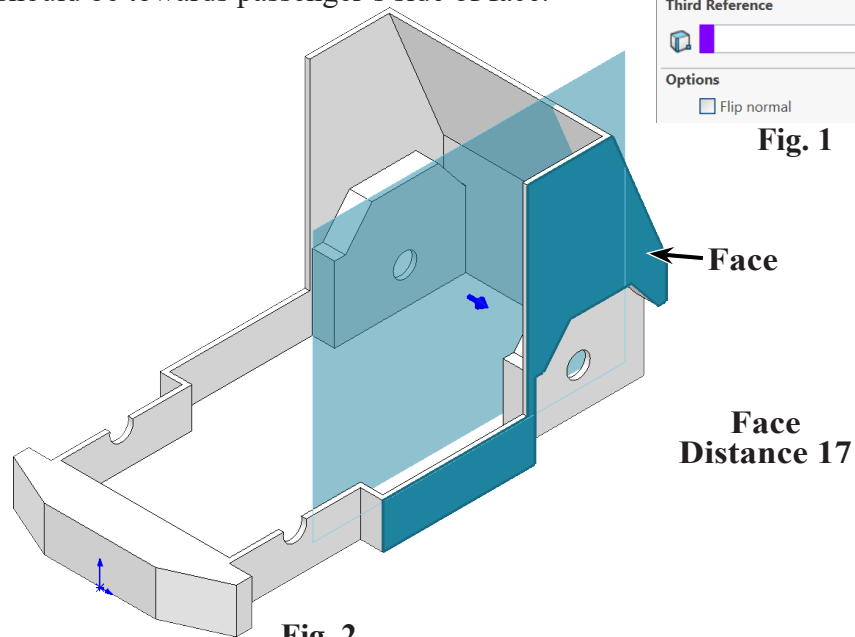



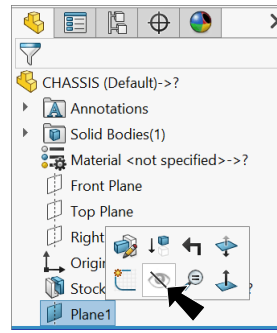




Fig. 2

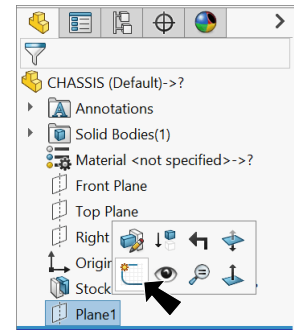
## B. Extrude1 Sketch1 Pillar.

Step 1. **Hide Plane1** . To hide, click **Plane1**  in the graphics area and **Hide**  on the context toolbar, **Fig. 3**.



**Fig. 3**


Step 2. Click **Plane1**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 4**.

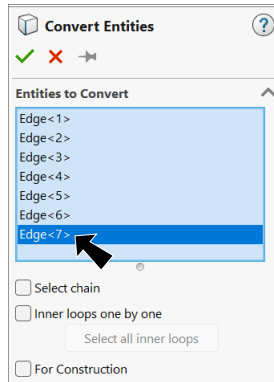


**Fig. 4**

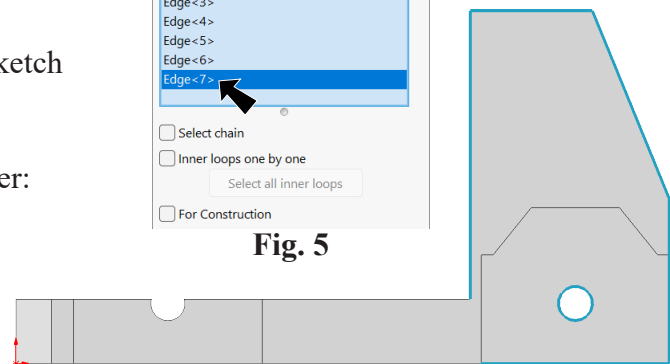
Step 3. Click **Normal To**  on the Standard Views toolbar. (Ctrl-8)

Step 4. Click **Convert Entities**  on the Sketch toolbar.

Step 5. In the Convert Entities Property Manager: under Entities to Convert, **Fig. 5** click **edges of pillar (6)** and **edge of axle hole (1)**, **Fig. 6** click OK .



**Fig. 5**



**Fig. 6**

Step 6. Click **Trim Entities**  (S) on the Sketch toolbar.

Step 7. In the Trim Property Manger:

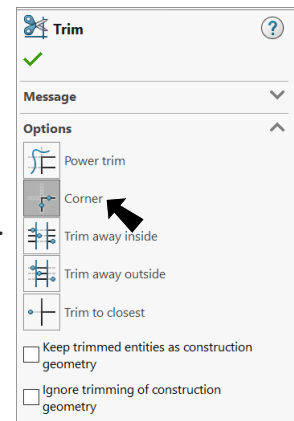
select **Corner** , **Fig. 7**

Trim the front and bottom converted edges to close sketch, **Fig. 8**.

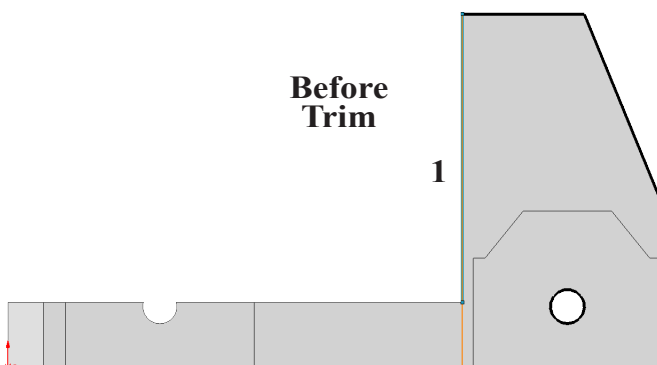
Click entities to trim.

Results shown in **Fig. 9**.

Click OK  when done.

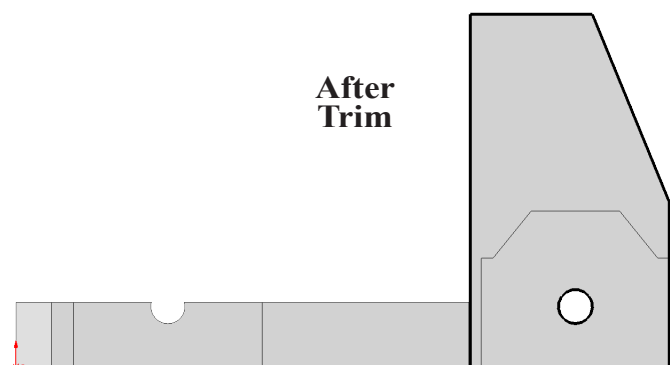


**Fig. 7**




**Fig. 8**

2




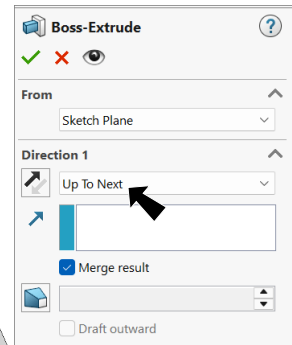
**Fig. 9**

Step 8. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)

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

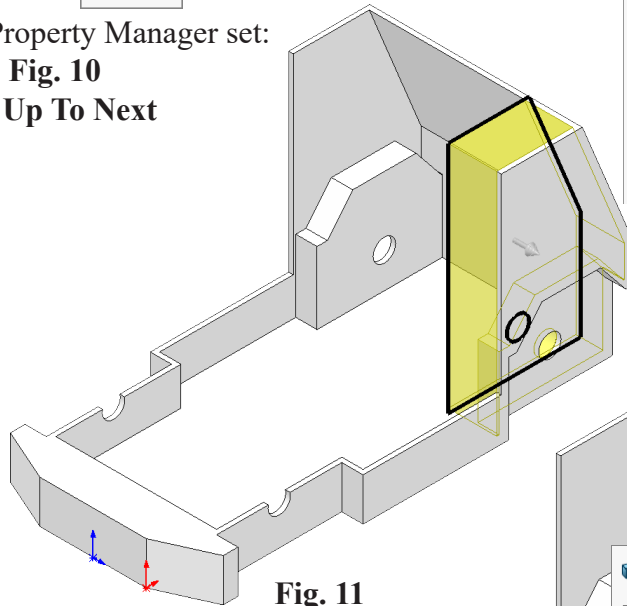
Step 10. Click **Extruded Boss/Base**  on the Features toolbar.

Step 11. In the Boss-Extrude Property Manager set:  
under Direction 1, **Fig. 10**  
End Condition **Up To Next**  
click OK  .




**Fig. 10**


Step 12. Save  (Ctrl-S).



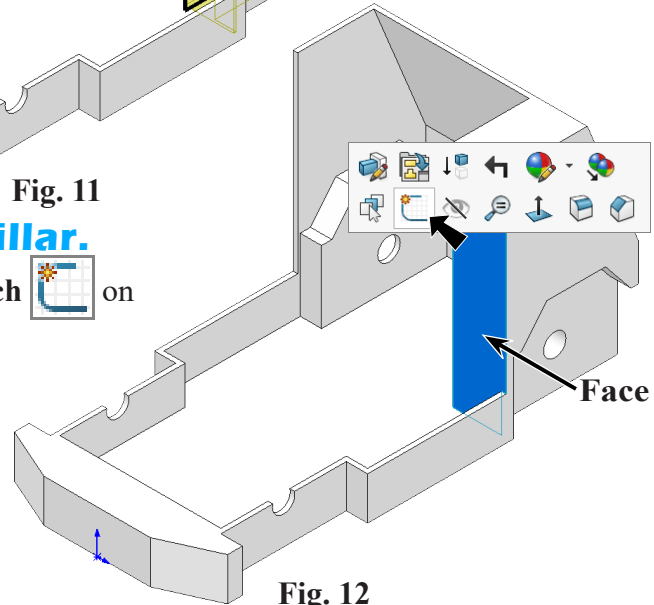
**Fig. 11**

### C. Extruded Cut 1 Sketch 2 Cut Pillar.

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

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

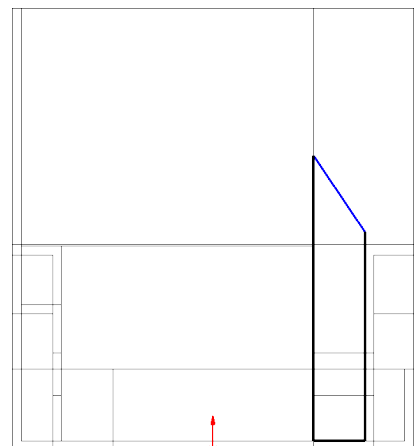
Step 3. Click **Wireframe**  on the View toolbar.



**Fig. 12**

Step 4. Click **Line**  (L) on the Sketch toolbar.

Step 5. Sketch the **4 lines**, **Fig. 13**. Start on inside edge of pillar along edge, down to bottom inside edge. Across to inside edge and then up at angle to close sketch.



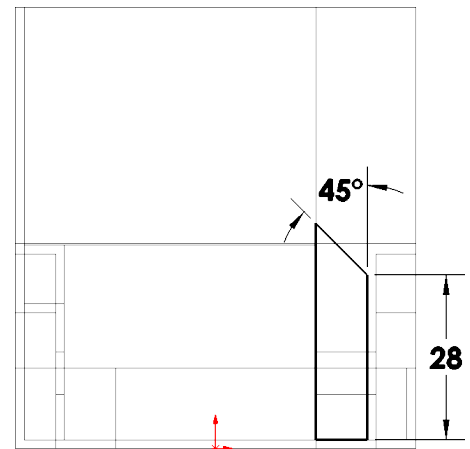
**Fig. 13**

Step 6. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 7. Add dimensions, **Fig. 14**.

Step 8. Click **Shaded With Edges**  on the View toolbar.


Step 9. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)

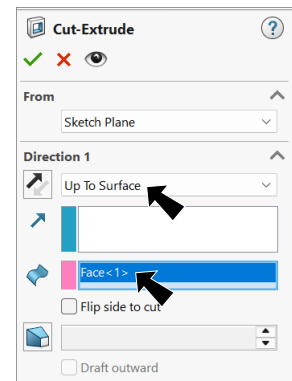


**Fig. 14**

Step 10. Click **Features**  on the Command Manager toolbar.

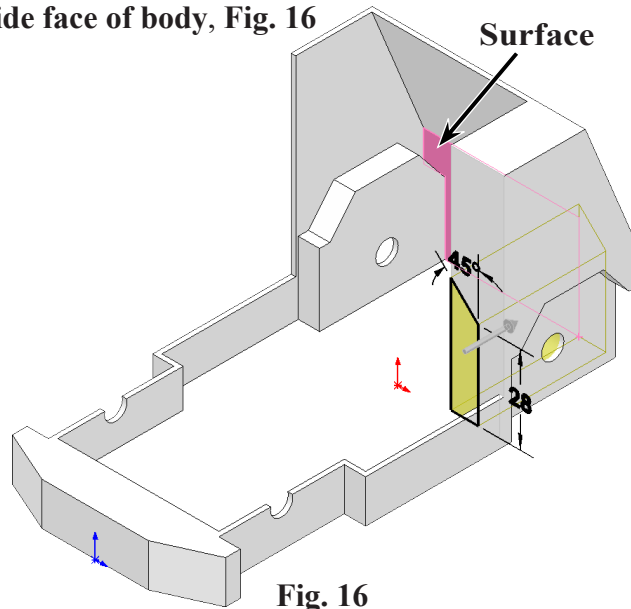
Step 11. Click **Extruded Cut**  on the Features toolbar.

Step 12. In Cut-Extrude Property Manager set:  
under Direction 1, **Fig. 15**  
End Condition **Up To Surface**  
click **rear inside face of body**, **Fig. 16**  
click OK .



**Fig. 15**

Step 13. Save  (Ctrl-S).



**Fig. 16**

## D. Mirror1 Pillar.

Step 1. Ctrl click Right Plane, Boss-Extrude1 and Cut-Extrude1 features to select plane and features, Fig. 17.

Step 2. Click Mirror  on the Features toolbar.

Step 3. In the Mirror Property Manager click OK .

Step 4. Save  (Ctrl-S).

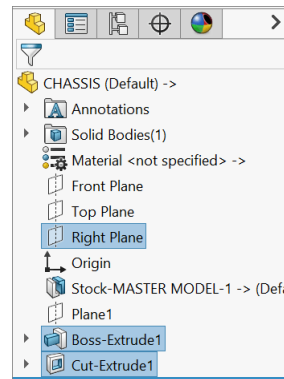


Fig. 17

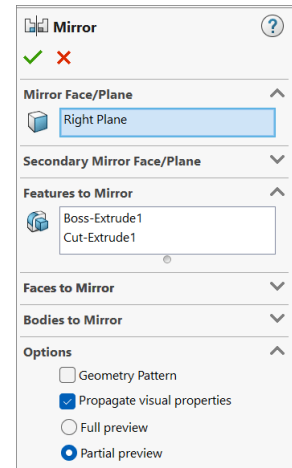


Fig. 18

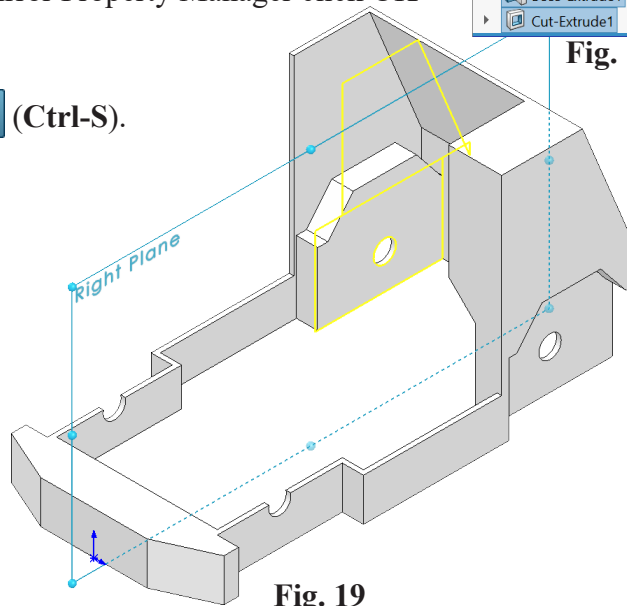


Fig. 19

## E. Section View.

Step 1. Click Section View  in View toolbar. Or View > Display > Section View.

Step 2. In the Section View Property Manager: under Section 1, Fig. 20

click Top Plane 

Offset Distance  36.3

click OK .

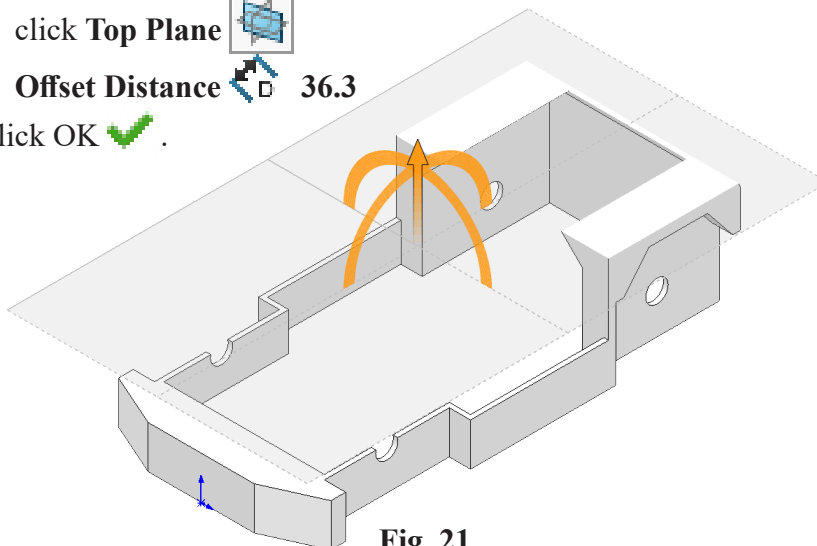


Fig. 21

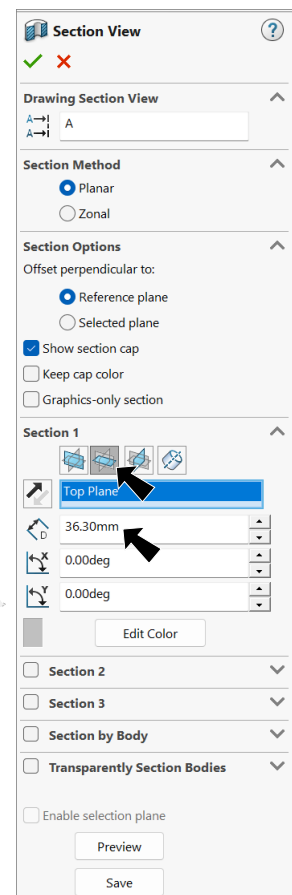


Fig. 20

## F. Delete Face.

Step 1. Zoom in on pillars, **Fig. 22**.


Step 2. Click **Surfaces**  on the Command Manager toolbar.


Step 3. Click **Delete Face**  on the Surfaces toolbar.

Step 4. In the Delete Face Property Manager:

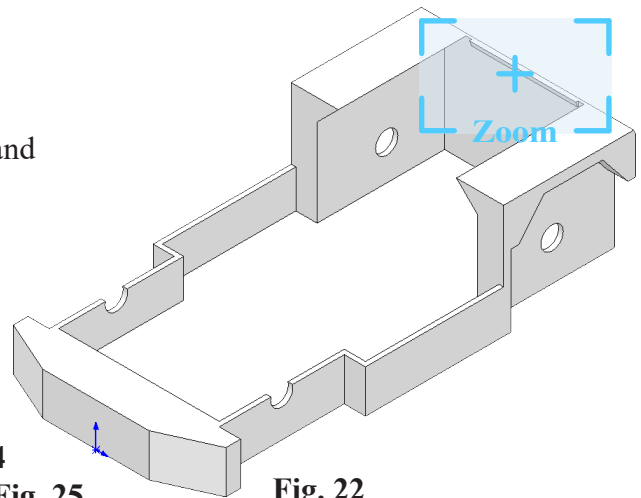
under Selections, **Fig. 23**  
 click **small triangular face**, **Fig. 24**  
 Rotate view to view inside other side, **Fig. 25**.

Use **Ctrl-Shift** click **Y axis of the Reference Triad**  **twice**  
 click **other small triangular face**, **Fig. 25**

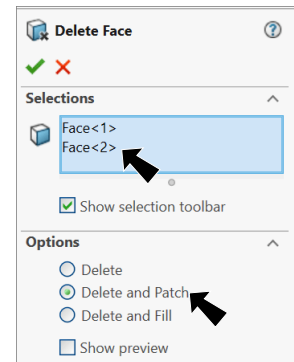
under Options  
**Delete and Patch**  
 click **OK** .

Step 5. Turn off **Section View**  in View toolbar. Or View > Display > Section View.

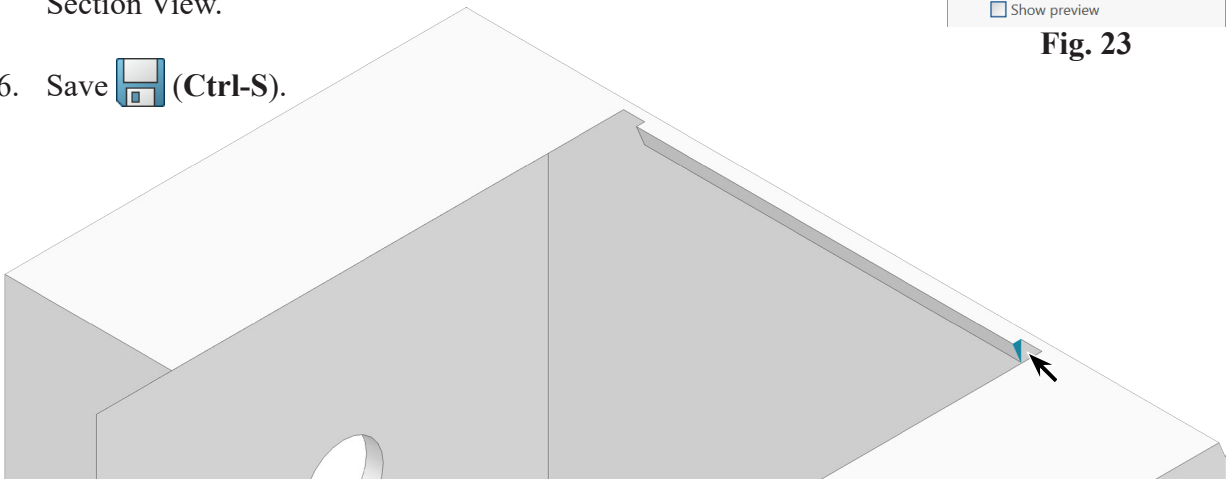
Step 6. Save  (**Ctrl-S**).



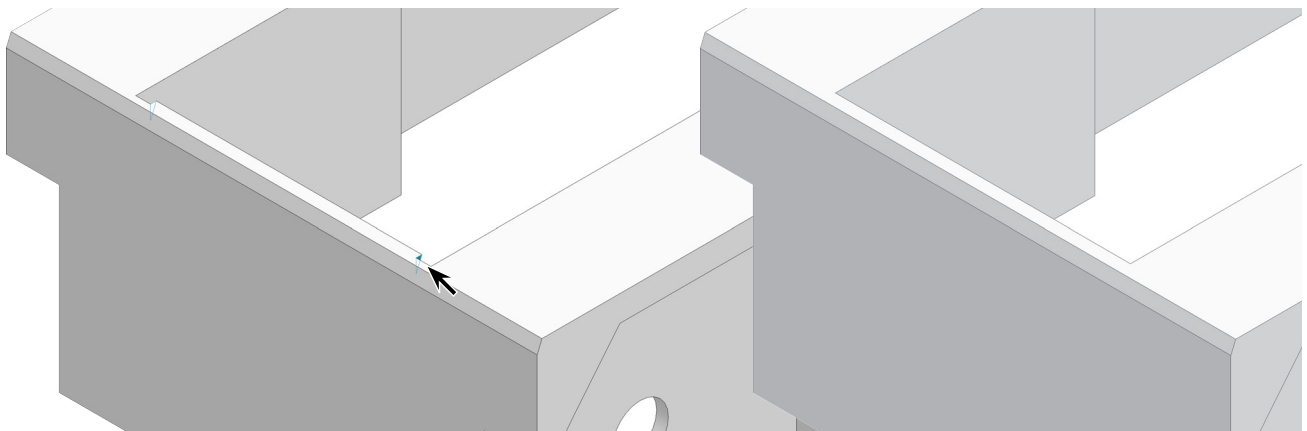
**Fig. 22**



**Fig. 23**





**Fig. 24**




**Fig. 25**



**Fig. 26**

## G. Extruded Cut2 Sketch3 Rear Window.

Step 1. Click **Right Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 27**.

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

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


Step 4. Click **Parallelogram**  in the **Rectangle flyout**  on the Sketch toolbar.

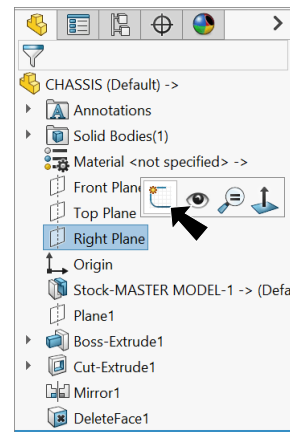
Step 5. Sketch parallelogram along the rear wall with the top and bottom lines horizontal. Start parallelogram on rear edge, up to top vertex and along top edge, **Fig. 28**.

Step 6. Click **Smart Dimension**  (S) on the Sketch toolbar.

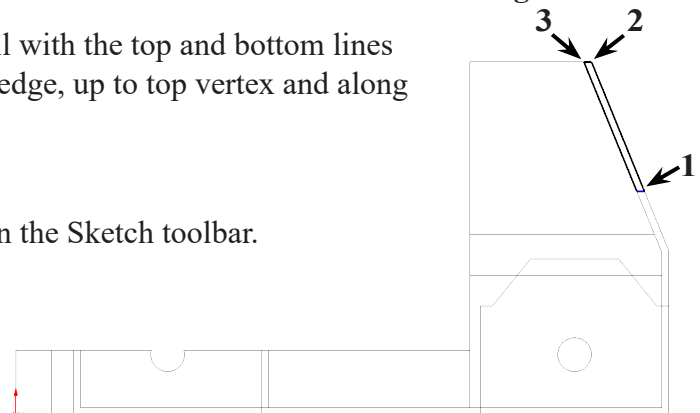
Step 7. Add **47.4** dimension, **Fig. 29**.

Step 8. Click **Shaded With Edges**  on the View toolbar.

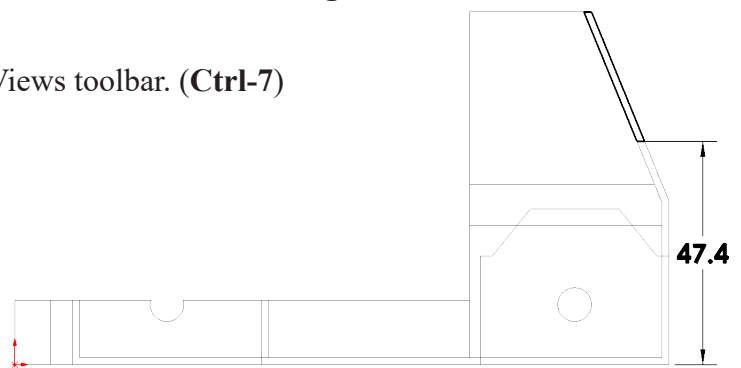
Step 9. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)



**Fig. 27**

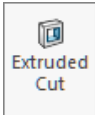


**Fig. 28**



**Fig. 29**

Step 10. Click **Features**  on the Command Manager toolbar.

Step 11. Click **Extruded Cut**  on the Features toolbar.

Step 12. In Cut-Extrude Property Manager set:

under Direction 1, **Fig. 30**

End Condition **Up To Surface**

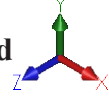
click **inside face of pillar**, **Fig. 31**

under Direction 2

End Condition **Up To Surface**

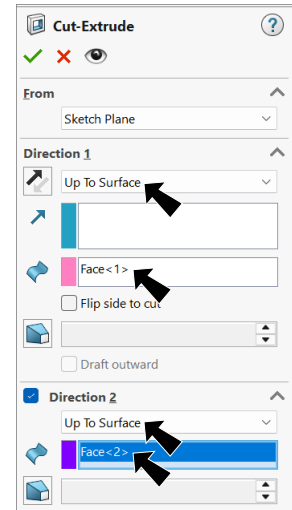
Rotate view to inside other pillar, use **Ctrl-Shift** click the **Y**

**axis of the Reference Triad**




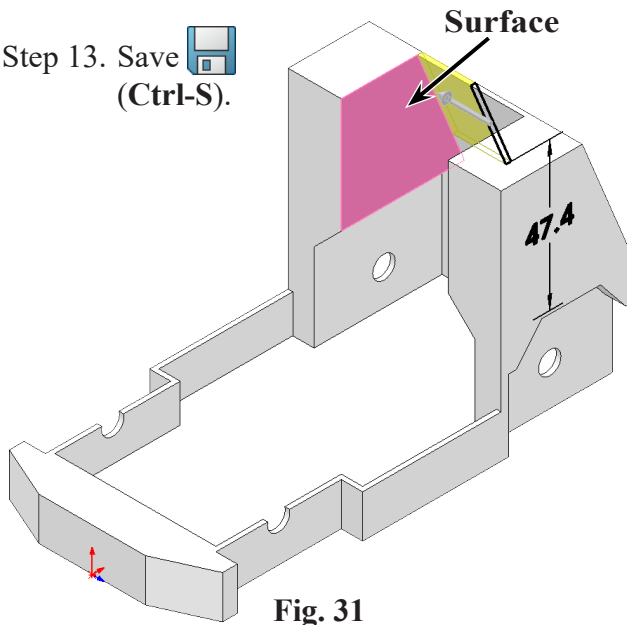
click **inside face of pillar**, **Fig. 32**

click **OK** .

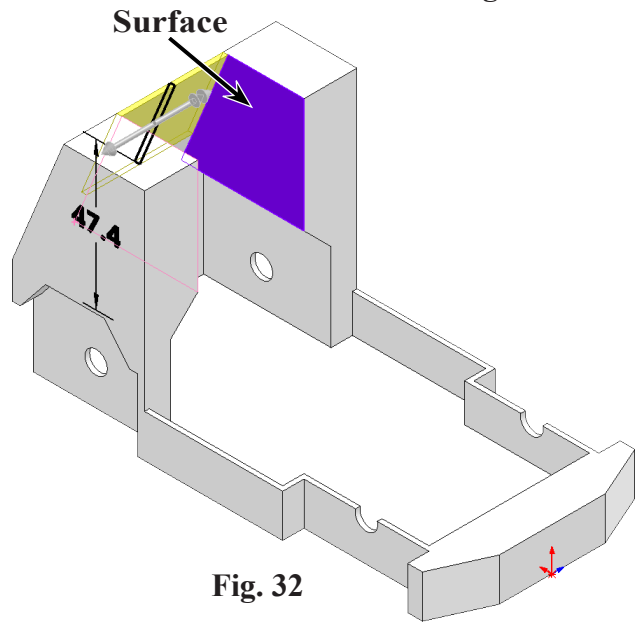


**Fig. 30**

Step 13. Save   
(**Ctrl-S**).






**Fig. 31**



**Fig. 32**

## H. Sweep Sketch4 Hinge 1 Chassis/Hatch.

Step 1. Click **Right Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 33**.

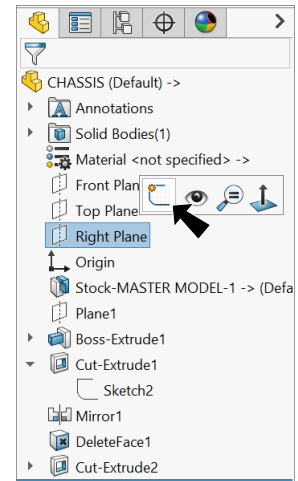
Step 2. Click **Normal To**  on the Standard Views toolbar. (**Ctrl-8**)

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

Step 4. Sketch **circle on front edge of body**, **Fig. 34**.

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

Step 6. Add dimensions, **Fig. 35**.

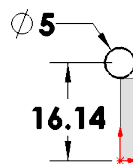


**Fig. 33**

**Sketch  
circle on  
edge**



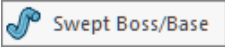
**Fig. 34**




**Fig. 35**


Step 7. Rotate view to **hinge**, **Fig. 37**. Use **Right Arrow key**  **once** and use **Down Arrow key**  **once**.

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

Step 9. Click **Swept Boss/Base**  on the Features toolbar.

Step 10. In the Swept Property Manager:  
under Profile and Path, **Fig. 36**

**Profile**  circle is selected, **Fig. 37**

**Path**  **right click** and click **Selection Manager**

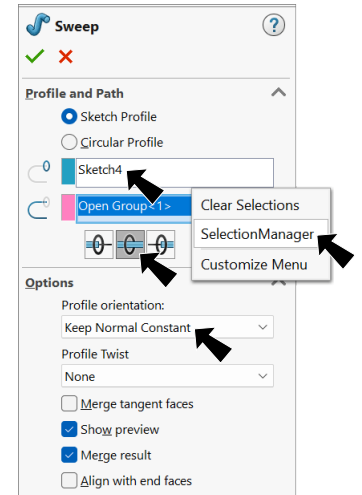
click **Select Group**  in Selection Manager, **Fig. 38**  
click the **3 edges along top front edge of bumper**

click OK in Selection Manager 

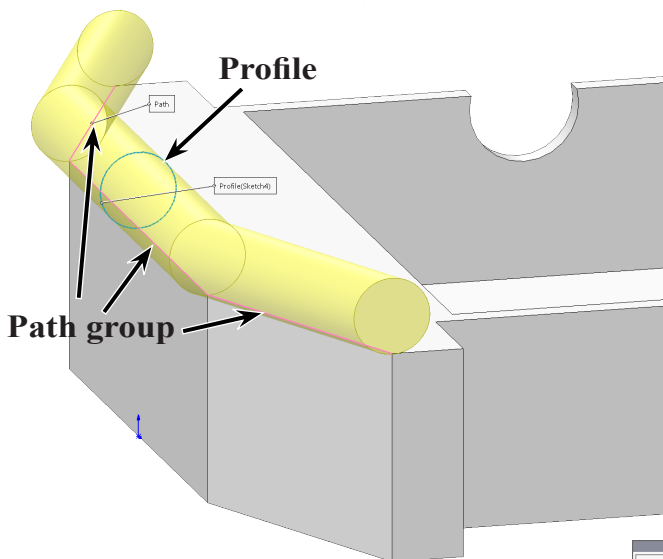
select **Bidirectional**   
under Options

Profile orientation **Keep Normal Constant**

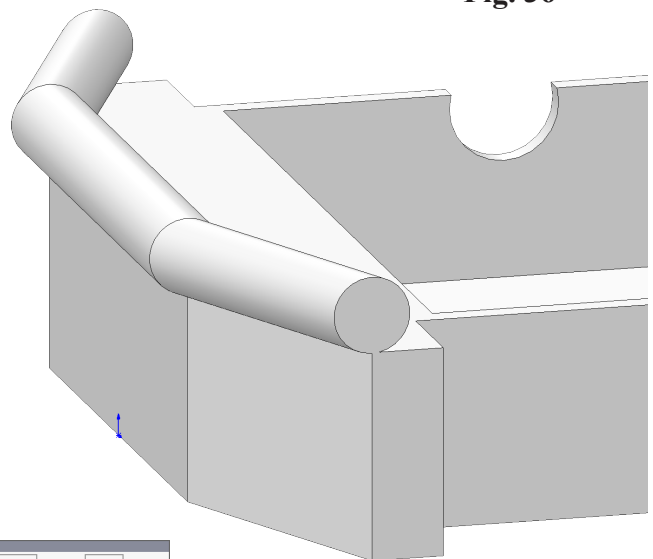
click OK 



**Fig. 36**



**Fig. 37**



**Fig. 39**



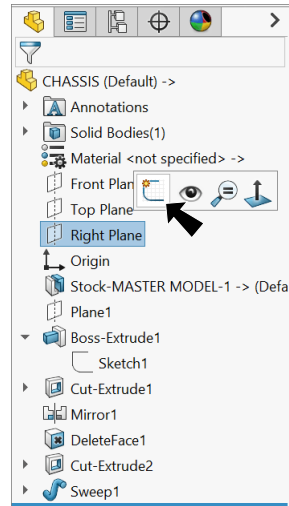
**Fig. 38**

# I. Extruded Cut2 Sketch3 Hinge1 Chassis/Hatch.

Step 1. Click **Right Plane**  in the Feature Manager and click **Sketch**



on the context toolbar, **Fig. 40**.

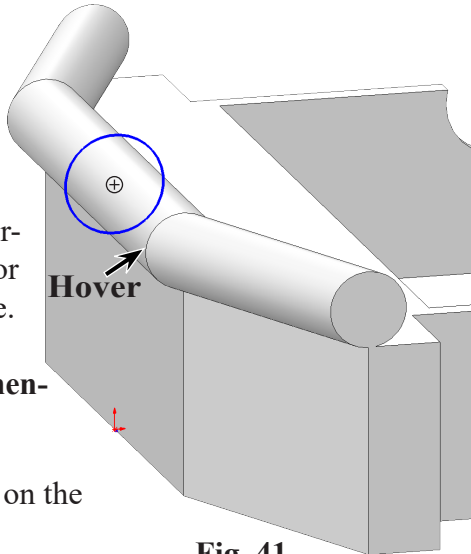


**Fig. 40**

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

Step 3. Sketch **circle at centerpoint of horizontal section of hinge Sweep1**, **Fig. 41**.

To wake up centerpoint, hover cursor over circular edge.

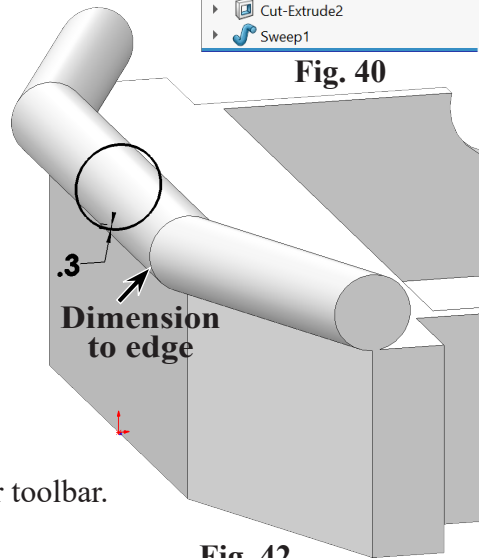


**Fig. 41**

Step 4. Click **Smart Dimension**



**sion** (S) on the Sketch toolbar.



**Fig. 42**

Step 5. Add **offset dimension .3** from circular edge, **Fig. 42**.

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

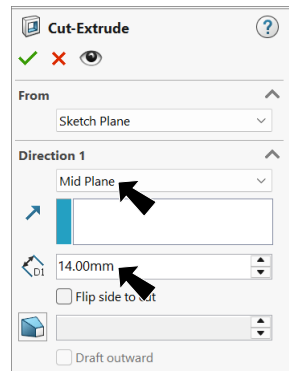
Step 7. Click **Extruded Cut**  on the Features toolbar.

Step 8. In the Cut-Extrude Property Manager set:


under **Direction 1**, **Fig. 43**  
End Condition **Mid Plane**

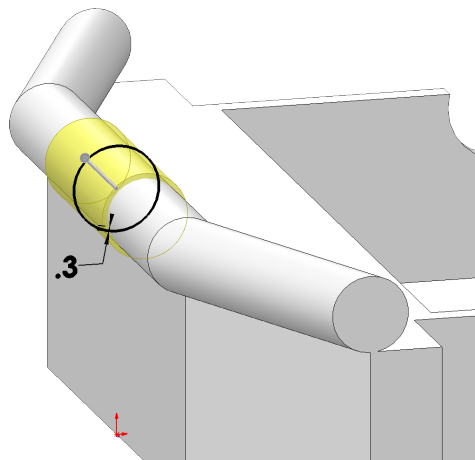
**Depth**  **14**

click **OK** .

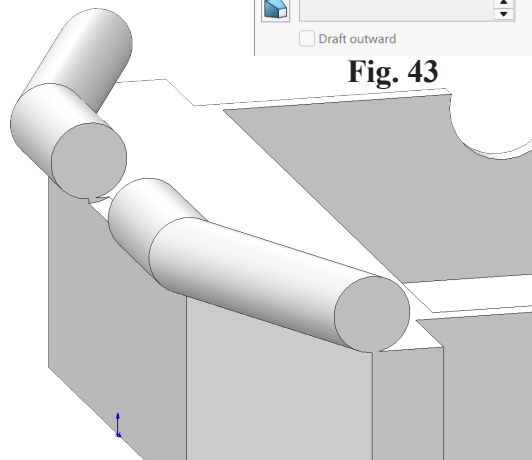


**Fig. 43**

Step 9. Save  (Ctrl-S).



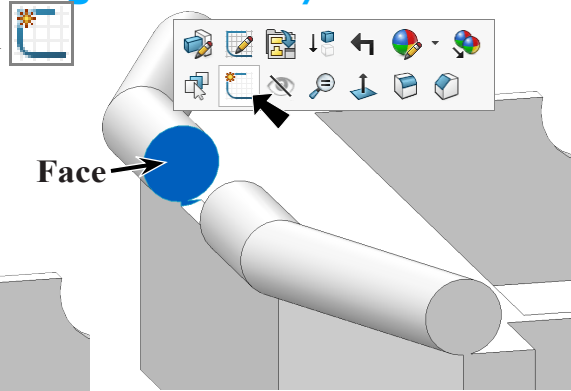
**Fig. 44**



**Fig. 45**

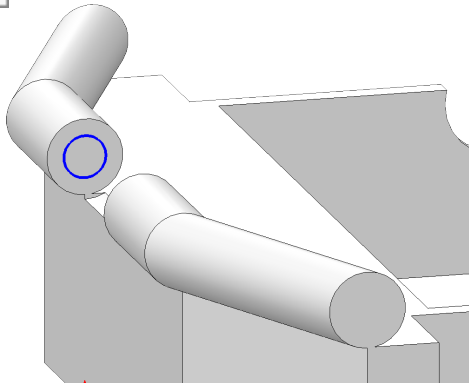
## J. Split Line and Dome Sketch4 for Hinge1 Chassis/Hatch.

Step 1. Click the **inside face of hinge** and click **Sketch** on the context toolbar, **Fig. 46**.



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

Step 3. Sketch **circle at centerpoint of cut**, **Fig. 47**. Wake up center-point.



Step 4. Click **Smart Dimension**

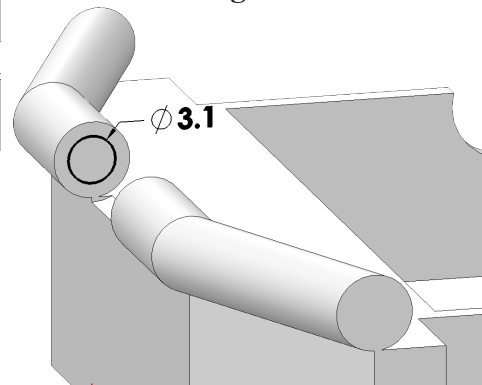


(S) on the Sketch toolbar.

**Fig. 47**


Step 5. Dimension **diameter 3.1**, **Fig. 48**.



Step 6. Click Insert Menu > Curve > Split Line.

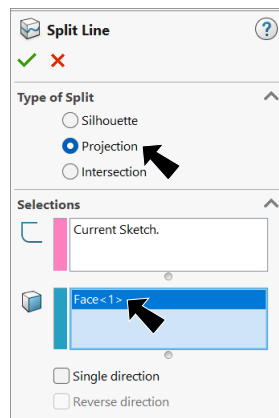


**Fig. 48**

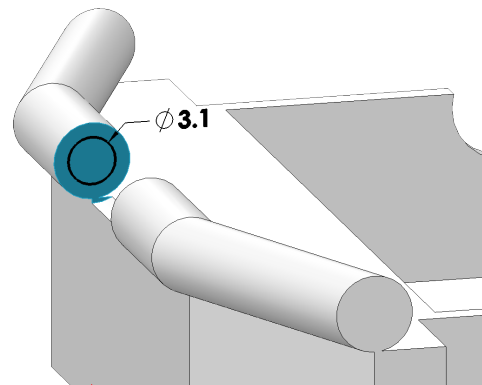
Step 7. In the Split Line Property Manager: under Type of Split, **Fig. 49** select **Projection**

under Selections  **Sketch is selected**

in Faces to Split field  click **side face**, **Fig. 50** click OK .



**Fig. 49**



**Fig. 50**

Step 8. Click **Dome**  **Dome** on the Features toolbar.

Step 9. In the Dome Property Manager set:

under Parameters, **Fig. 51** click **split line face**,

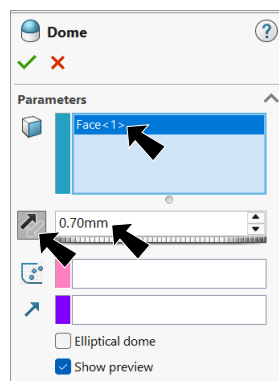
**Fig. 52**

**Distance .7**

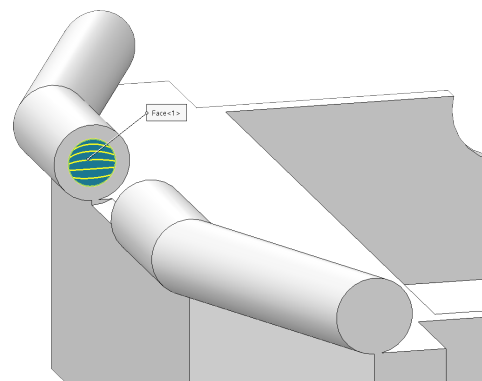
**Reverse Direction** 

**Dome should be inward**

click OK .




**Fig. 51**



**Fig. 52**


Step 10. Save  (Ctrl-S).

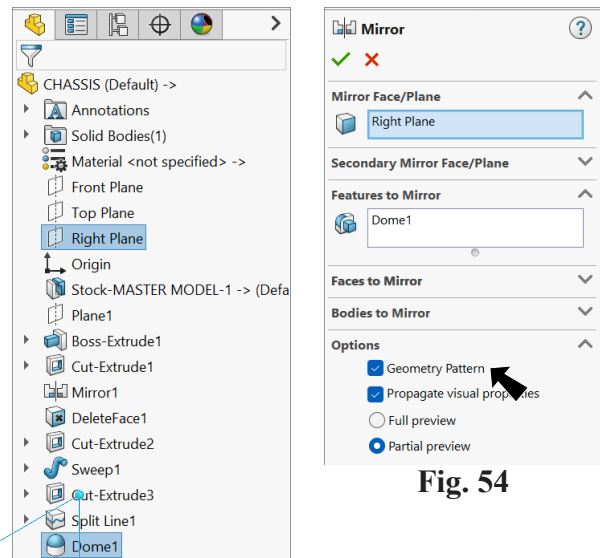
## K. Mirror2 Dome.

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

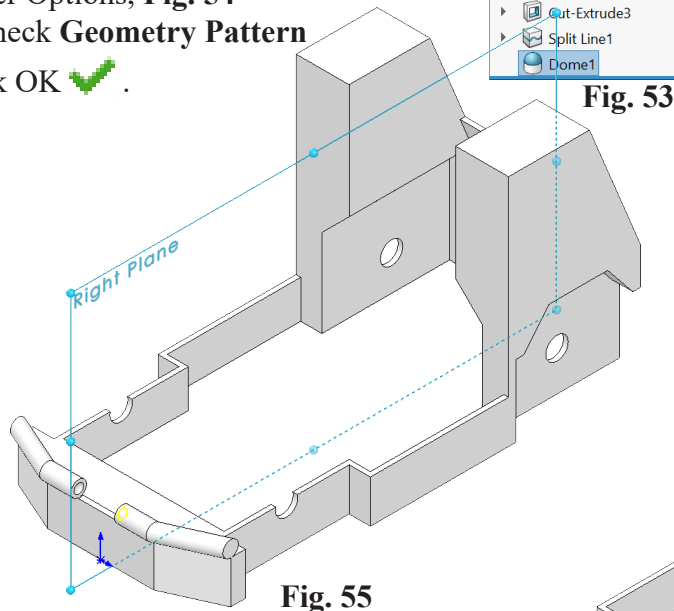
Step 2. **Ctrl click Right Plane** and **Dome1** features to select plane and feature, **Fig. 53**.

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

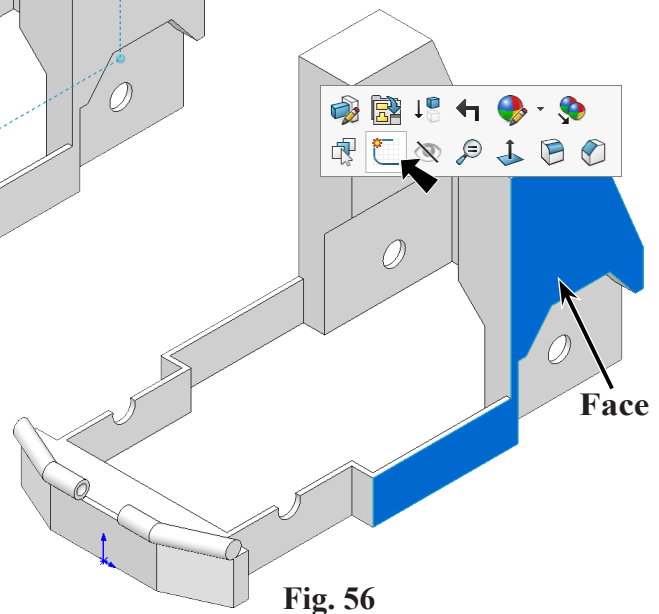
Step 4. In the Mirror Property Manager set: under Options, **Fig. 54** check **Geometry Pattern** click OK .



**Fig. 54**




**Fig. 53**



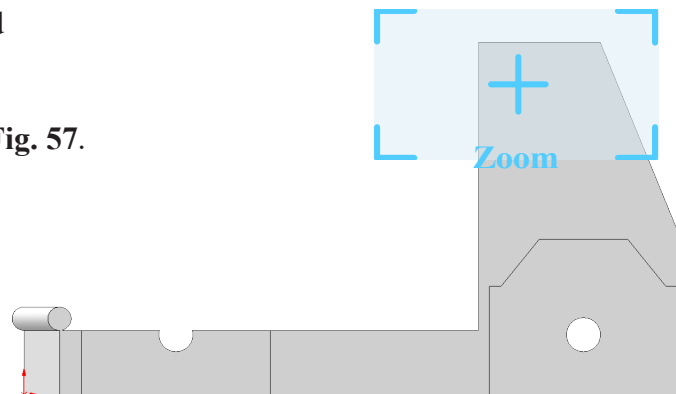
**Fig. 56**

## L. Extrude2 Sketch7 Hinge2 Chassis/Roof.

Step 1. Click **side face Chassis** and click **Sketch**  on the context toolbar, **Fig. 56**.


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

Step 3. Zoom in on **rear top corner** of body, **Fig. 57**.



**Fig. 57**

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

Step 5. Sketch circle forward of and coincident  with top rear vertex of body, Fig. 58.

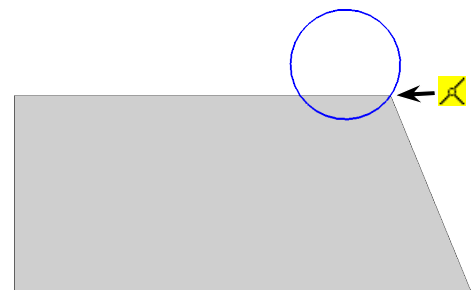


Fig. 58

Step 6. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 7. Add dimensions, Fig. 59.

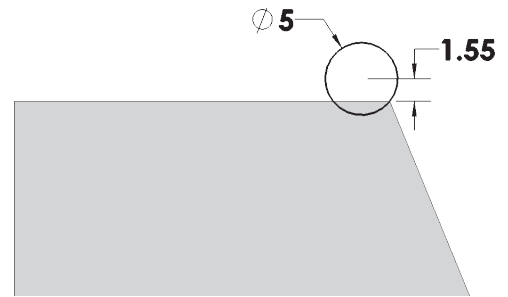

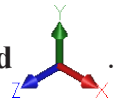





Fig. 59

Step 8. Rotate view to back side, click **Isometric**  on the Standard Views toolbar (Ctrl-7), then Ctrl-Shift click the Y axis of the Reference Triad .

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

Step 10. Click **Extruded Boss/Base**  on the Features toolbar.

Step 11. In the Boss-Extrude Property Manager set:  
under Direction 1, Fig. 60  
End Condition **Blind**  
**Reverse Direction**   
**Depth**  17  
click OK .

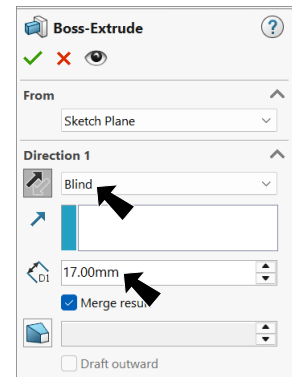


Fig. 60

Step 12. Zoom in on hinge2, Fig. 62.

Step 13. Save  (Ctrl-S).

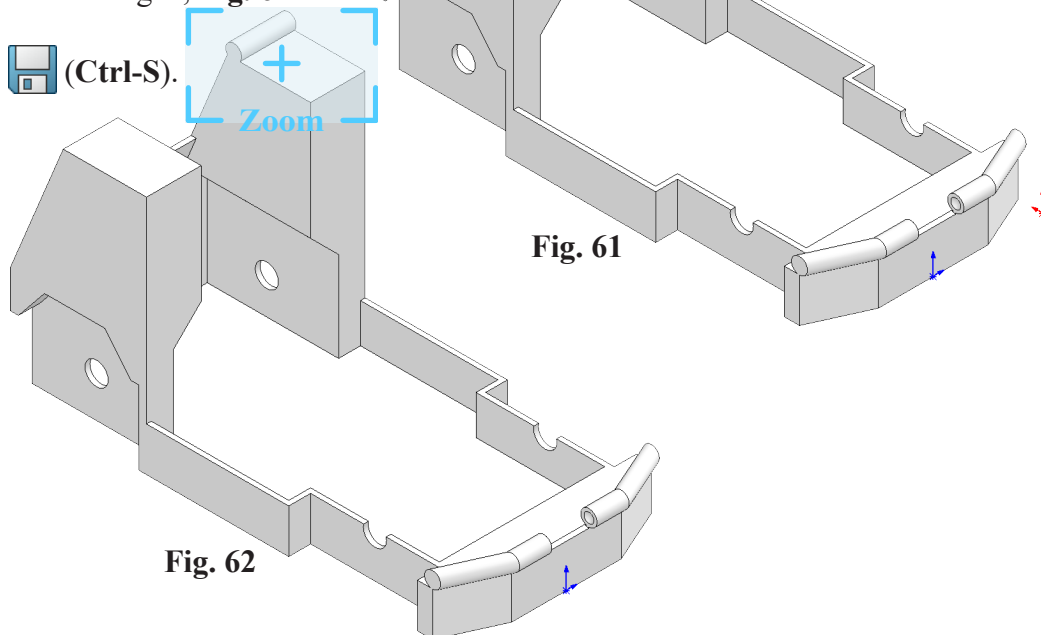

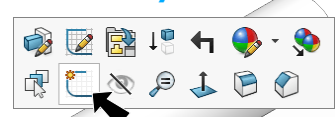


Fig. 61

Fig. 62

## M. Split Line and Dome Sketch4 for Hinge2 Chassis/Roof.

Step 1. Click the **inside face of hinge** and click **Sketch**  on the context toolbar, **Fig. 63**.



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

Step 3. Sketch **circle at centerpoint of extruded hinge**, **Fig. 64**. Wake up centerpoint.

Step 4. Click **Smart Dimension**




(S) on the Sketch toolbar.

Step 5. Dimension **diameter 3.1**, **Fig. 65**.

Step 6. Click **Insert** Menu > **Curve** > **Split Line**. **Fig. 64**

Step 7. In the Split Line Property Manager:

under **Type of Split**, **Fig. 66** select **Projection**

under **Selections**  **Sketch is selected**

in **Faces to Split** field  click **side face**, **Fig. 67**

click **OK** .

Step 8. Click **Dome**  **Dome** on the Features toolbar.

Step 9. In the Dome Property Manager set:

under **Parameters**, **Fig. 68**

click **split line face**, **Fig. 69**

**Distance .7**

**Reverse Direction** 

**Dome should be inward**

click **OK** .

Step 10. Save  (Ctrl-S).

Face

Fig. 63

Fig. 64

Fig. 65




Fig. 66

Fig. 67

Fig. 68

Fig. 69

## N. Mirror3 Boss-Extrude2.

- Step 1. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)
- Step 2. **Ctrl click Right Plane** and **Boss-Extrude2** features to select plane and feature, **Fig. 70**.
- Step 3. Click **Mirror**  on the Features toolbar.
- Step 4. In the Mirror Property Manager click OK .

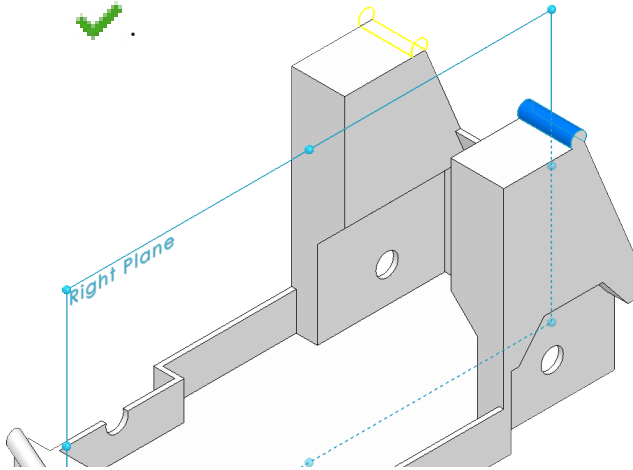


Fig. 72

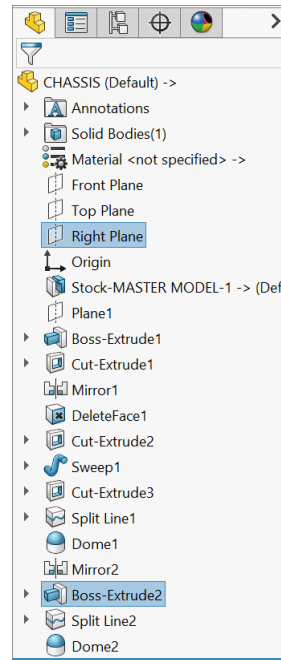


Fig. 70

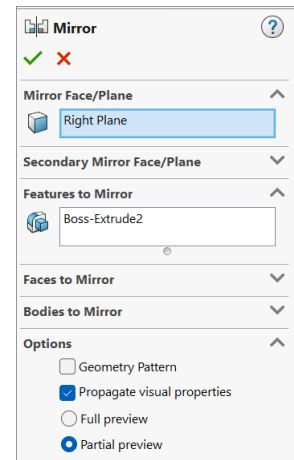





Fig. 71

## O. Mirror4 Dome2.

- Step 1. **Ctrl click Right Plane** and **Dome2** features to select plane and feature, **Fig. 73**.
- Step 2. Click **Mirror**  on the Features toolbar.
- Step 3. In the Mirror Property Manager set:
  - under Options, **Fig. 74**
  - check **Geometry Pattern**
  - click OK .
- Step 4. Save  (Ctrl-S).

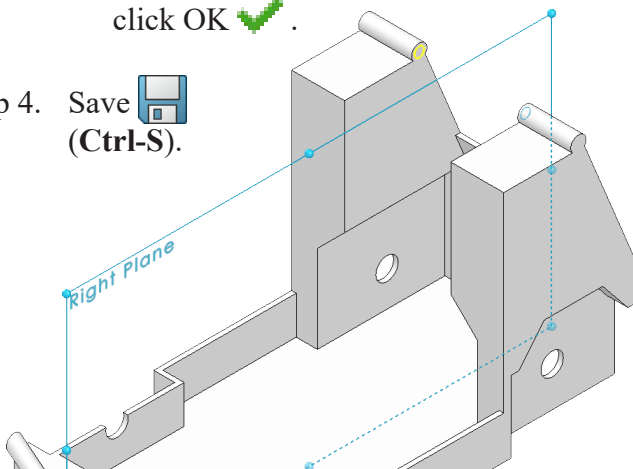


Fig. 75

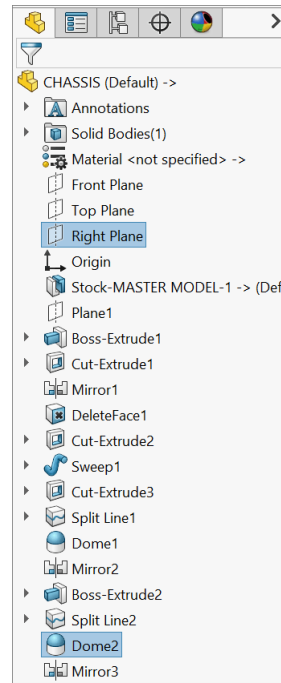


Fig. 73

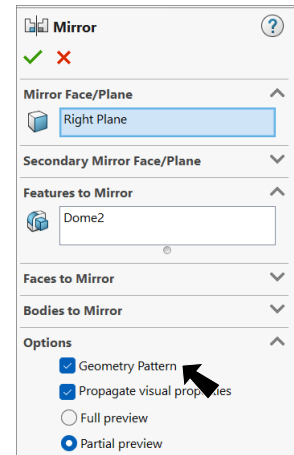


Fig. 74

## P. Extrude3 Sketch9 Axle Support.

Step 1. Click **top face of side of body** and click **Sketch**  on the context toolbar, **Fig. 76**.

Step 2. Click **Corner Rectangle**  in the **Rectangle flyout**  on the Sketch toolbar.

Step 3. Sketch **rectangle coincident with driver side inside edge of body**, **Fig. 77**.

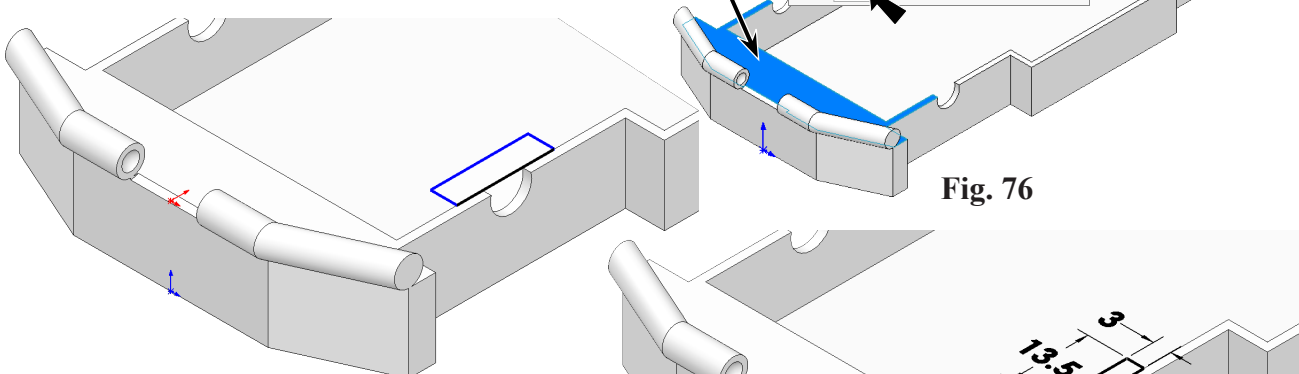


Fig. 76

Fig. 77

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

Step 5. Add dimensions, **Fig. 78**. Dimension from **midpoint to model blue Origin**.

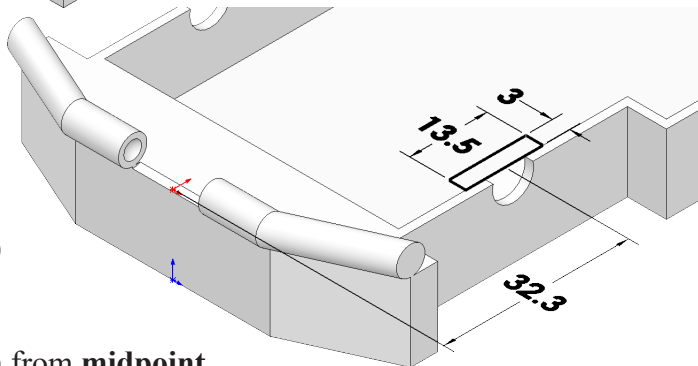


Fig. 78

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

Step 7. Click **Extruded Boss/Base**  on the Features toolbar.

Step 8. In the Boss-Extrude Property Manager set:

under **Direction 1**, **Fig. 79**

End Condition **Blind**

**Depth**  **5**

under **Direction 2**

End Condition **Up To Next**

click **OK** .

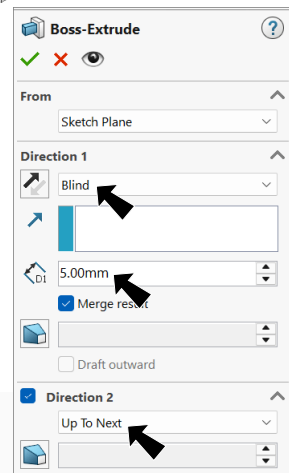


Fig. 79

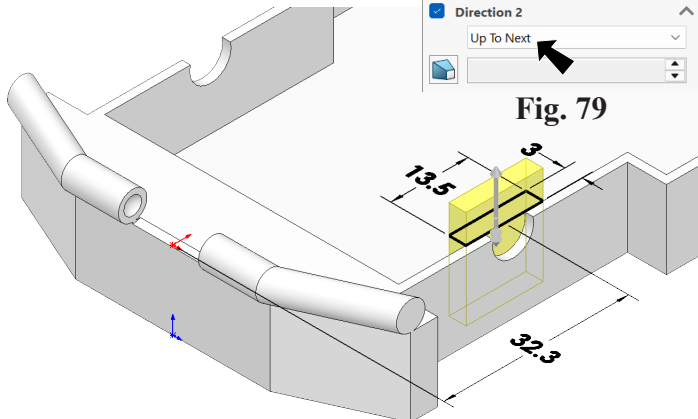
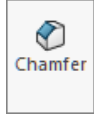


Fig. 80

## Q. Chamfer1.

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

Step 2. In the Chamfer Property Manager set:  
under Chamfer Type, **Fig. 81**

select **Angle Distance** 

click **top corner edges of support**, **Fig. 82**

under Chamfer Parameters

**Distance**  3.2

**Angle**  45°

click OK .

Step 3. Save  (Ctrl-S).

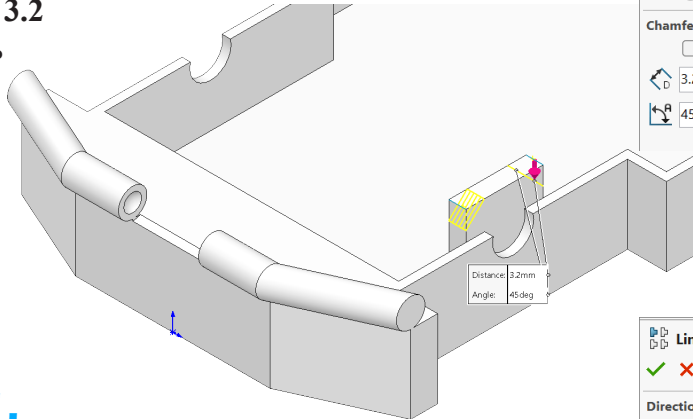


Fig. 82

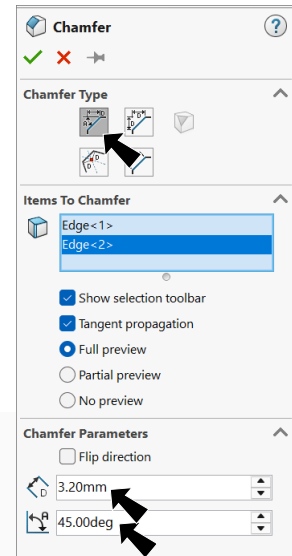


Fig. 81

## R. Linear Pattern1.

Step 1. Click **Linear Pattern**  on the Features toolbar.

Step 2. In the Linear Pattern Property Manager set:  
under Direction 1, **Fig. 83**

click a **horizontal front edge**

**Reverse Direction** 

**Spacing**  13

**Number of Instances**  2

under Features and Faces

click **Axle support features (Boss-Extrude3 and Chamfer1)**, **Fig. 84**

click OK .

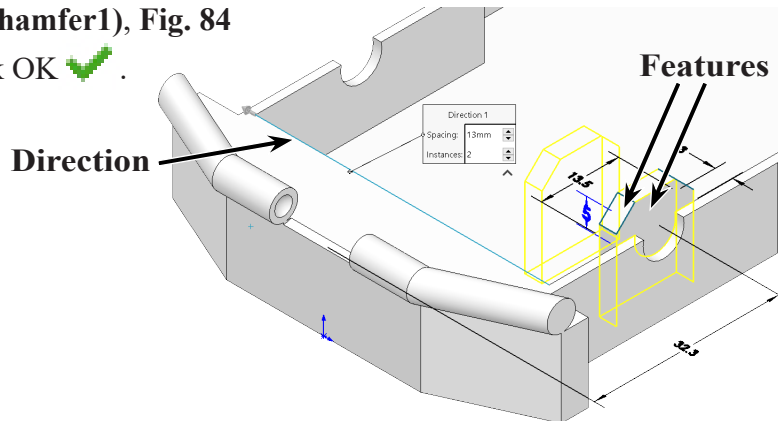


Fig. 84

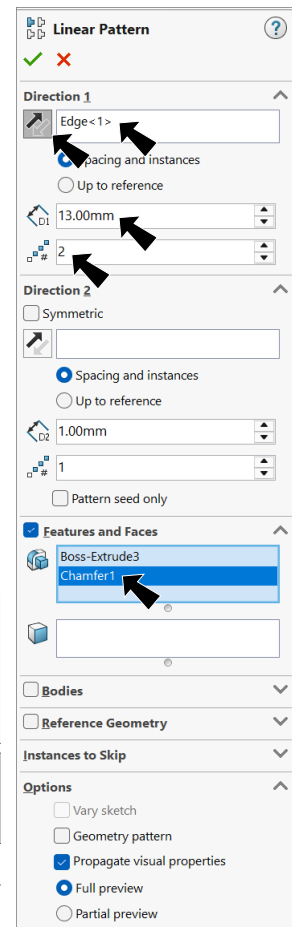


Fig. 83

## S. Linear Pattern2.

Step 1. Click **Linear Pattern**  on the Features toolbar.

Step 2. In the Linear Pattern Property Manager set:

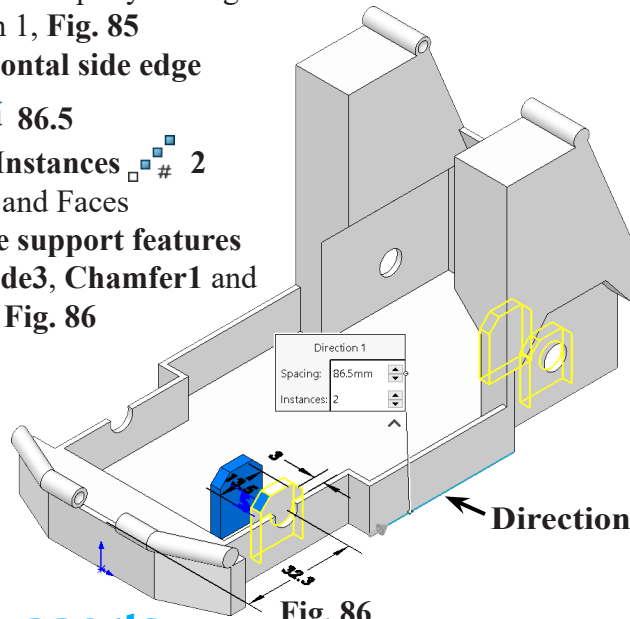
under Direction 1, **Fig. 85**  
click a **horizontal side edge**

Spacing  **86.5**

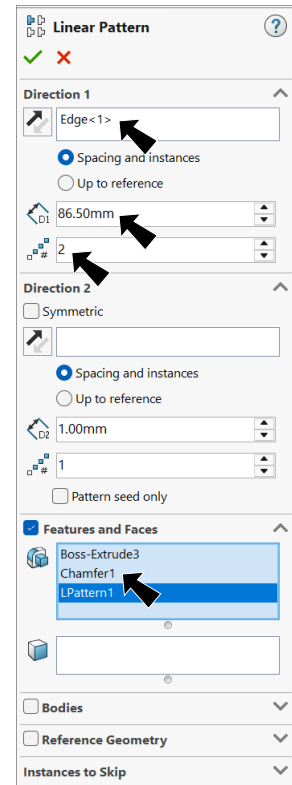
Number of Instances  **2**

under Features and Faces  
click all **Axle support features**  
(**Boss-Extrude3**, **Chamfer1** and  
**LPattern1**), **Fig. 86**

click OK .




**Fig. 86**




**Fig. 85**

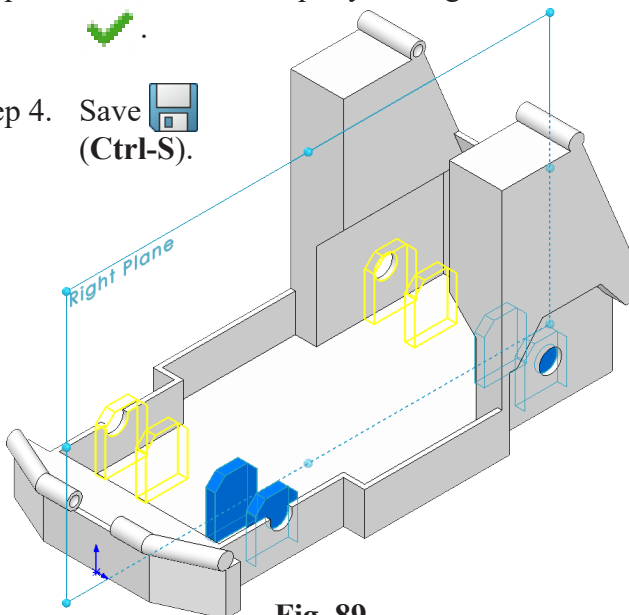
## T. Mirror5 Axle Supports.

Step 1. **Ctrl click** **Right Plane** , **Boss-Extrude3**, **Chamfer1** and **LPattern1-2** features to select plane and features, **Fig. 87**.

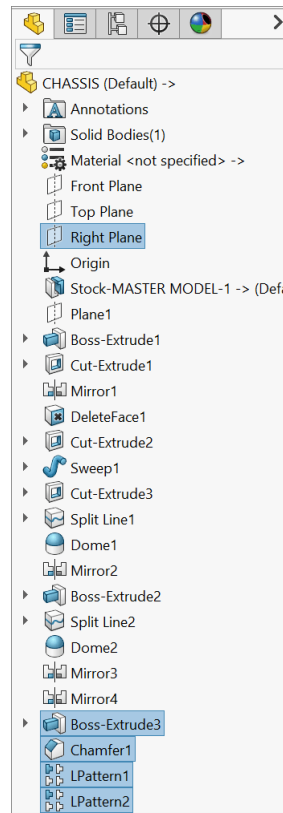
Step 2. Click **Mirror**  on the Features toolbar.

Step 3. In the Mirror Property Manager click OK .

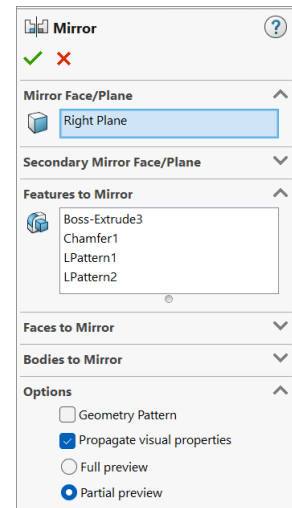
Step 4. Save   
(**Ctrl-S**).



**Fig. 89**






**Fig. 87**



**Fig. 88**

## U. Extruded Cut4 Sketch 10 Axle Holes.


Step 1. Click **Right Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 90**.

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 at each axle hole**, **Fig. 91**. Wake up centerpoint, hover cursor over circular edge.

Step 5. **Unselect Circle tool.**

Step 6. **Ctrl drag** a selection to select **both circles** and click **Make Equal**  on the context toolbar, **Fig. 92**.


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

Step 8. Dimension **diameter 7.2**, **Fig. 93**. Clearance of .2 for Axle.

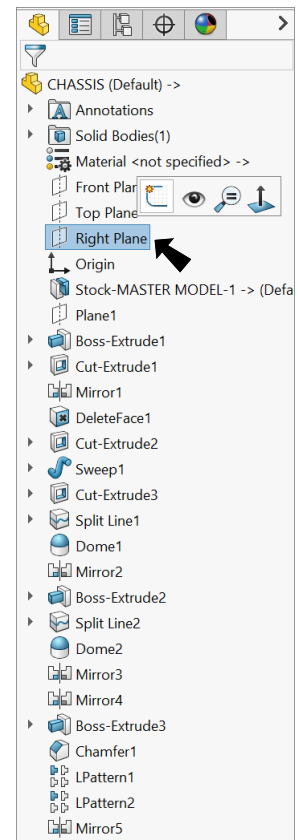
Step 9. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

Step 10. Click **Features**  on the Command Manager toolbar.

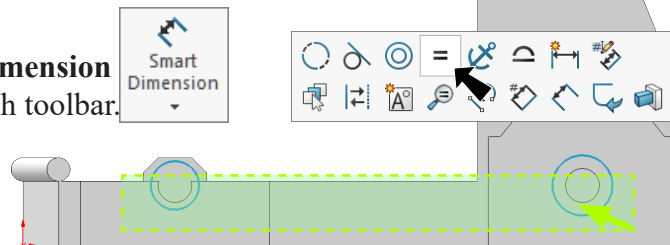
Step 11. Click **Extruded Cut**  on the Features toolbar.

Step 12. In the Cut-Extrude Property Manager set: under Direction 1, **Fig. 94**  
End Condition  
**Through All - Both**  
click OK .

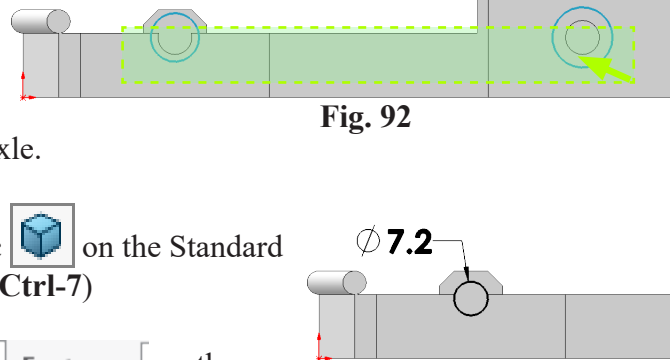
Step 13. Save  (**Ctrl-S**).



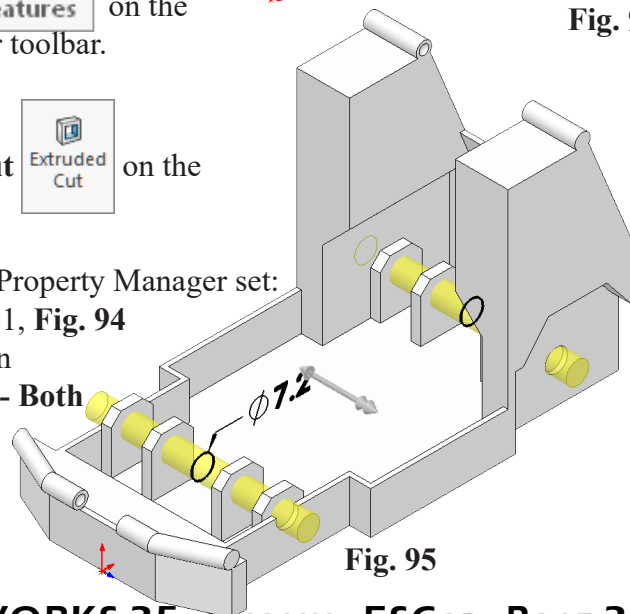
**Fig. 90**



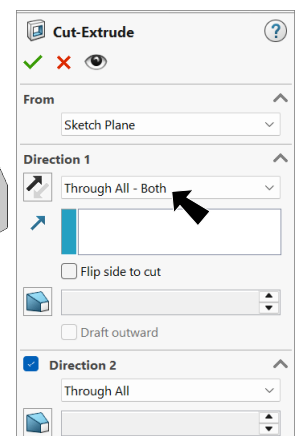
**Fig. 92**



**Fig. 93**



**Fig. 95**






**Fig. 94**

## V. Extrude11 Sketch4 Motor Holder.

Step 1. Click the **top face of bottom of Chassis** and click **Sketch**

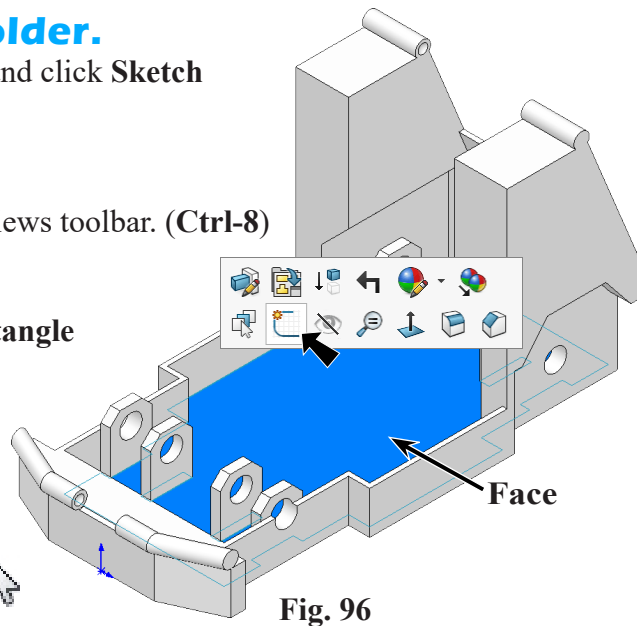
 on the context toolbar, **Fig. 96**.



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**, **Fig. 97**.

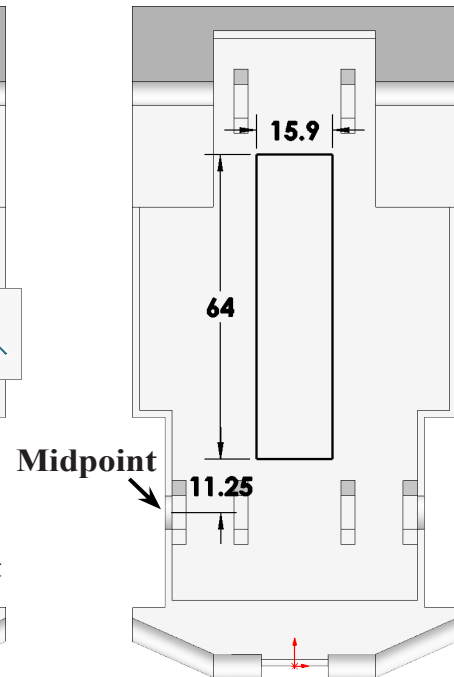
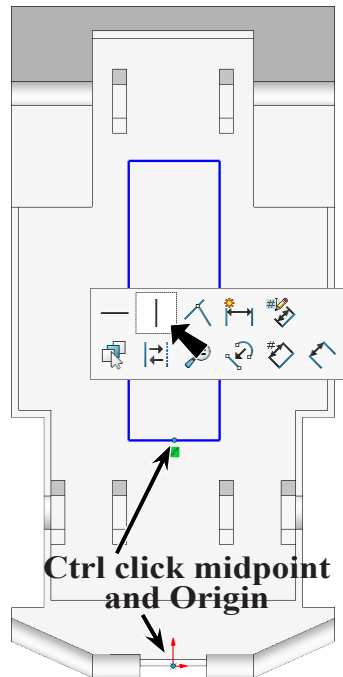
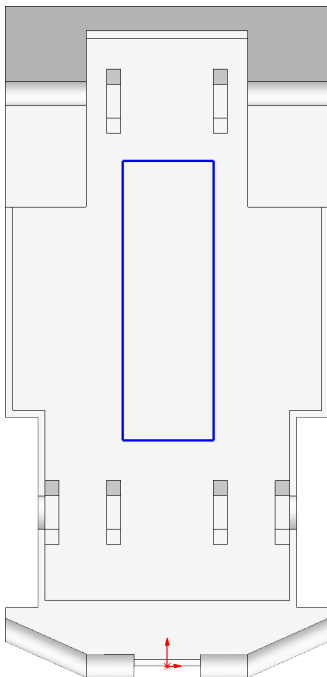
Step 5. **Unselect Rectangle tool**. To unselect, right click graphics area and click **Select from** menu.




Step 6. **Ctrl click midpoint of a horizontal line and Origin**  to select both. Release Ctrl key and click **Make Vertical**  on the context toolbar, **Fig. 98**.

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

Step 8. Add dimensions, **Fig. 99**. Dimension midpoint of axle hole.



Step 9. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

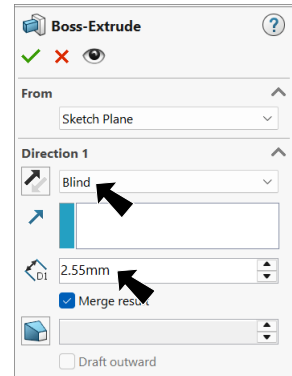
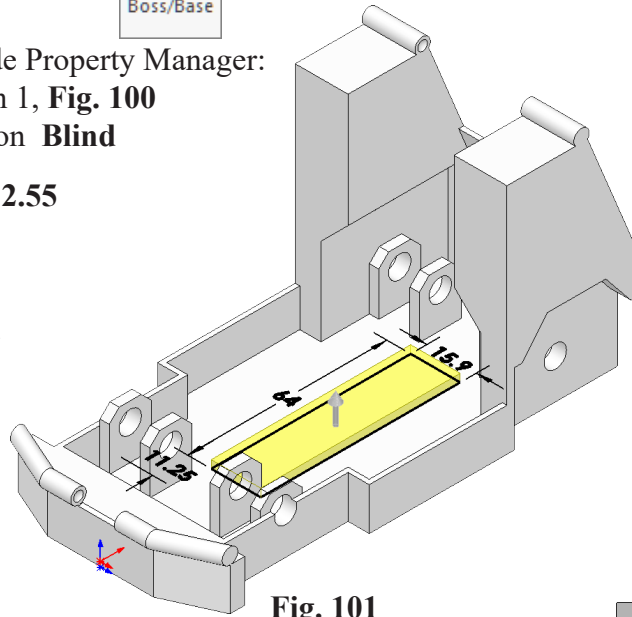
Step 10. Click **Features**  on the Command Manager toolbar.

Step 11. Click **Extruded Boss/Base**  on the Features toolbar.

Step 12. In the Boss-Extrude Property Manager:  
under Direction 1, **Fig. 100**  
End Condition **Blind**

**Depth**  **2.55**  
click OK .


Step 13. Save  (**Ctrl-S**).





**Fig. 100**

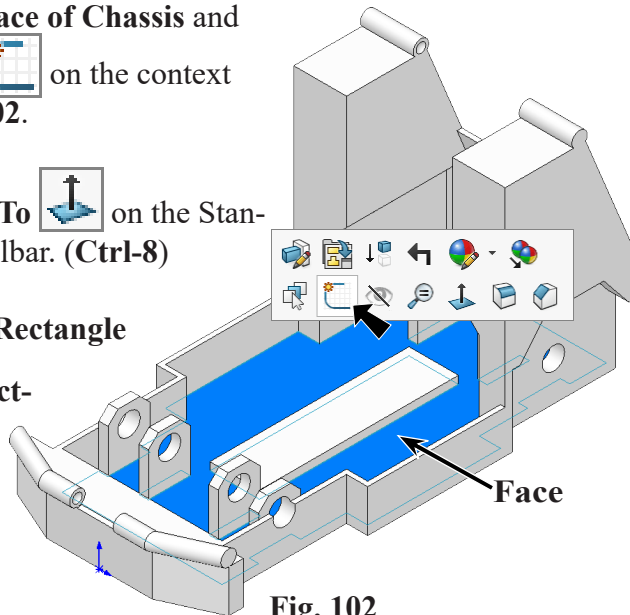
**Fig. 101**

## W. Extrude5 Sketch12 Motor Side Rails.

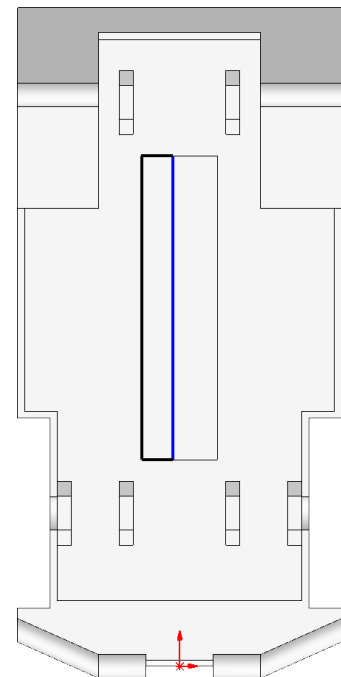
Step 1. Click the **top face of Chassis** and  
click **Sketch**  on the context  
toolbar, **Fig. 102**.

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

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



**Fig. 102**



**Fig. 103**

Step 4. Sketch **corner rectangle along edge motor holder, coincident with front, side and rear edges of motor holder extrude, Fig. 103.**

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

Step 6. Add 2 dimension using -2 (key-in -2) to flip rectangle to outside of motor holder extrude, **Fig. 104**.

Step 7. **Unselect Smart Dimension**. To unselect, right click graphics area and click Select  from menu.

Step 8. Click **Right Plane**  in the Feature Manager to select plane, **Fig. 105**.



Step 9. **Ctrl drag** a selection to **select rectangle**, **Fig. 106**.

Step 10. Click **Mirror Entities**  **Mirror Entities** on the Sketch toolbar.

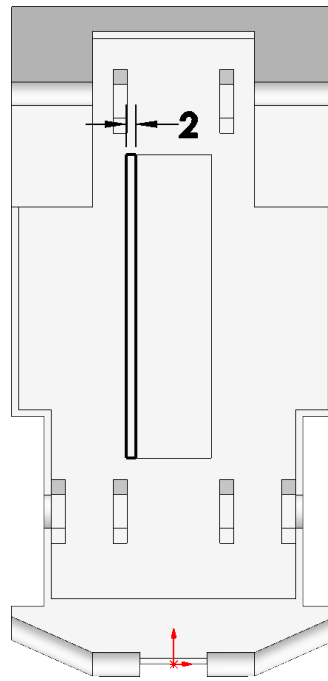
Step 11. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)

Step 12. Click **Features**  on the Command Manager toolbar.

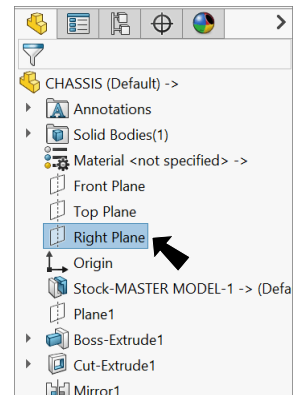
Step 13. Click **Extruded Boss/Base**  on the Features toolbar.

Step 14. In the Boss-Extrude Property Manager:  
 under Direction 1, **Fig. 107**  
 End Condition **Blind**  
**Depth**  7  
 click OK .

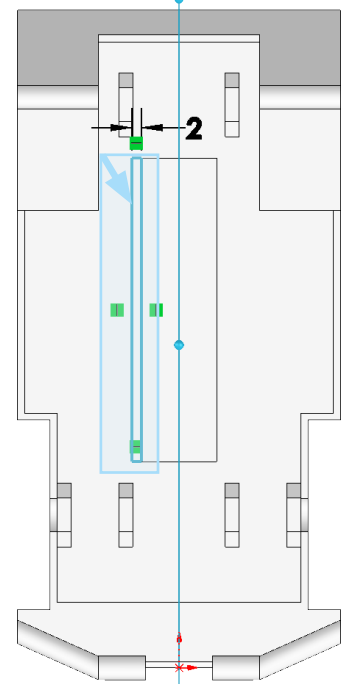
Step 15. Save  (Ctrl-S).



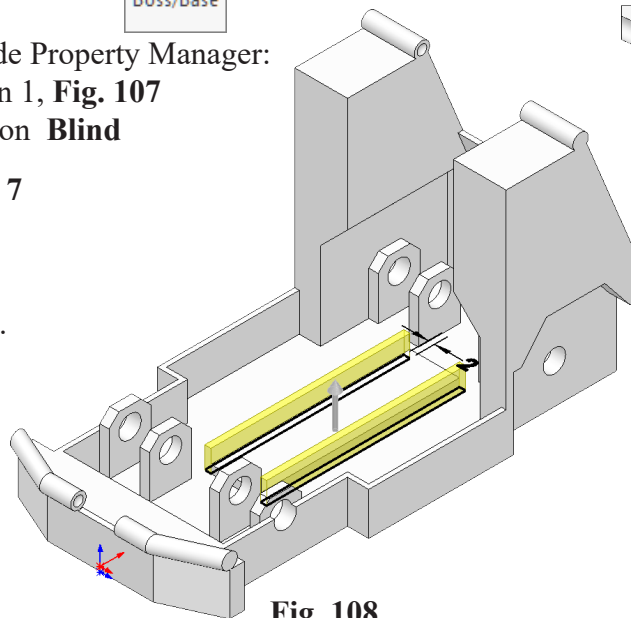
**Fig. 104**



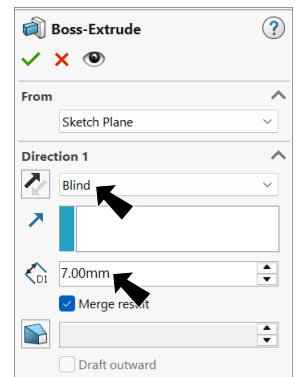
**Fig. 105**



**Fig. 106**




**Fig. 108**







**Fig. 107**



## X. Extrude6 Sketch 13 Studs from Block.

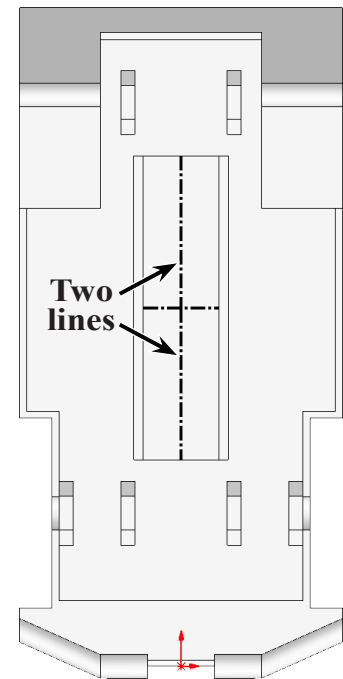
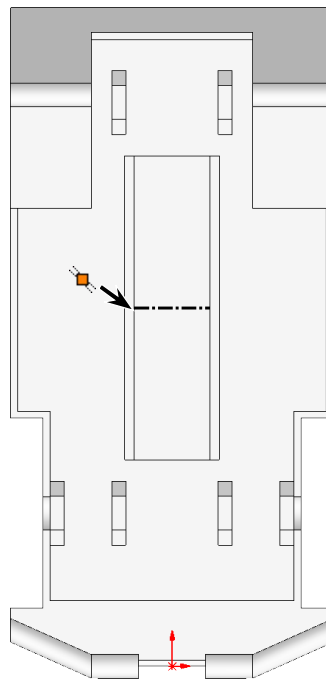
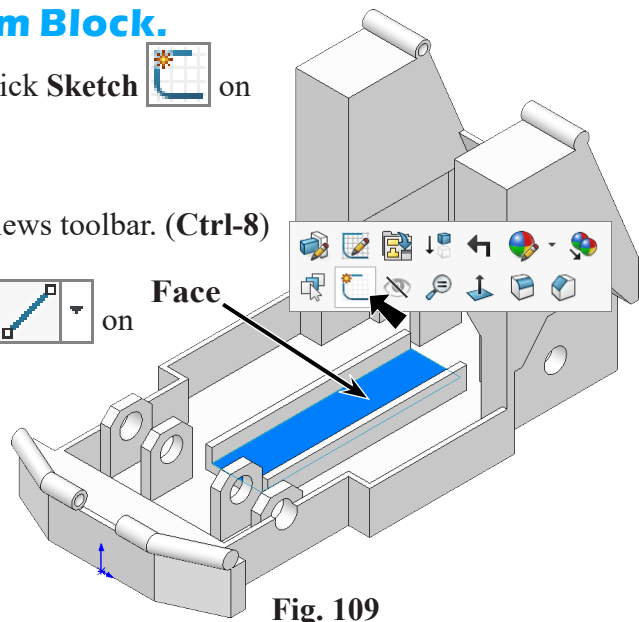
Step 1. Click the **top face of motor holder** and click **Sketch**  on the context toolbar, **Fig. 109**.

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

Step 3. Click **Centerline**  in the **Line flyout**  on **Face**  on the Sketch toolbar.



Step 4. Sketch **horizontal centerline** at midpoint  of motor holder extrude, **Fig. 110**. Double click to terminate the line chain.

Step 5. Sketch **two vertical centerlines**, **Fig. 111**. One at midpoint  of motor holder and midpoint  of horizontal center and another below it.



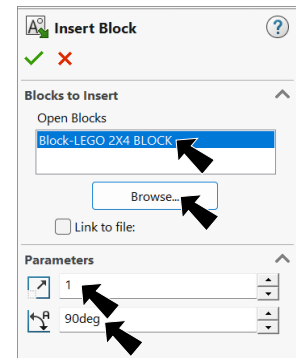
Step 6. Click Tools Menu > Blocks > Insert.

Step 7. In Insert Block Property Manager, click **Browse**, **Fig. 112** in Open dialog, navigate to **Documents\Tech Ed 25-26\ESCar** and open **LEGO 2x4 Block** file, **Fig. 113** under Parameters


**Block Scale**  **1**  
**Block Rotation**  **90°**

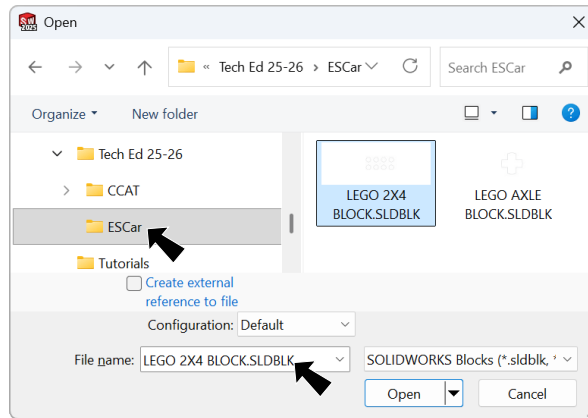
click place two **Blocks** away from any edges, **Fig. 114**

click **OK** .




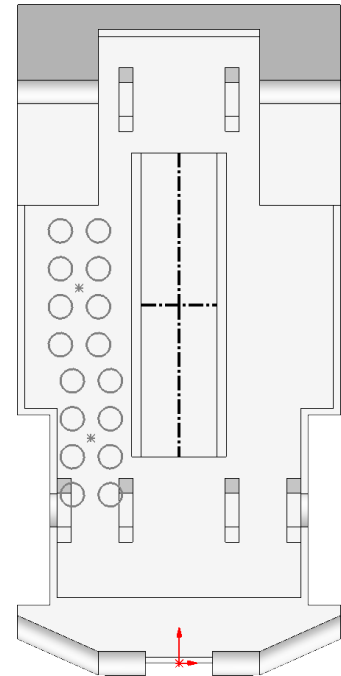
**Fig. 112**

Step 8. **Ctrl click midpoint of a vertical centerline and centerpoint of a Block and Make Coincident**  on the context toolbar, **Fig. 115**.

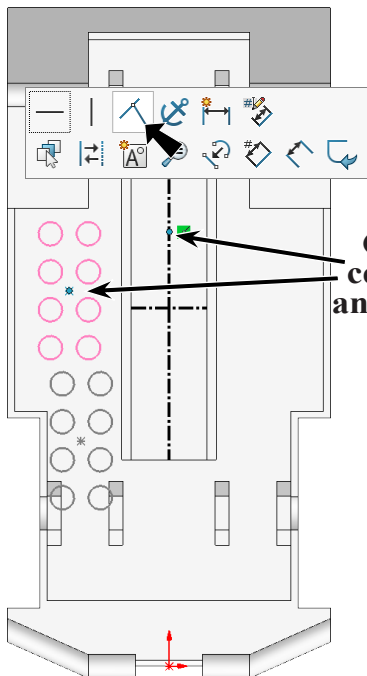


**Fig. 113**

Step 9. **Ctrl click midpoint of other vertical centerline and centerpoint of other Block** to select both. Release Ctrl key and click **Make Coincident**  on the context toolbar, **Fig. 116**.

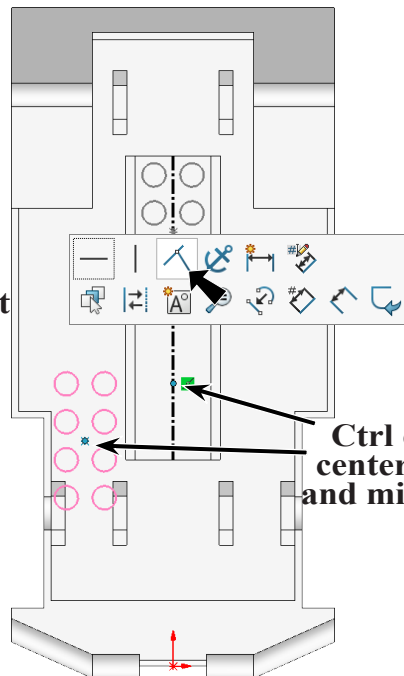


**Fig. 114**



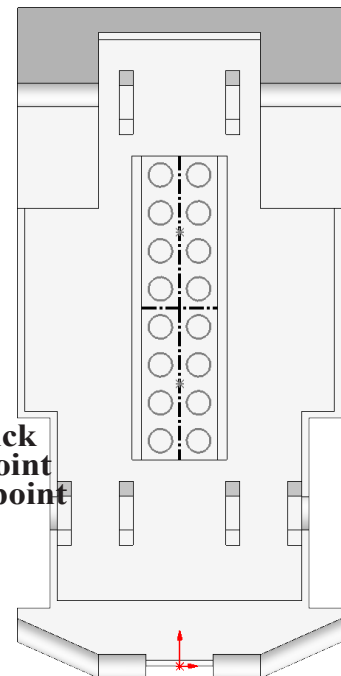
**Fig. 115**

**Ctrl click centerpoint and midpoint**




**Fig. 116**

**Ctrl click centerpoint and midpoint**





**Fig. 117**

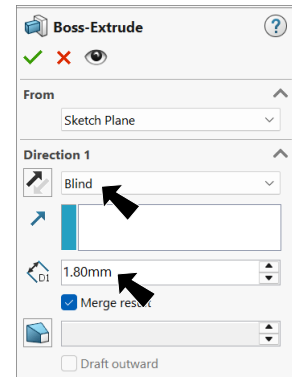
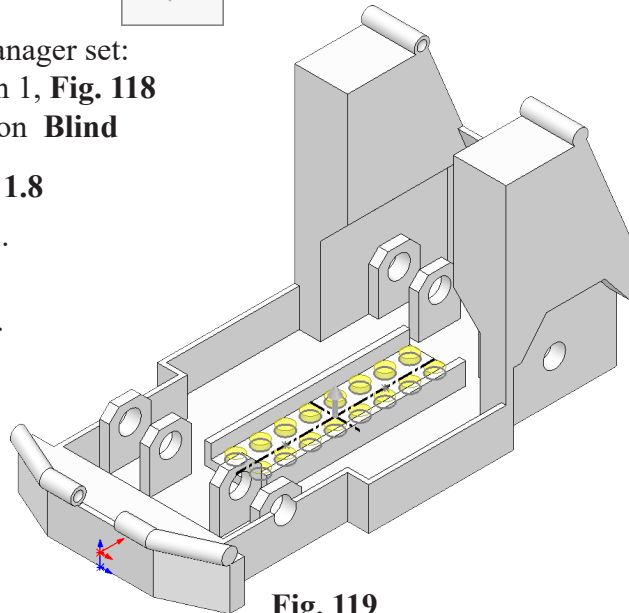
Step 10. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

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

Step 12. Click **Extruded Boss/Base**  on the Features toolbar.

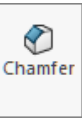
Step 13. In the Property Manager set:  
under Direction 1, **Fig. 118**  
End Condition **Blind**  
**Depth**  **1.8**  
click OK .


Step 14. Save  (**Ctrl-S**).






**Fig. 118**

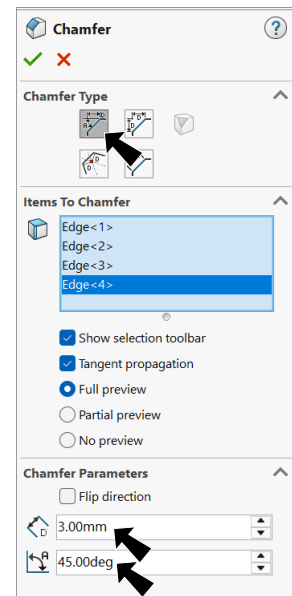
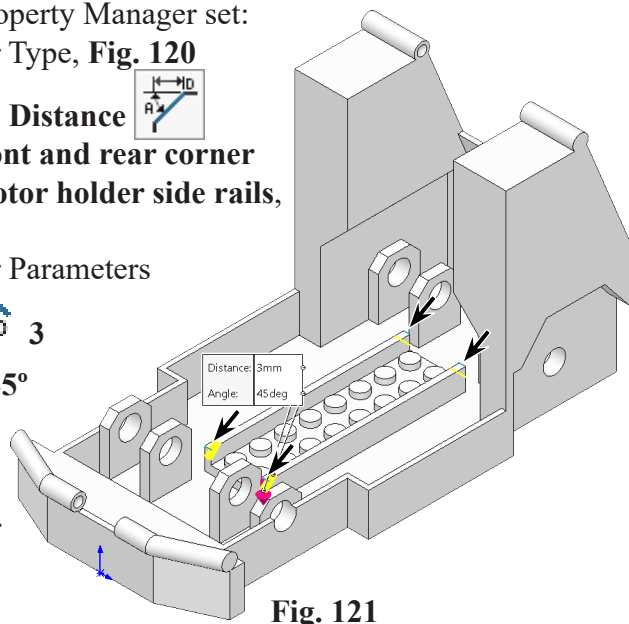
## Y. Chamfer2.

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

Step 2. In the Chamfer Property Manager set:  
under Chamfer Type, **Fig. 120**  
select **Angle Distance**   
click **top front and rear corner edges of motor holder side rails**, **Fig. 121**  
under Chamfer Parameters

**Distance**  **3**  
**Angle**  **45°**  
click OK .

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




**Fig. 120**

**Fig. 121**

## Z. Fillets 1-5.

Step 1. Rotate view to view **under hinge1 from rear**, click **Iso-metric** on the Standard Views toolbar (Ctrl-7), then **Shift click the Y axis of the Reference**

Triad  . Zoom in, Fig. 122.

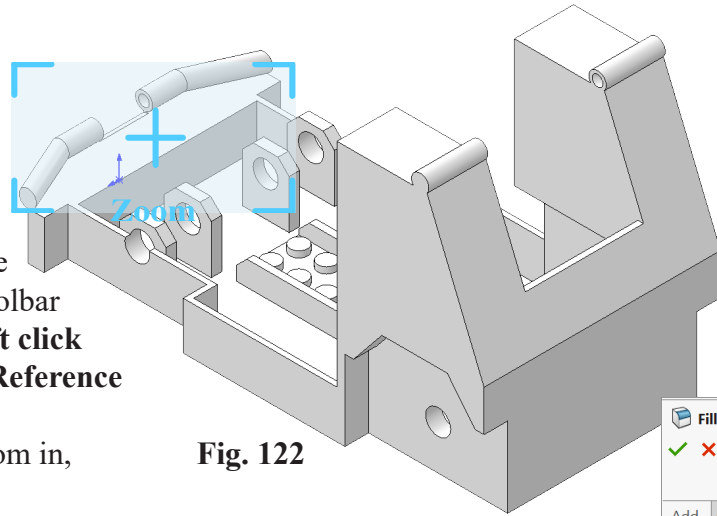


Fig. 122

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

Step 3. In the Fillet Property Manager set: select **FilletXpert**, Fig. 123

① **Radius**  **1**  
 uncheck **Tangent propagation**  
 click edge under hinge1 (1), Fig. 124  
 click **Apply**

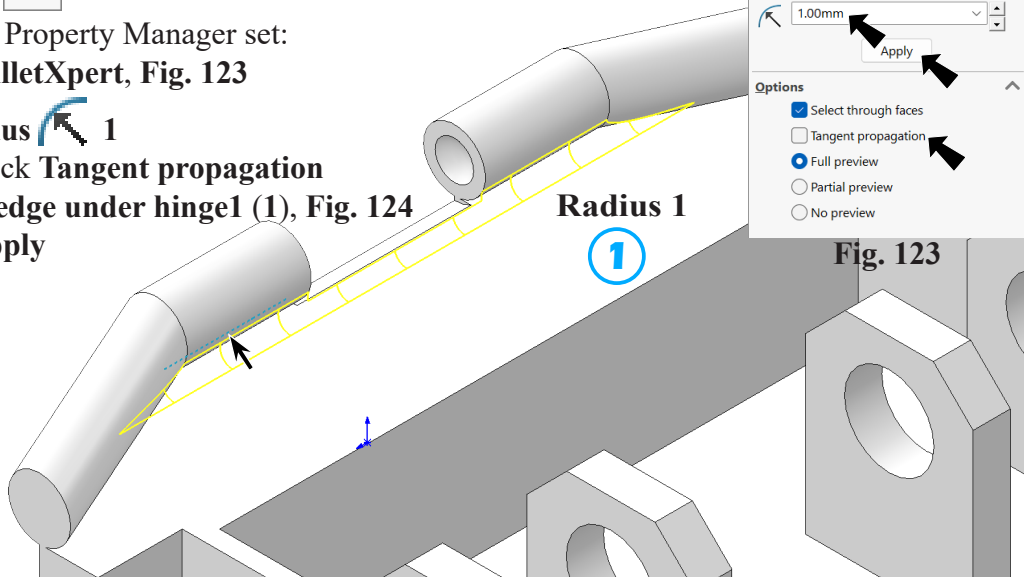


Fig. 123

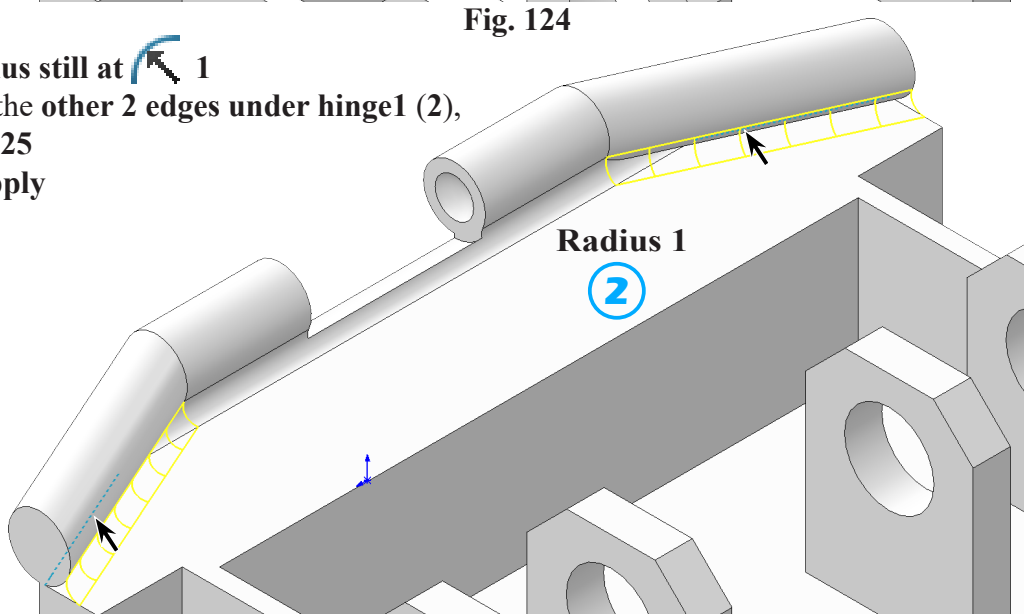



Fig. 124

② **Radius** still at  **1**  
 click the **other 2 edges under hinge1 (2)**, Fig. 125  
 click **Apply**

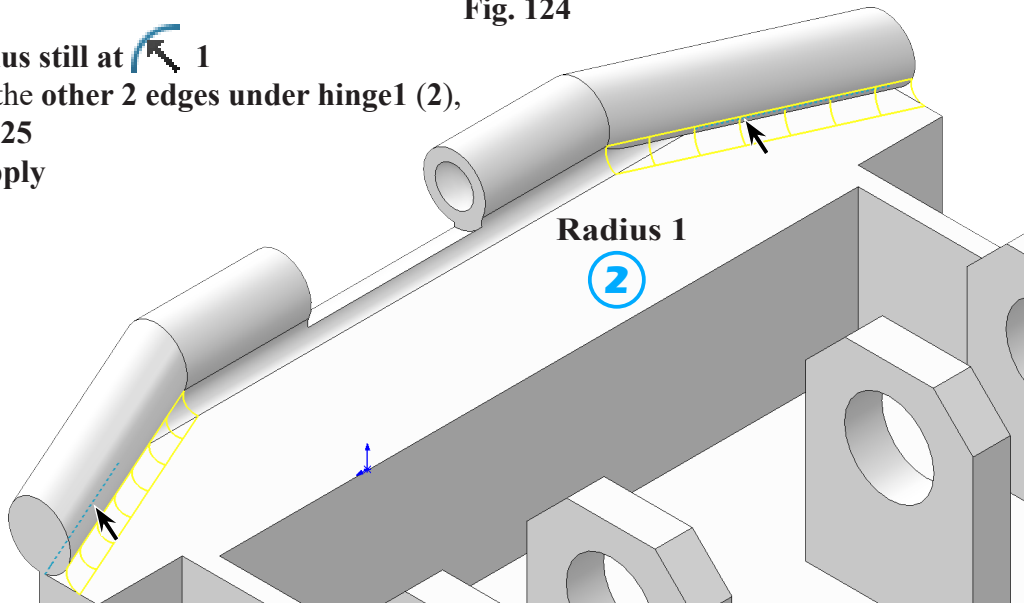


Fig. 125

③ Radius .5  
click edges between hinge1 (2), Fig. 126  
click Apply

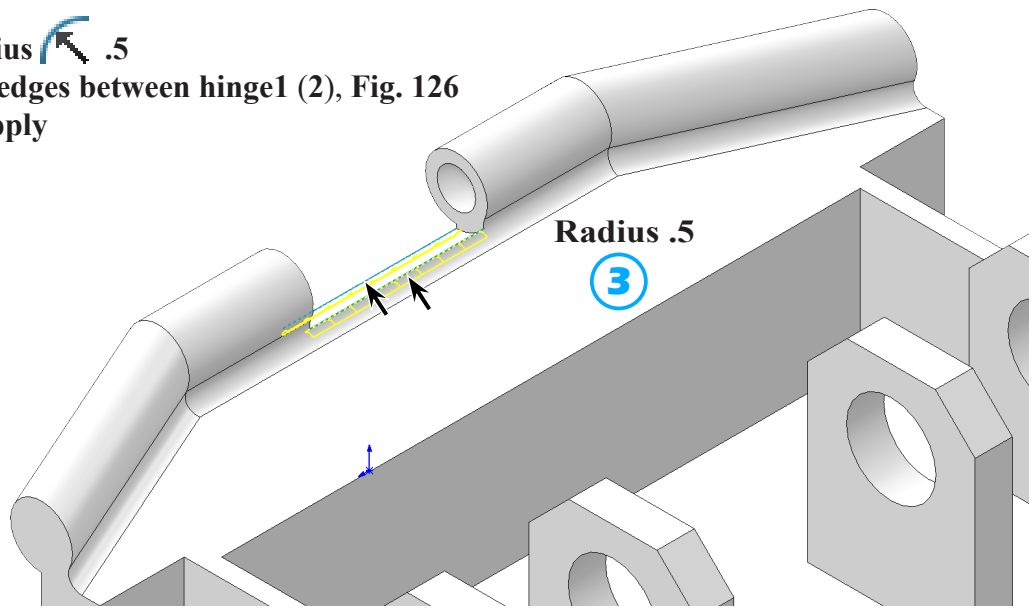


Fig. 126

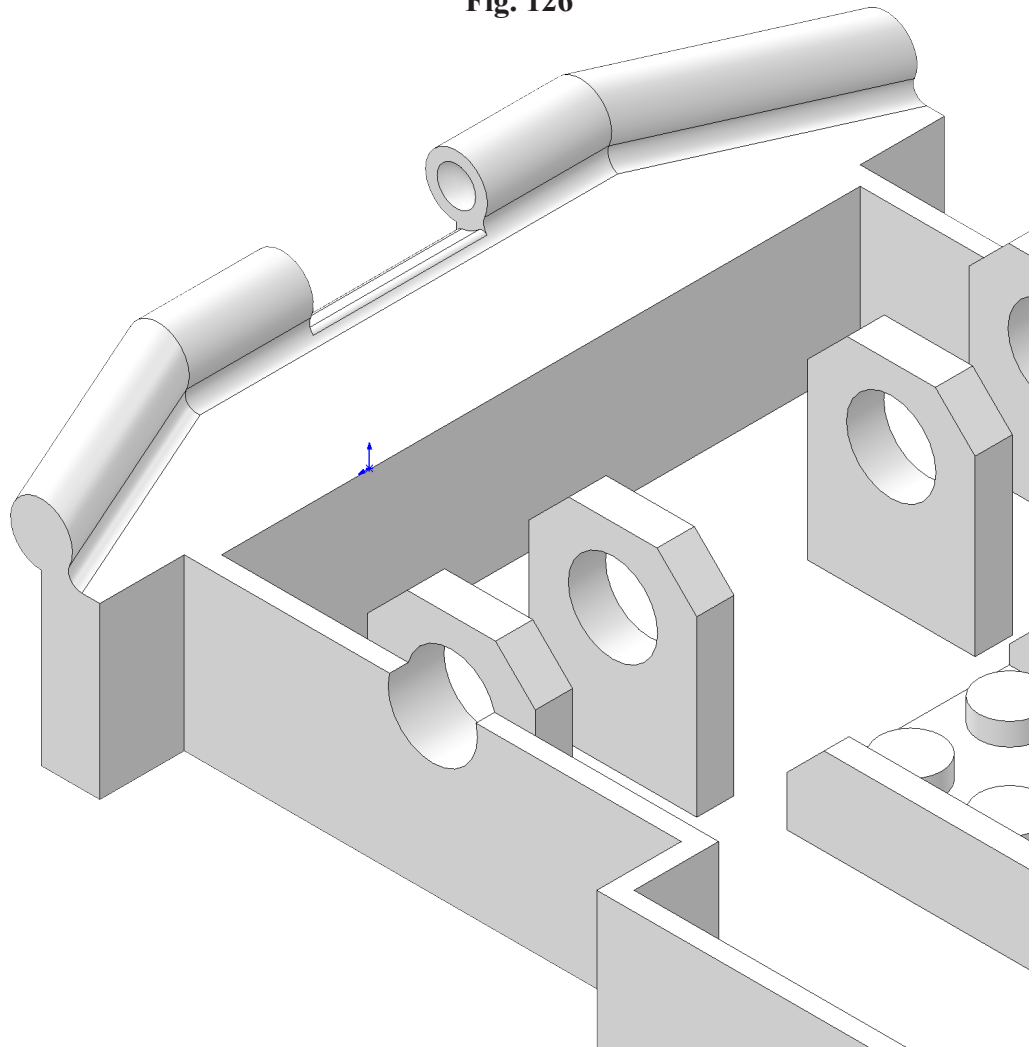


Fig. 127

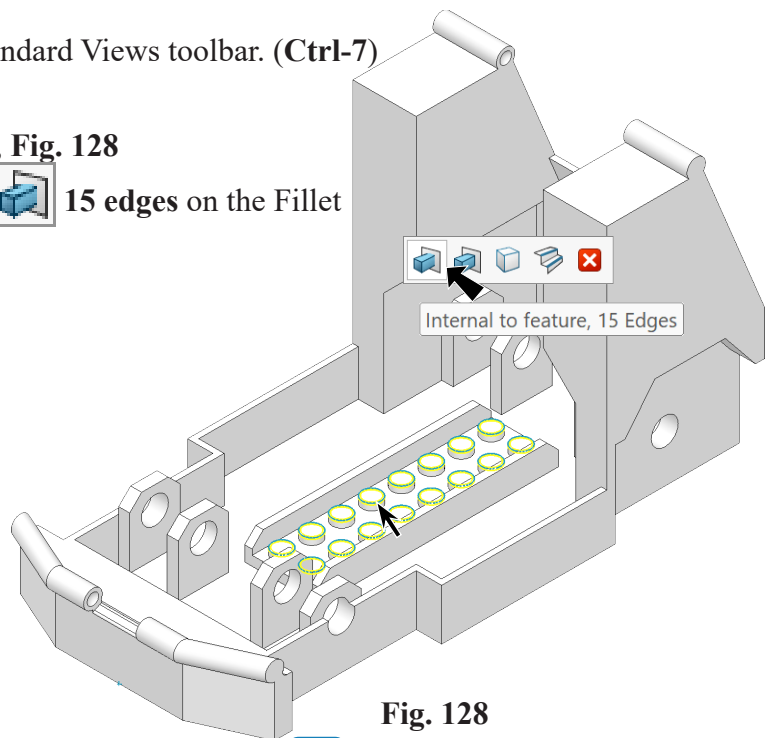
Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

④ **Radius**  .4


click a **top edge of a stud**, **Fig. 128**

click **Internal to feature**  **15 edges** on the Fillet pop-up

click **Apply**



**Fig. 128**

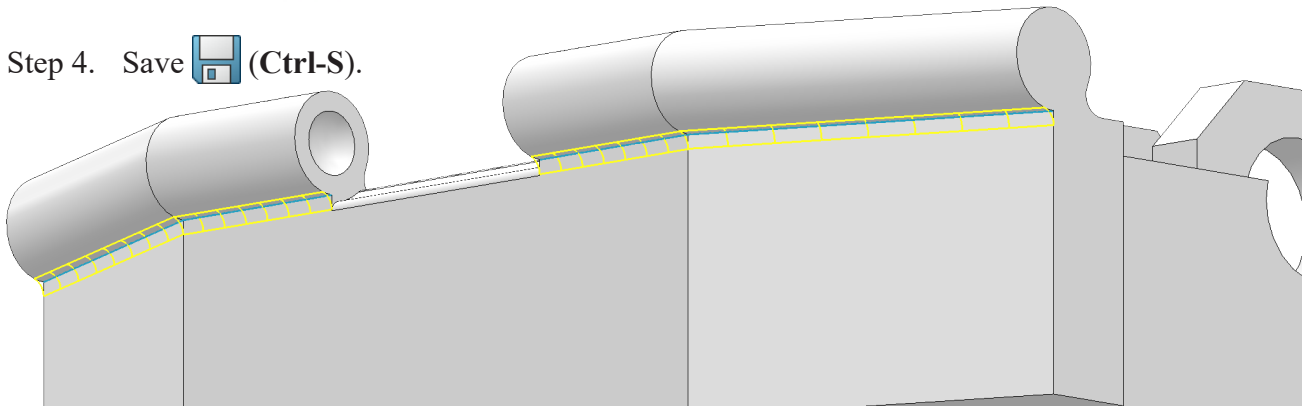
Rotate view to view under hinge1, use **Up Arrow key**  **three times**.

⑤ **Radius**  .8

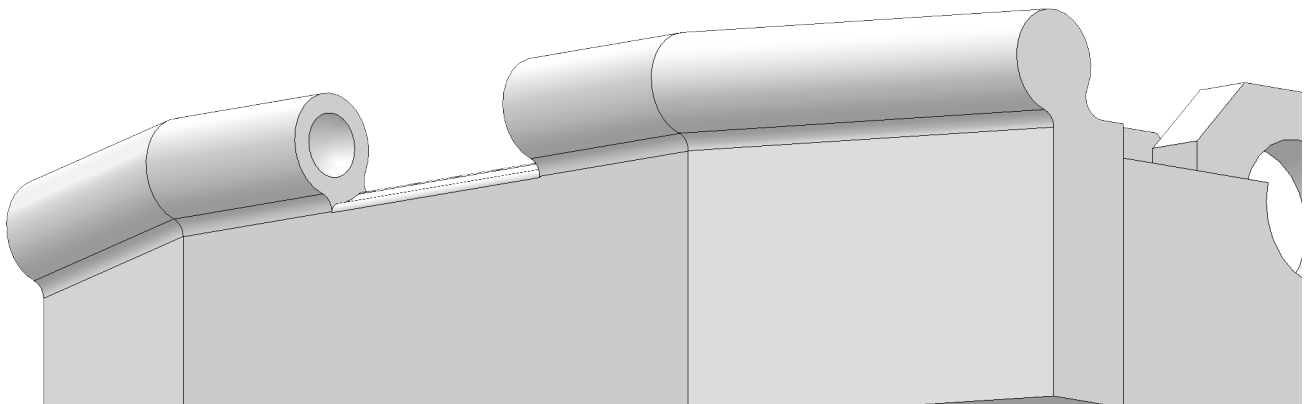
click **edges under hinge1 (4)**, **Fig. 129**

click **OK** .

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





**Fig. 129**




**Fig. 130**

## AA. Appearance: Gray Plastic.

Step 1. Click the **Chassis** to select part, click **Appearances**

Callout  on the context toolbar and click **Chassis..** , Fig. 131.

Step 2. In the Appearances Task pane, expand **Plastic**, click **Medium Gloss** and in the lower pane select **light grey medium gloss plastic**, Fig. 132.

Step 3. In the Appearances Property Manager:  
under Color, Fig. 133  
set **RGB values**:  
**R 127**  
**G 127**  
**B 127**  
click OK .

Step 4. Save  (Ctrl-S).

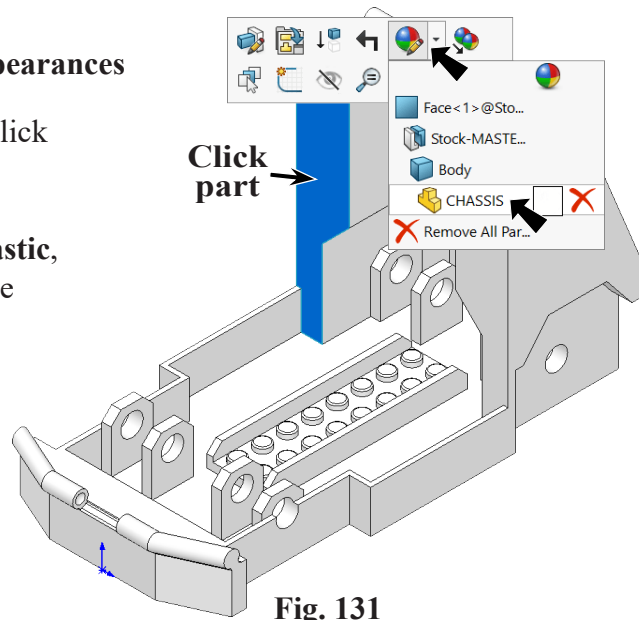


Fig. 131

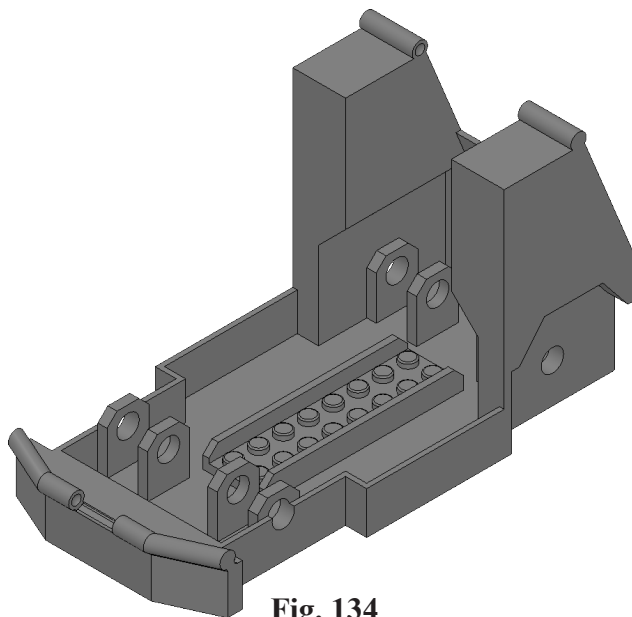


Fig. 134

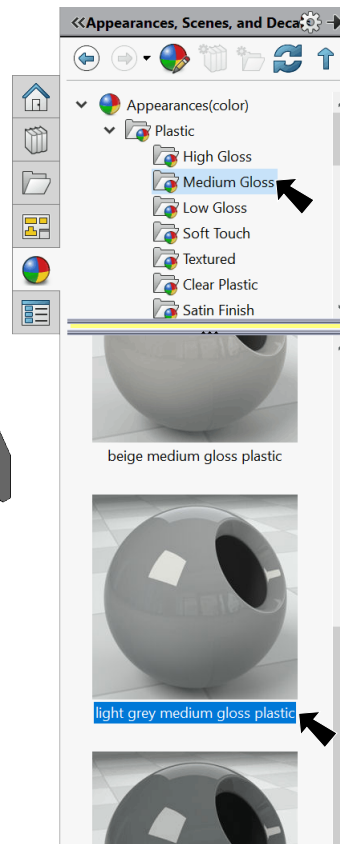


Fig. 132

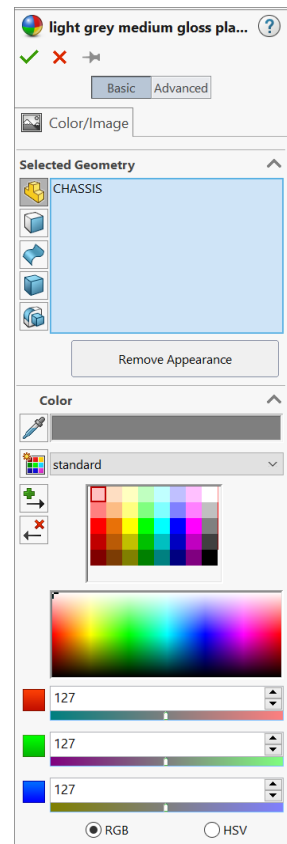


Fig. 133