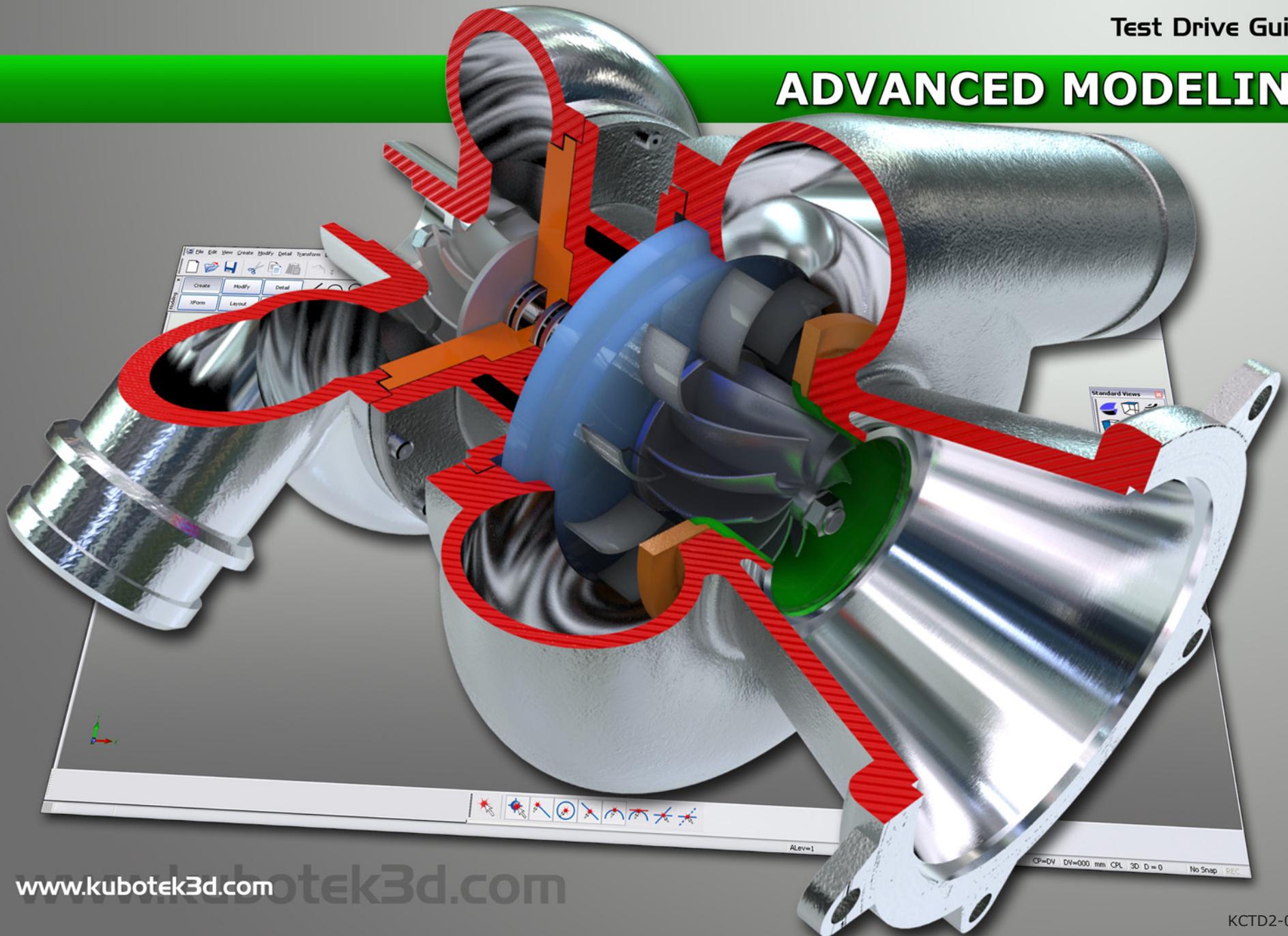


ADVANCED MODELING



Copyright and Trademark Notice

© Copyright 2006-2018 Kubotek3D All rights reserved

This documentation may not be reproduced in any form, for any purpose.

Kubotek Corporation and the program authors have no liability or responsibility to the purchaser or any other person or entity with respect to liability, loss or damage caused, or alleged to be caused either directly or indirectly by this software, including but not limited to, any interruption of service, loss of business or anticipatory profits or consequential damages resulting from the use or operation of this software.

KeyCreator is a registered trademark of Kubotek Corporation.

KeyCreator is based upon ACIS® software. The following products are incorporated into this software, and are registered trademarks of Spatial Corporation: ACIS® Kernel, ACIS® 3D Toolkit, ACIS® Local Operations, ACIS® Healing, ACIS® Advanced Blending.

Microsoft and Windows are trademarks or registered trademarks of Microsoft Corp.

All other brand and product names are trademarks or registered trademarks of their respective owners.



Kubotek3D

2 Mount Royal Avenue Suite 500

Marlborough, MA 01752

PHONE: (508) 229-2020

FAX: (508) 229-2121

WEB: kubotek3d.com

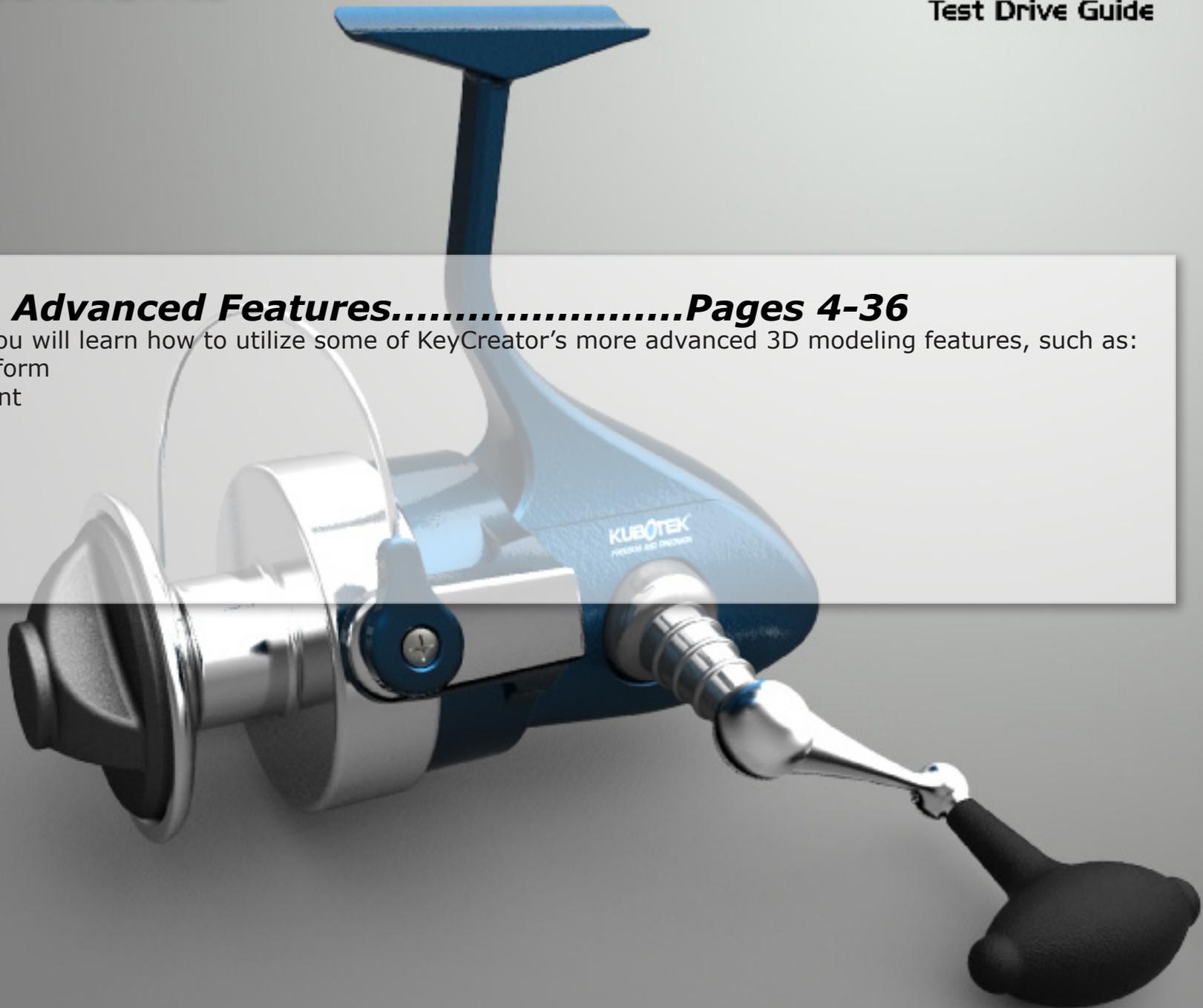
Table of Contents

KEYCREATOR[®]
Test Drive Guide

CHAPTER 1 - Advanced Features.....Pages 4-36

In this first section you will learn how to utilize some of KeyCreator's more advanced 3D modeling features, such as:

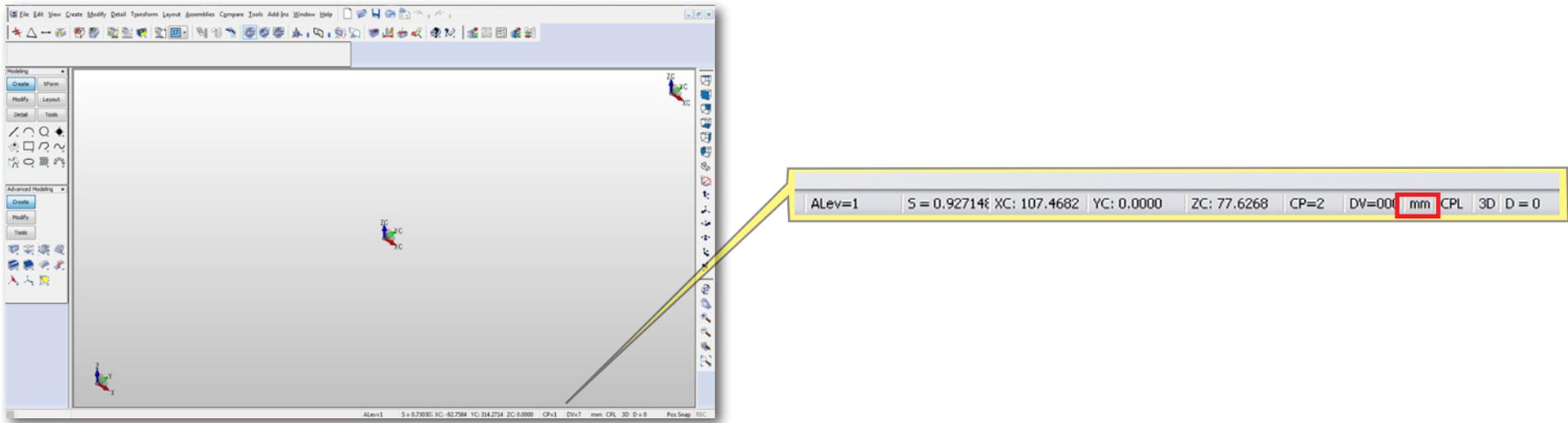
- Dynamic Transform
- Topology Imprint
- Prune
- Graft
- Unite
- Subtract
- Patterns
- Hole Feature



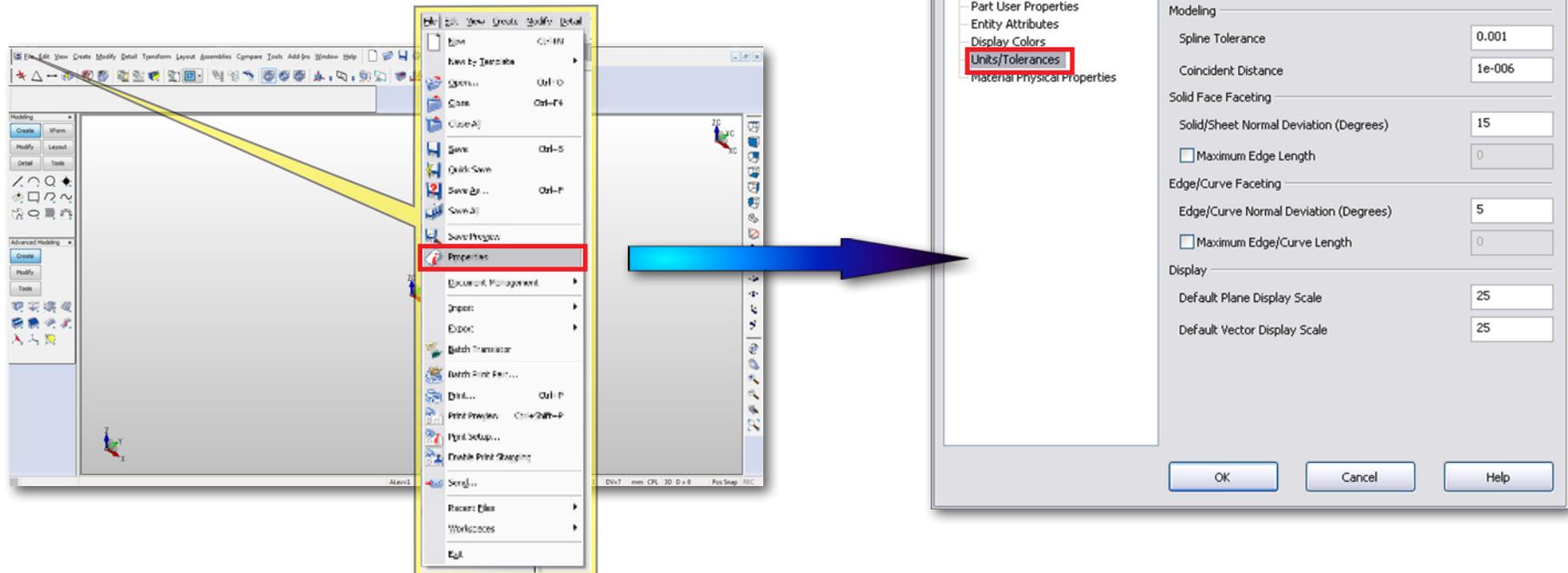
Advanced Features

Let's start by building a basic hinge model.

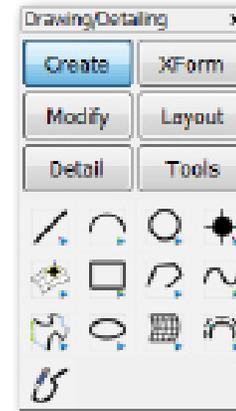
The status bar on the bottom right of the screen should indicate this as shown.



If not, you can set the units as follows:
Go to File>Properties>Units/Tolerances and set as shown:

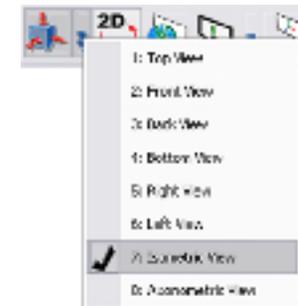
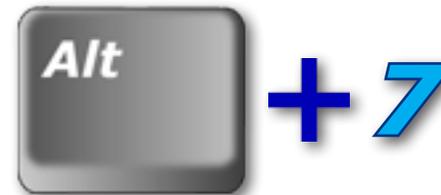


Keep in mind as you proceed that you can utilize the Modeling and Advanced Modeling Palettes to create and modify geometry.

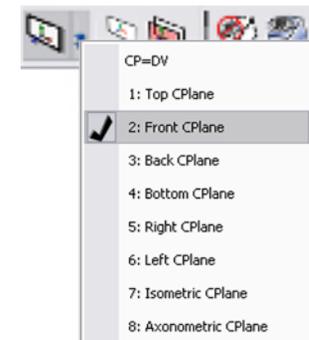
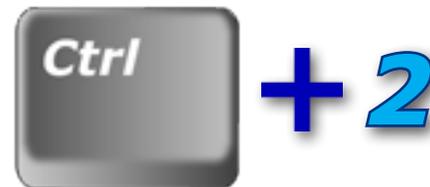


Let's begin!

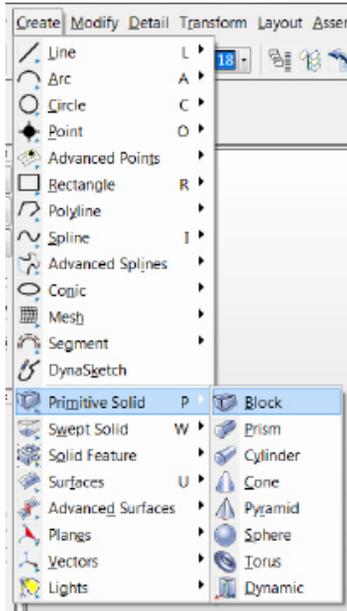
Set the view to Isometric (View 7) by selecting Alt+7 on your keyboard or by selecting the double arrow beside the Disp View icon  and choosing '7: Isometric View' as shown:



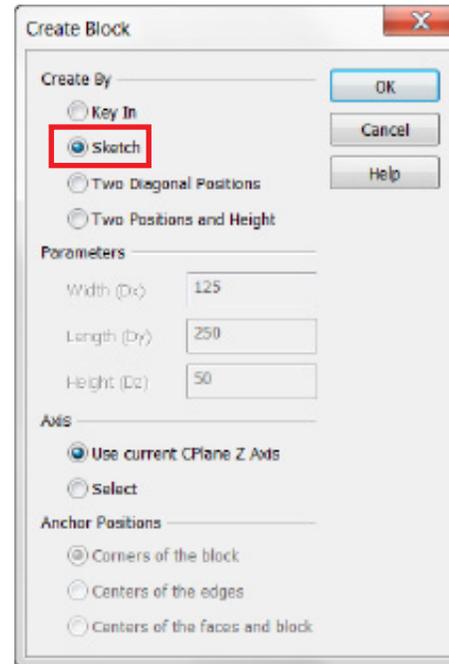
Now set the construction plane (CPlane) to 1 by selecting Ctrl+1 on your keyboard or double arrows  of CPlane icon and choosing '1: Top CPlane' as shown.



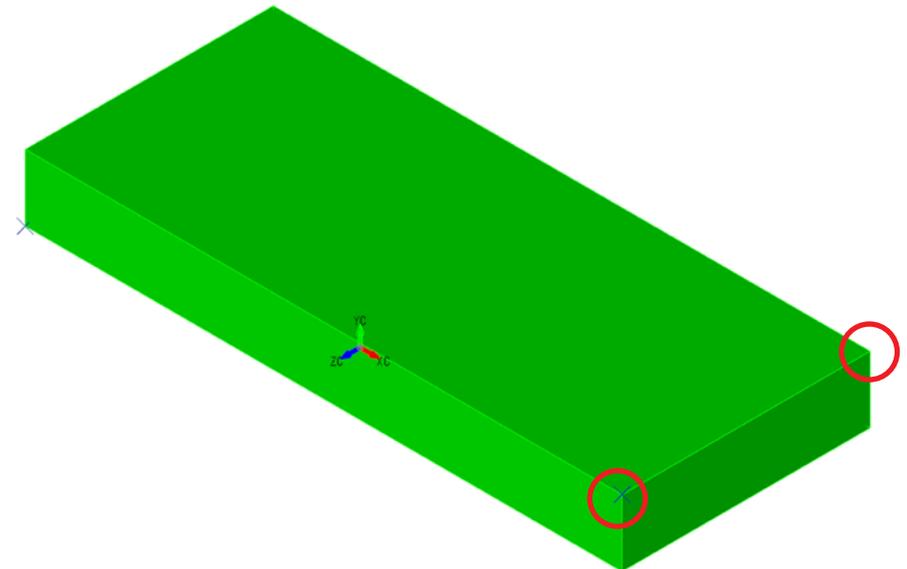
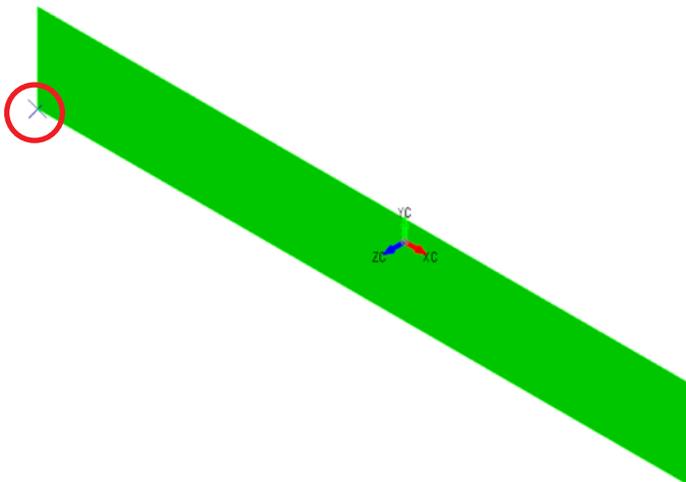
Select Create>Primitive Solid>Block.



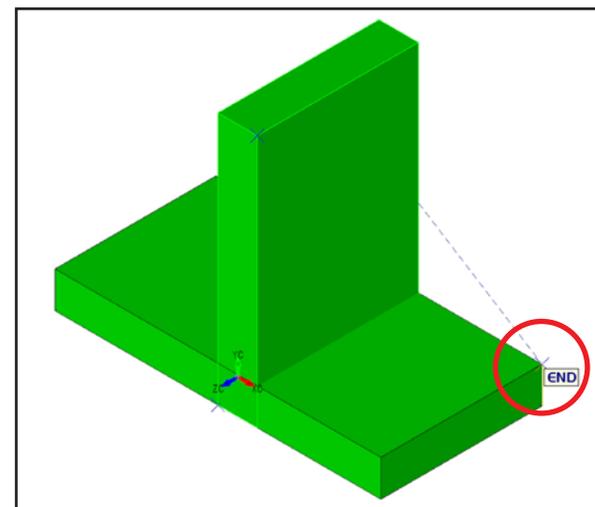
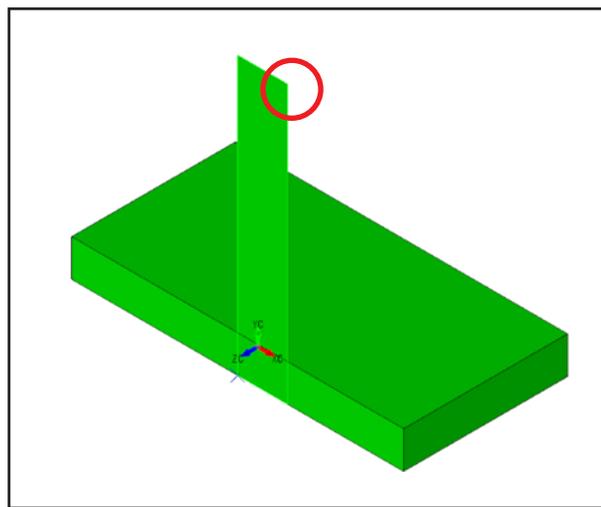
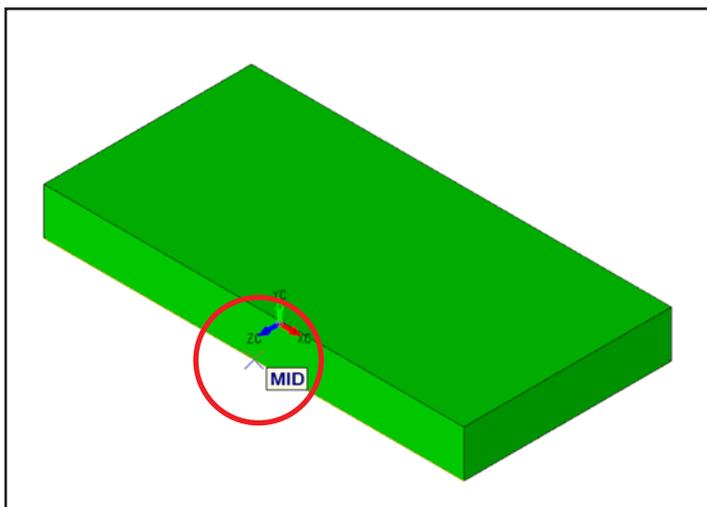
Select the 'Sketch' option:



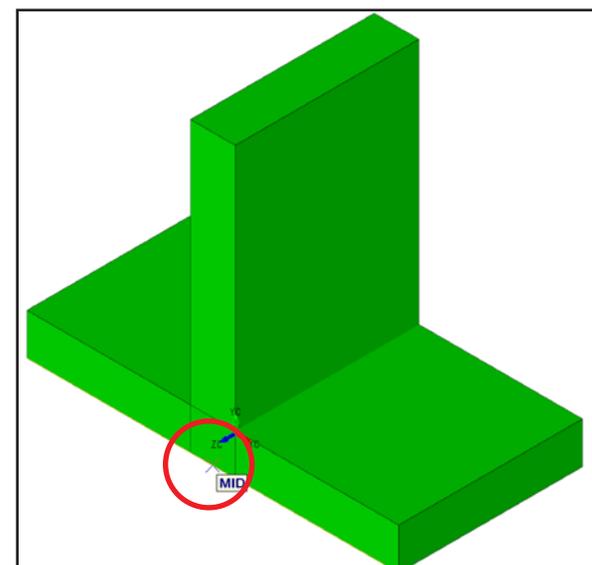
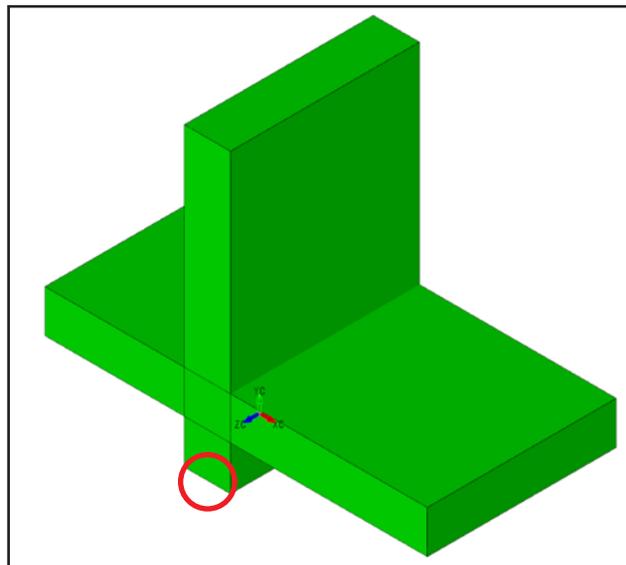
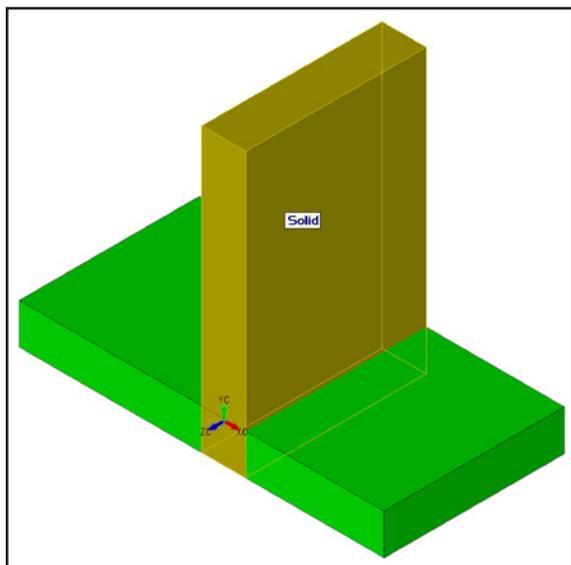
Select a point for the first corner, another point for a second corner, then select a third and final point to place the block. You should see a dynamic preview as you do these steps.



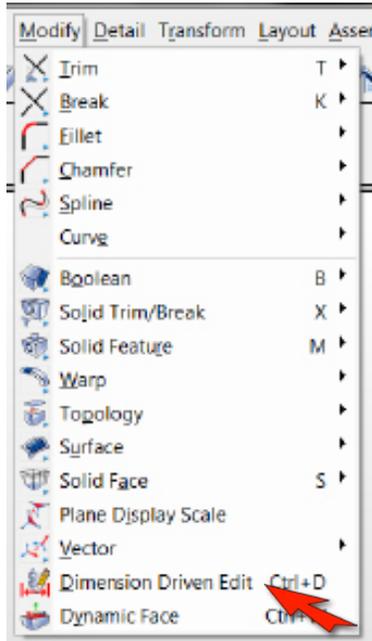
Create a second block, similar to the one shown here. Place the first point of this block at the bottom edge Midpoint ('MID') of the first block. For the third and final point, let the cursor snap to the right top rear corner of the first block, as shown.



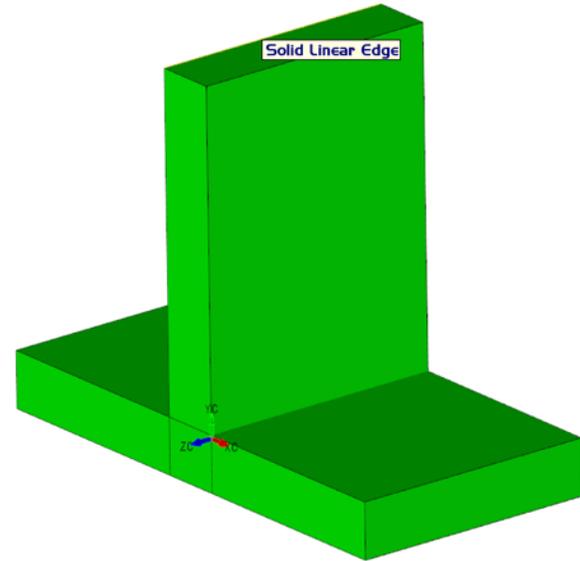
Let's center the top block. Select Generic Move  then select the top block. Making sure 'Cursor' is selected in the Conversation Bar at top left of screen, select the Midpoint of the bottom front edge of the top block. Drag the block and allow it to snap to the bottom front edge midpoint of the bottom block.



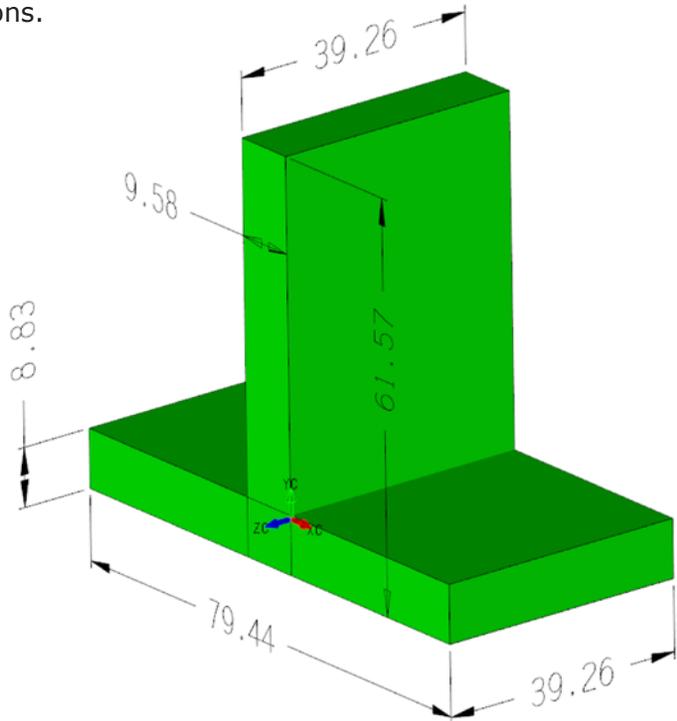
Select Modify >Dimension Driven Edit.



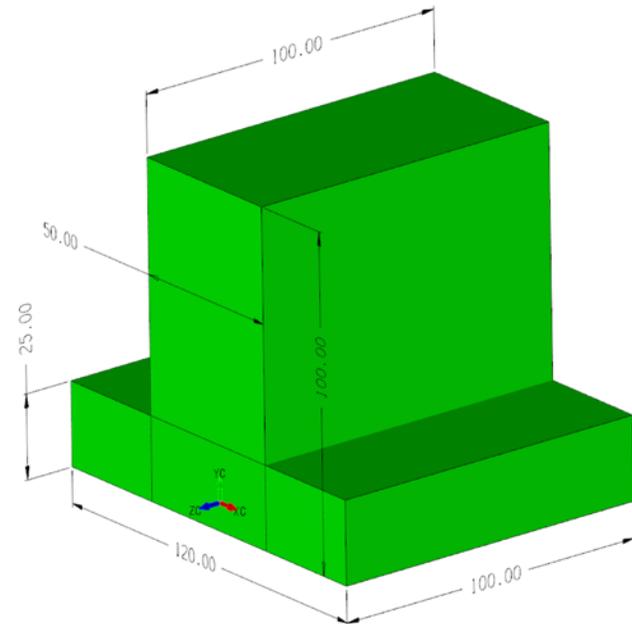
Create some drafting dimensions by selecting the edges as shown.



Your model should look similar to the one below after adding the dimensions.

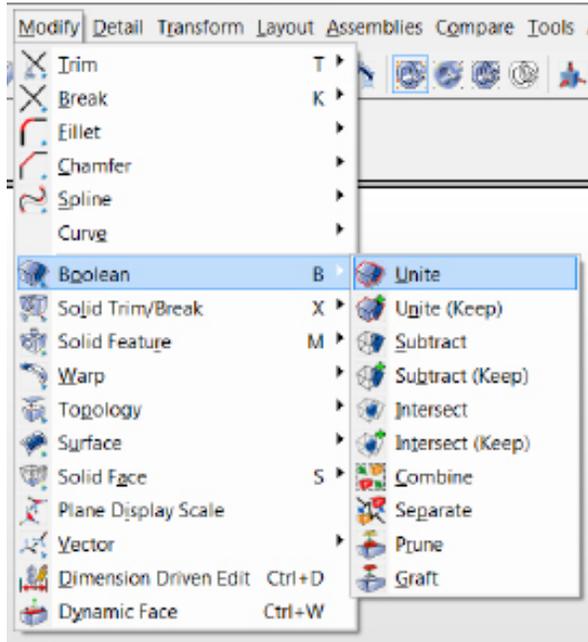


Staying in DDE mode, reselect the dimensions to resize the model to the dimensions shown below. If needed, re-center the top block.

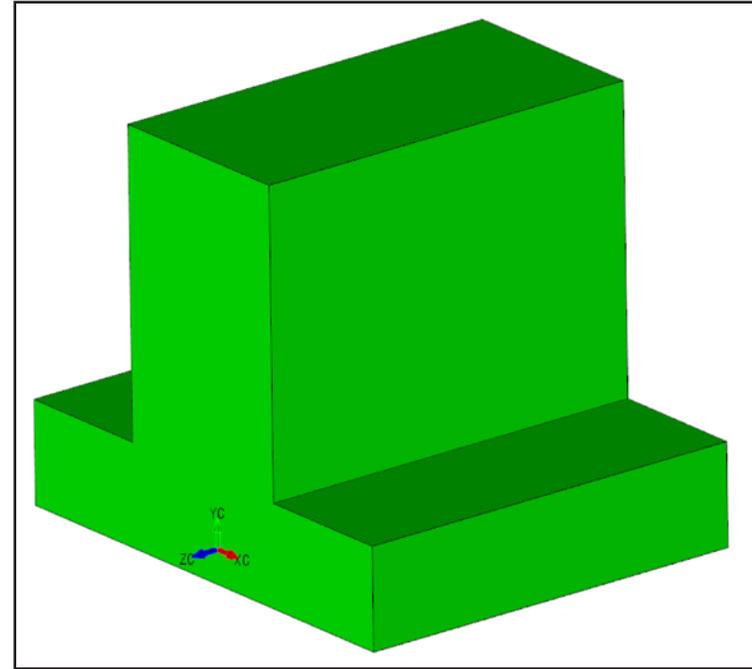


Select 'Delete Multiple' icon  along top and delete all dimensions.

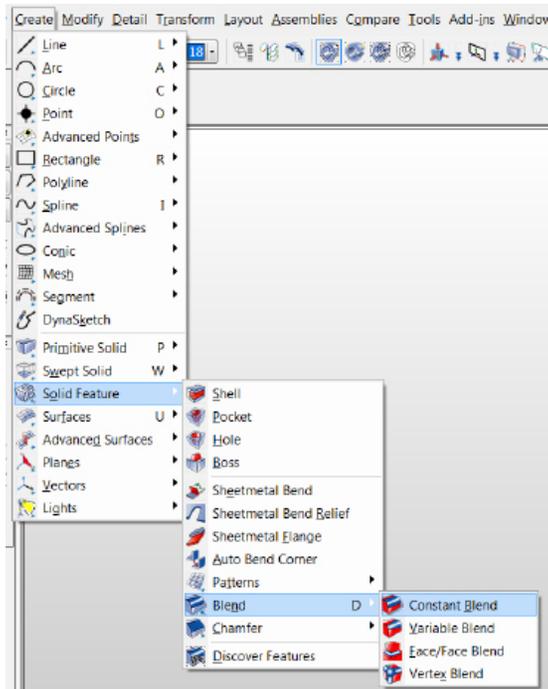
Select Modify > Boolean > Unite



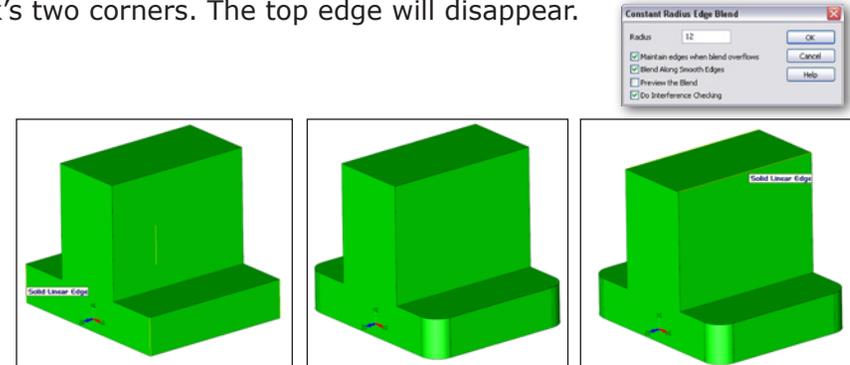
Select both blocks. Hit **Accept**. The two blocks are now one solid.



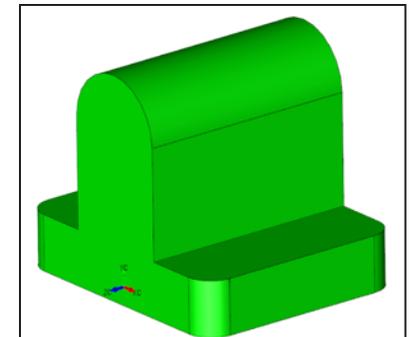
Select Create > Solid Feature > Blend > Constant Blend



Place 12mm blends on the four base corners, and 25mm blends on the top block's two corners. The top edge will disappear.



HINT: Hit 'Backup' in Conversation Bar to change blend size while staying in function.



Select the Splitter Window icon  at the top, then select the Materials Tab along the bottom of the Splitter Window.



Clean



25% Transp.



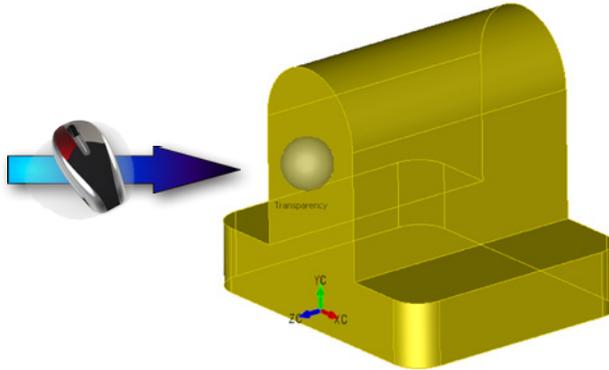
50% Transp.



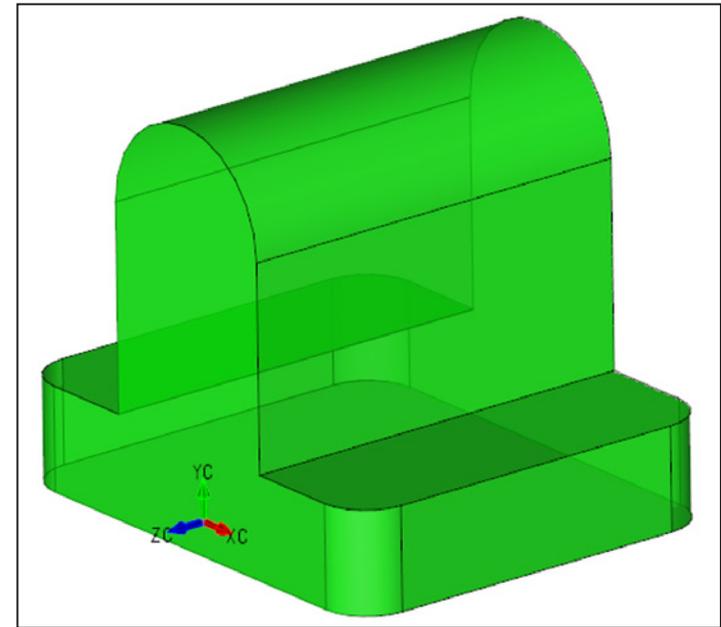
75% Transp.



Drag and drop the 50% transparency orb to the model with the LMB.



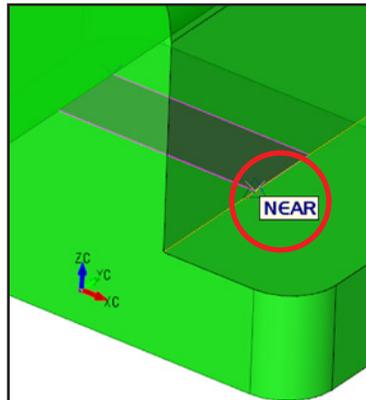
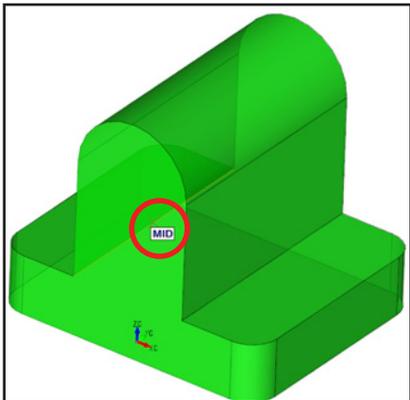
The model should now appear like this.



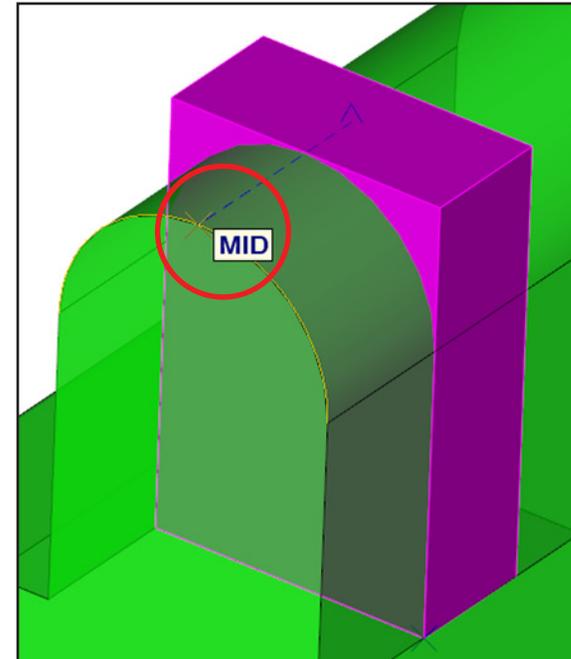
Hit Ctrl+1 to change the CPlane to Top.

Change the color by selecting the arrow by this icon  up top, which affects all new geometry.

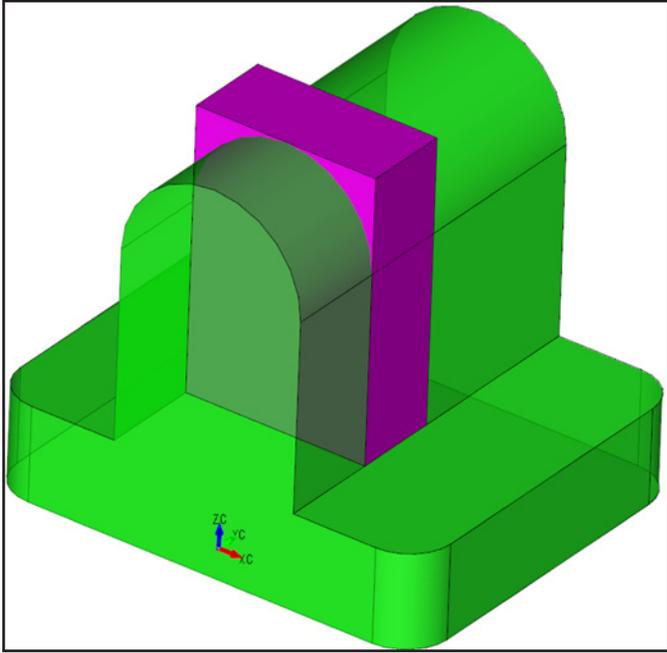
Sketch a Primitive Block, placing the first corner at the edge midpoint as shown. Hold down the Shift key while placing the second corner as shown. You should see a 'NEAR' tooltip.



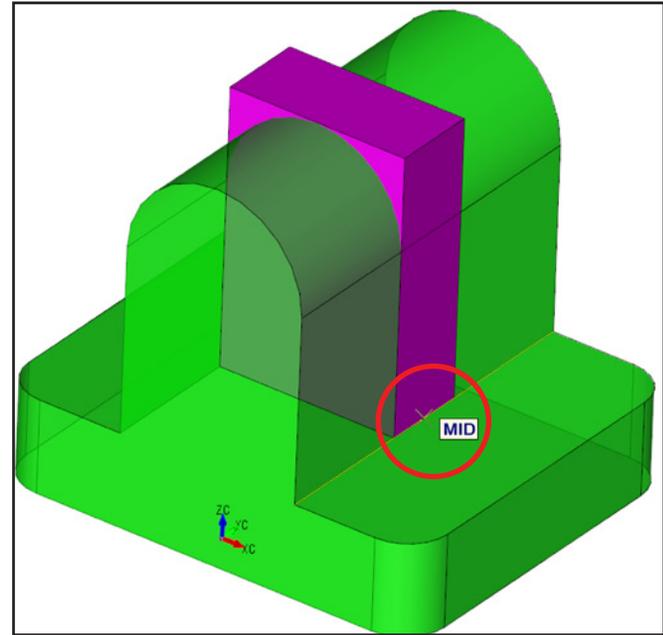
For the third point, hover the cursor over the top of the cylinder until you see the 'MID' tooltip.



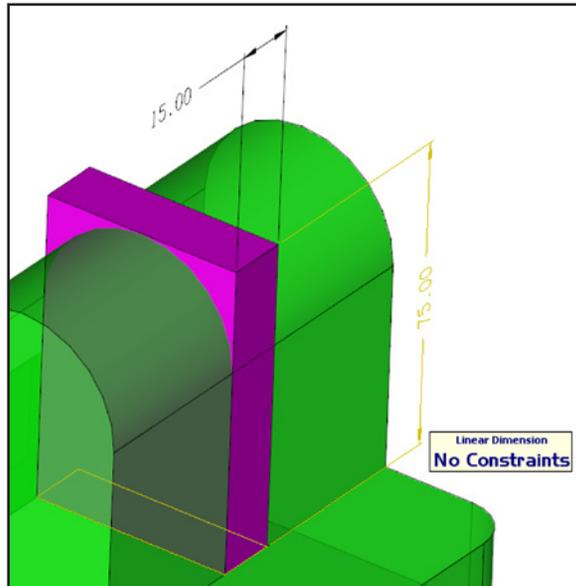
Your model should look like this.



Using Generic Move , snap the midpoint of the new block to the midpoint of the edge it's touching, as shown.

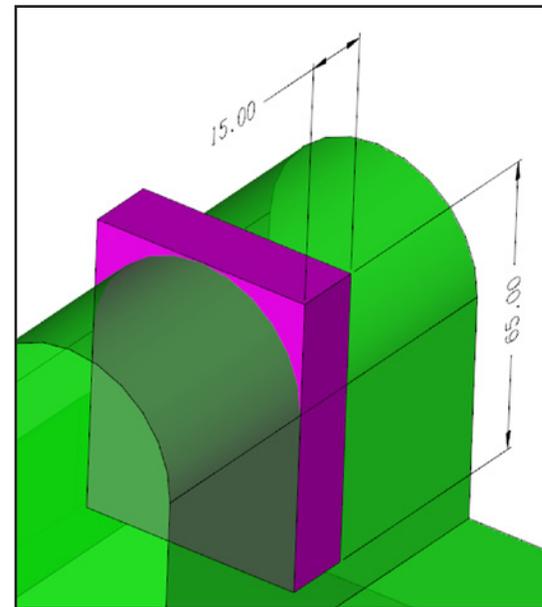


Using DDE , make the block 15mm thick. And 65mm FROM THE TOP of the cylinder.



HINT: Only highlight the bottom face of the block when editing the dimension.

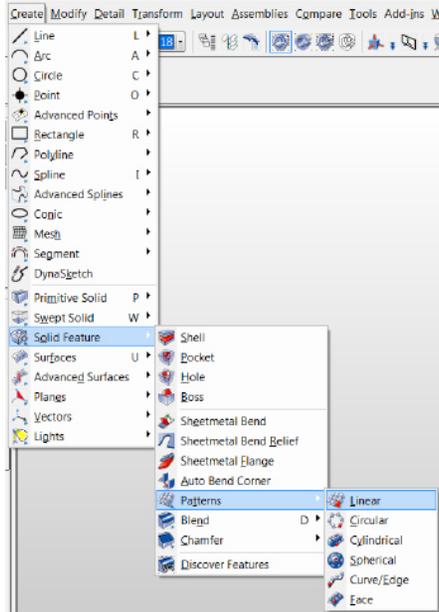
Your model should look like this.



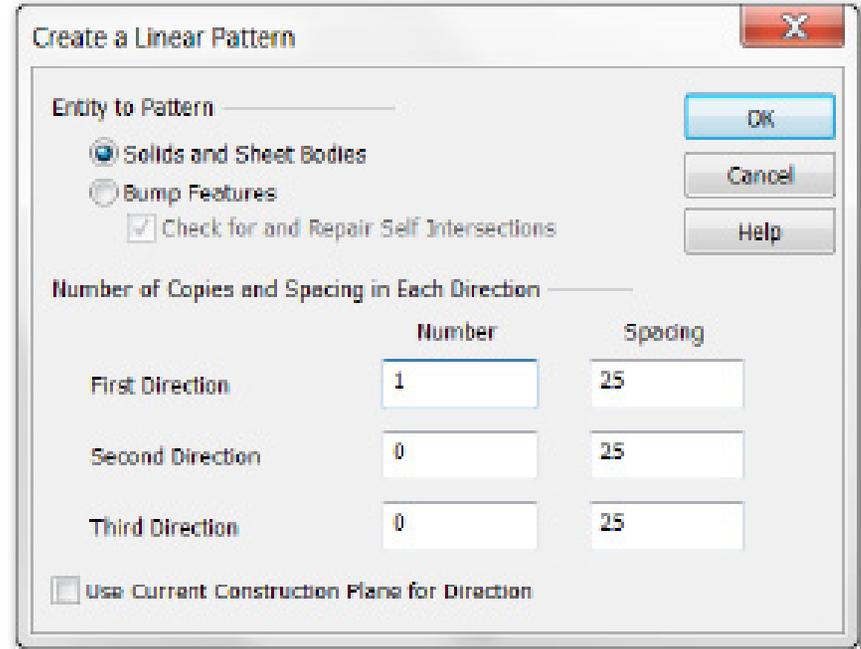
Delete the dimensions using .

We will now create a pattern using the new block.

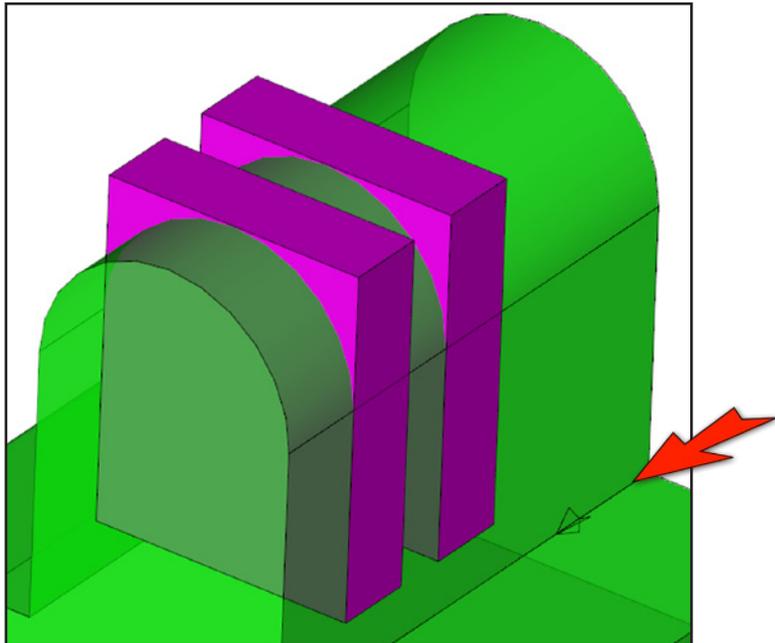
Select Create >Solid Feature >Patterns > Linear



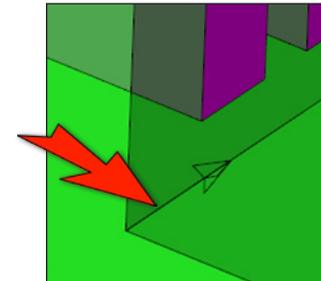
Specify options as shown.



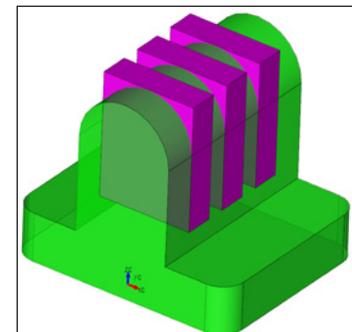
Select the block, and Accept.
To indicate the first direction, select the edge as shown and select Accept.



Select the second direction, select the edge as shown and select Accept.
You must reselect the block and Accept in between direction 1 and 2.

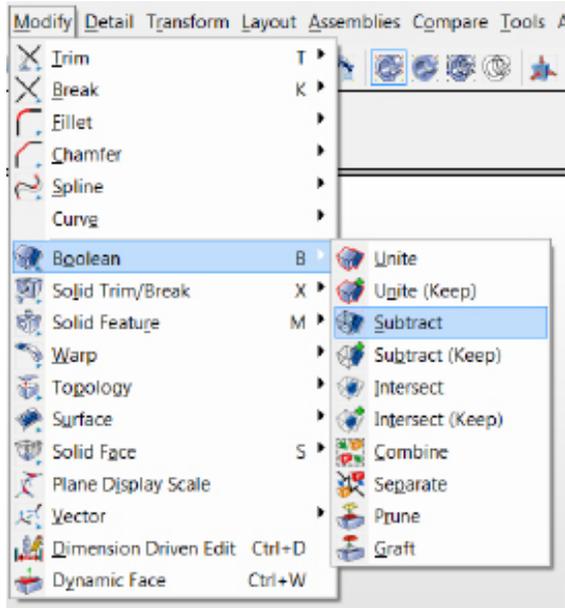


Your model should look like this.

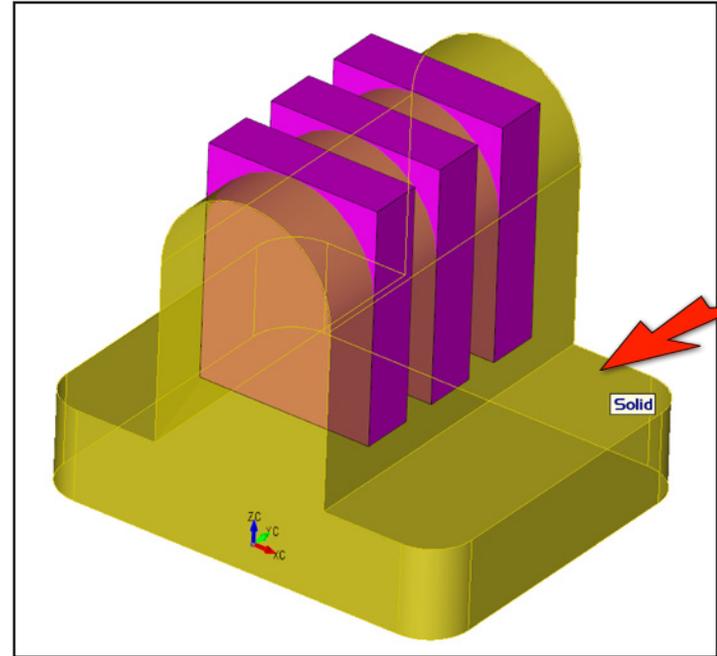


We will now use these blocks to cut through the model.

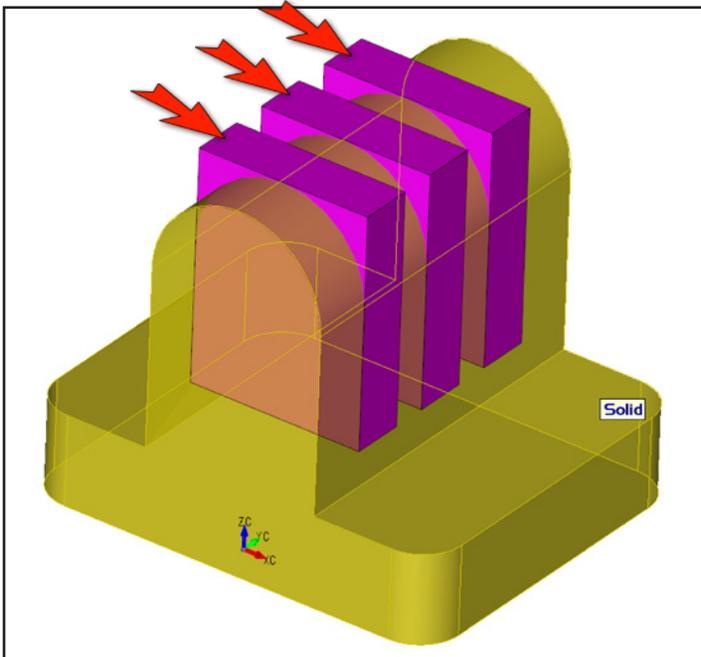
Select Modify > Boolean > Subtract



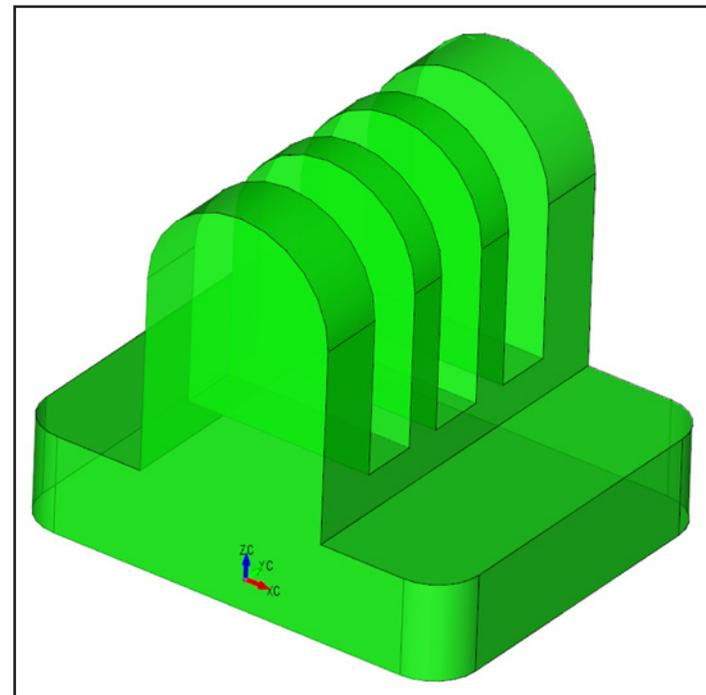
Select the base part as the solid to subtract from.



Then select the three blocks and Accept.



The model should look like this.

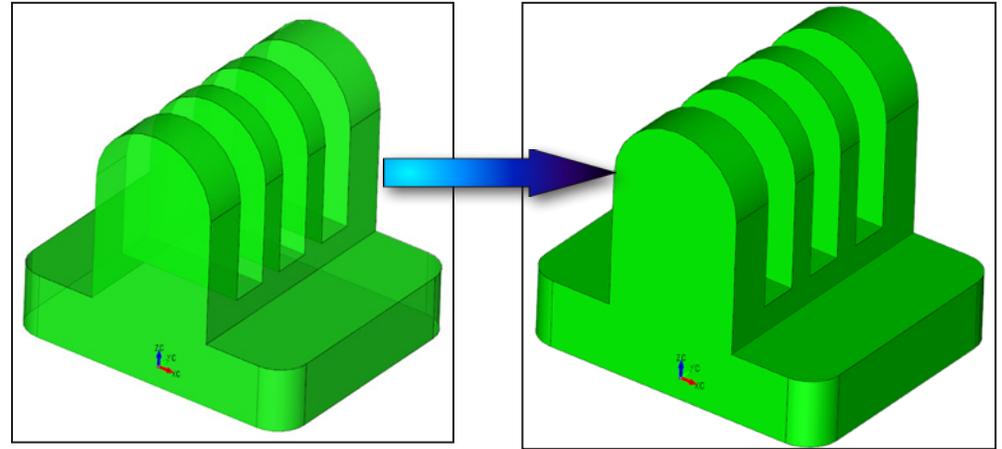


Select the  icon at top of screen, then select

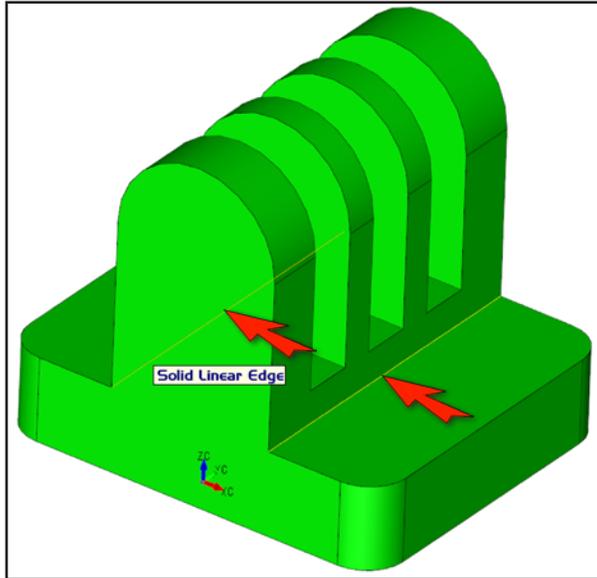


Select model then Accept.

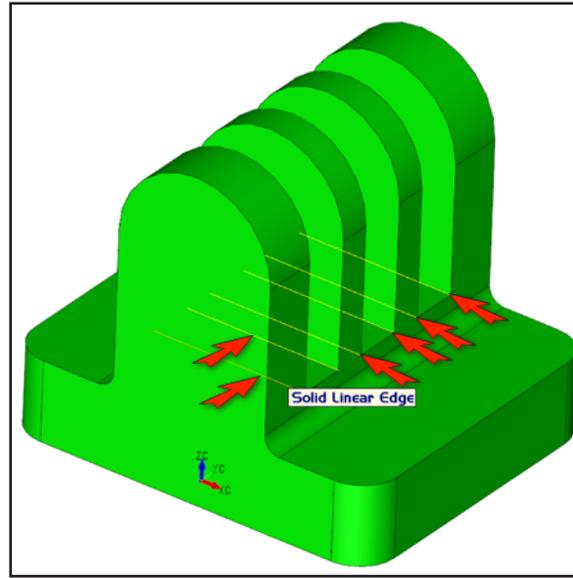
Specify zero transparency for the entire body and hit OK.



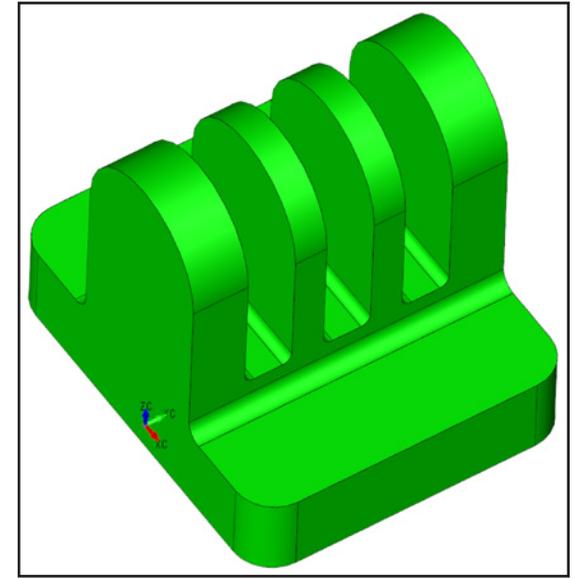
Create some Constant Blends on the edges as shown. 3mm for between the tabs, 5mm for the two long edges. You can select the edges through the model without rotating it.



Edges for 5 MM



Edges for 3 MM

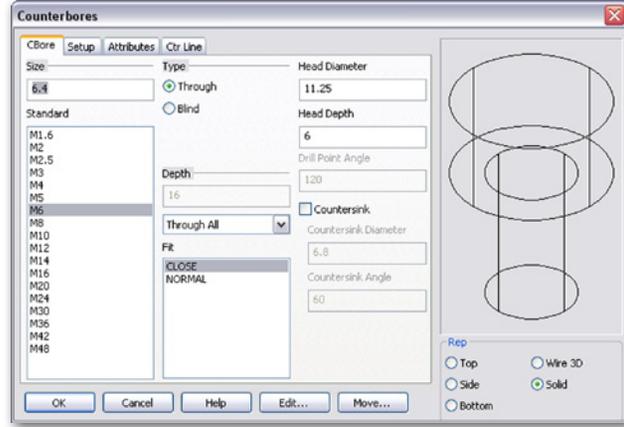
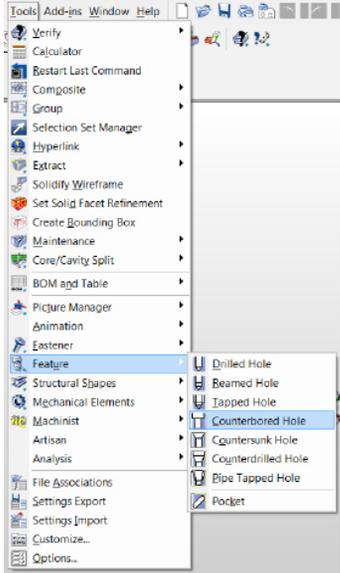


Finished blends

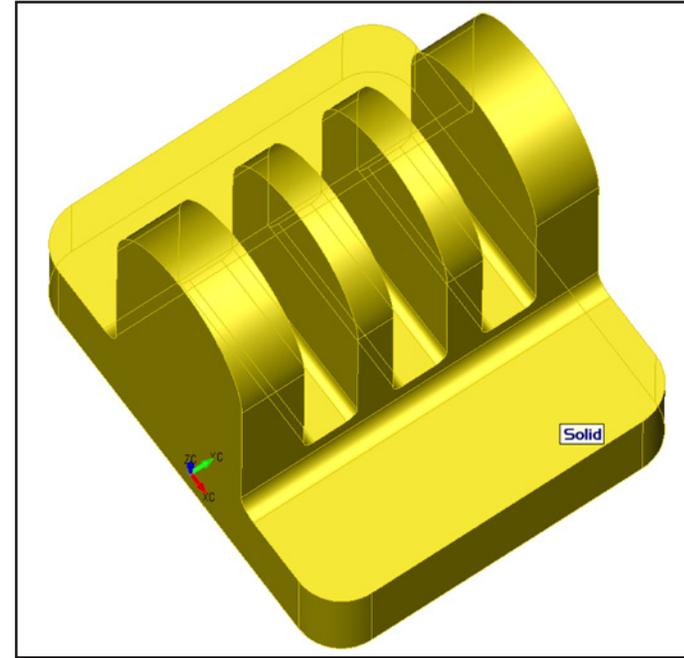
We will now place some Counterbored holes on the model.

Select solid to add holes. Make sure you're still on CPlane 1 (TOP).

Select Tools >Feature >Counterbored Hole

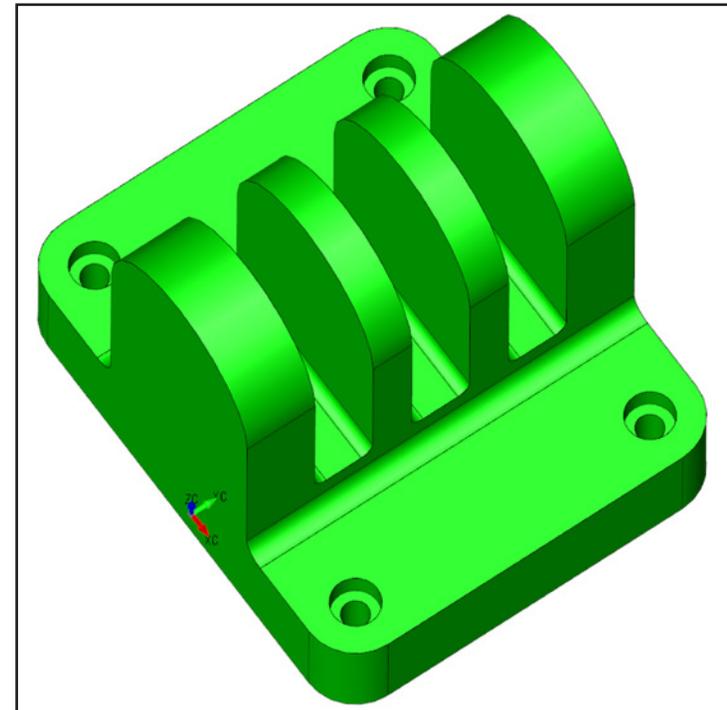
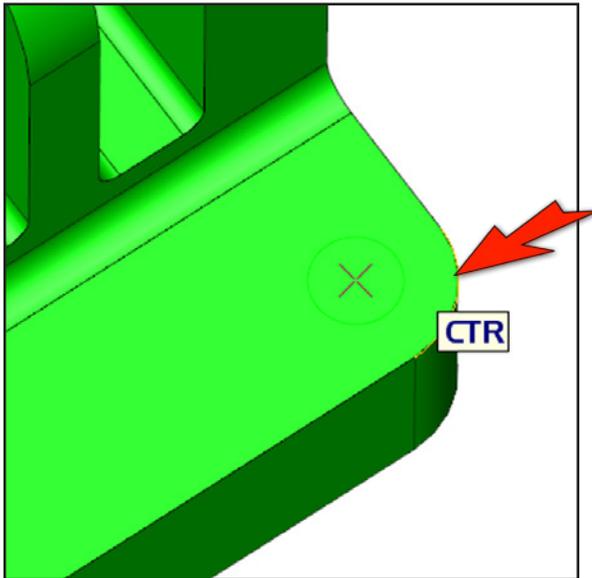


Specify size M6, and options as shown. If you see English and not Metric, select Setup tab and change it.

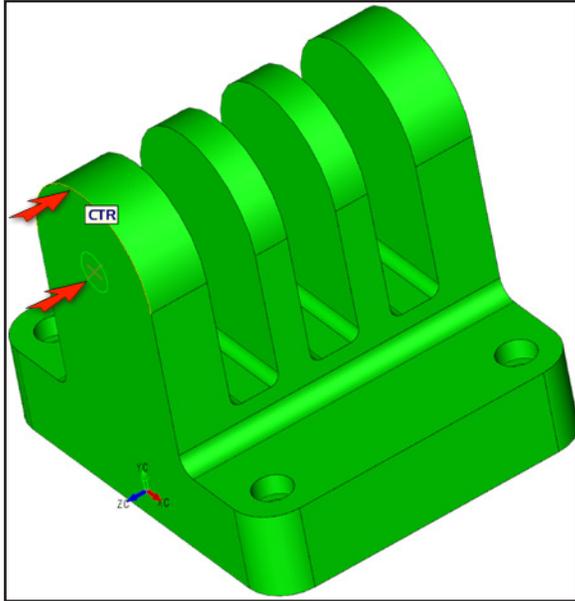


You should see a preview of the cbore hole. Allow the cursor to snap to the 'CENTER' of each base corner radius. Place the four holes. Remember you can select edges through model.

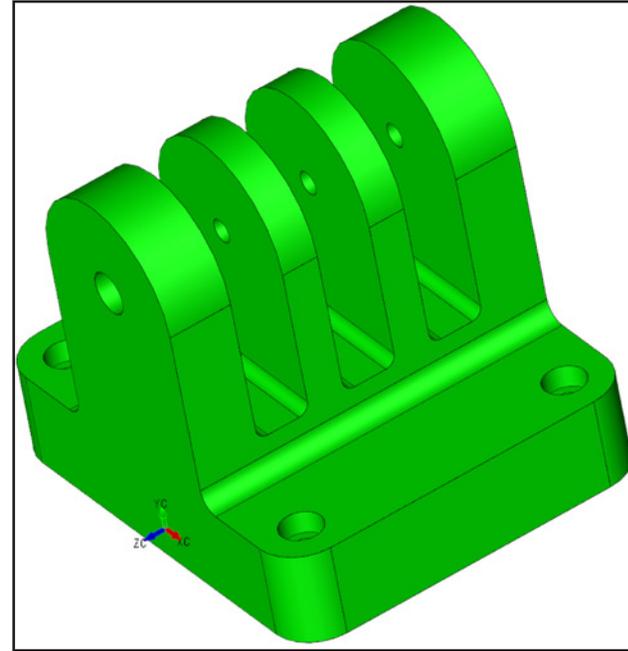
Your model should look like the one below now.



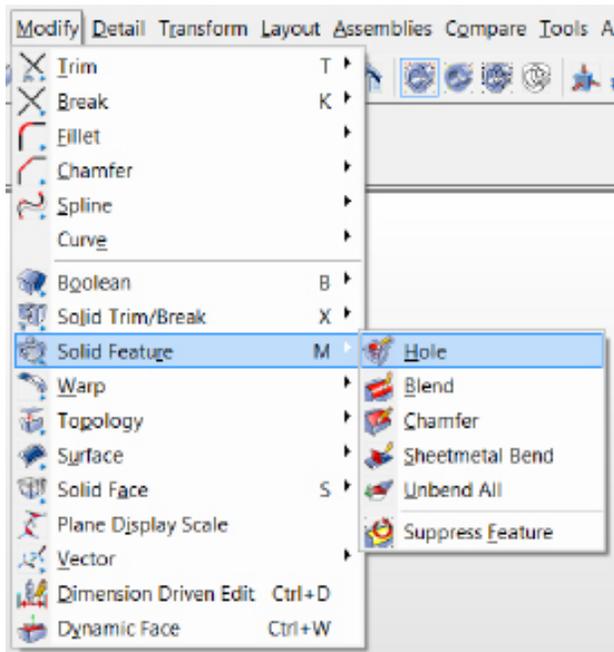
Change to CPlane 2 (FRONT).
Place another M6 c bore through hole through the front top tab face.
Again, allow the cursor to snap to the 'CENTER' of the cylinder face.



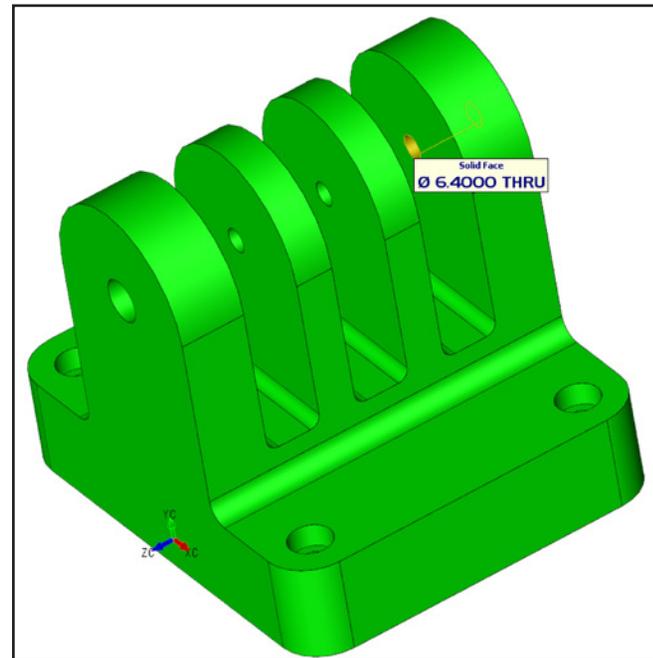
Your model should look like the one below now.



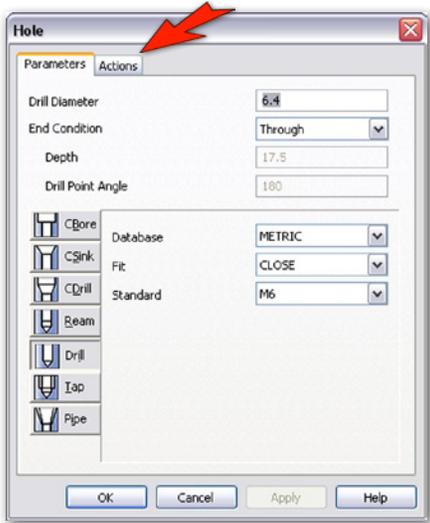
We will now edit a hole using parameters from an existing hole.
Select Modify >Solid Feature >Hole



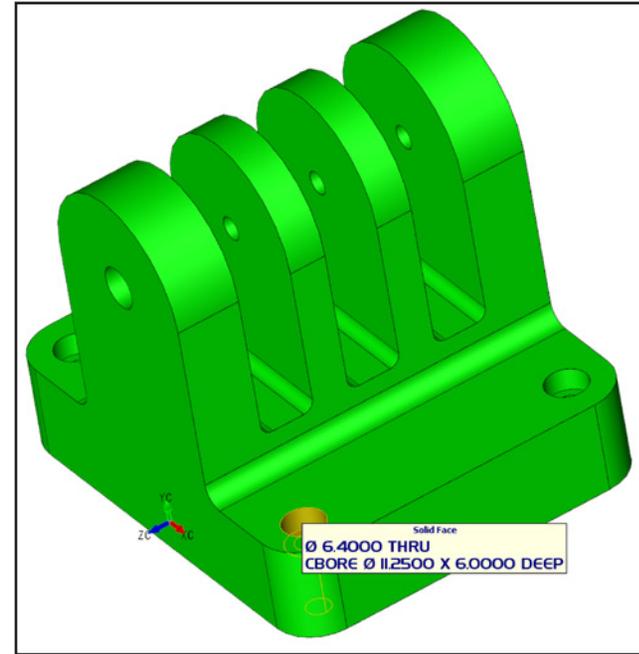
Select the hole on the rear tab, as shown, and Accept.



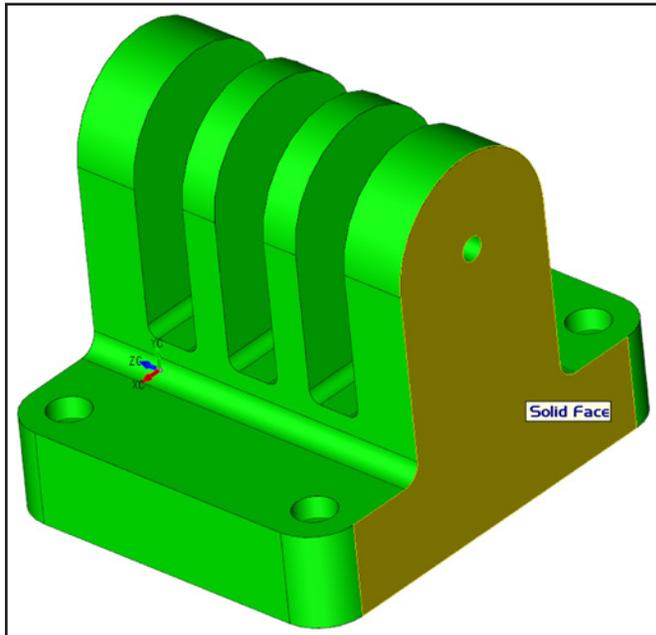
Select the Actions tab, and select Get parameters from another hole.



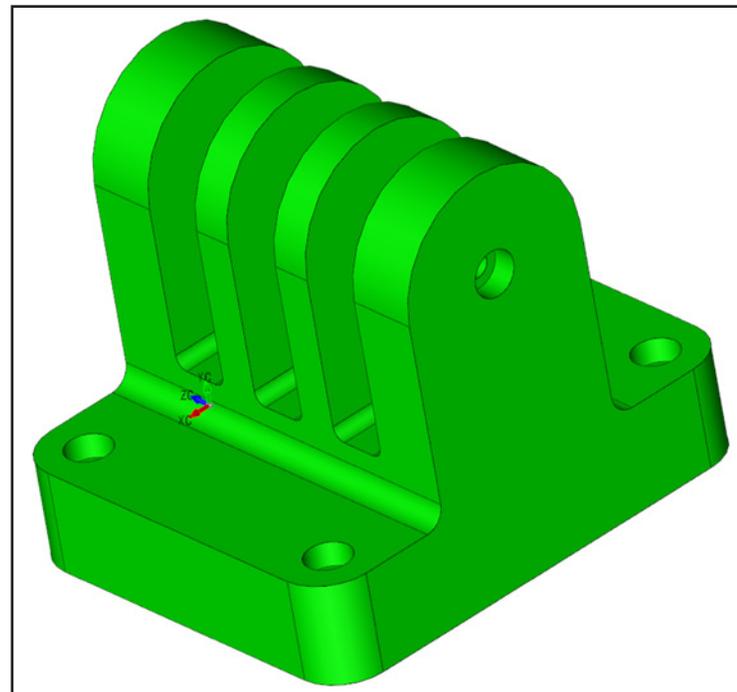
Select one of the four base bores. Hit OK.



Select the face of the rear tab to indicate on which face to put the bore. Accept.

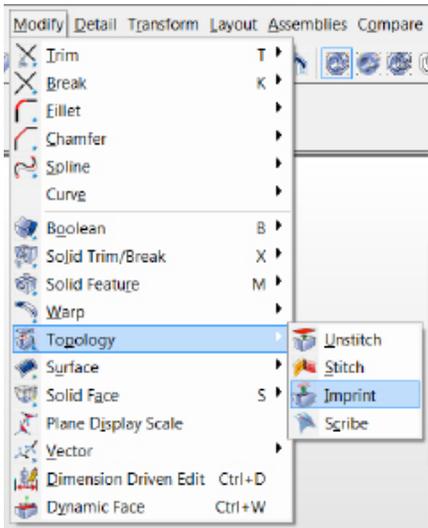


Your model should look like the one below now.

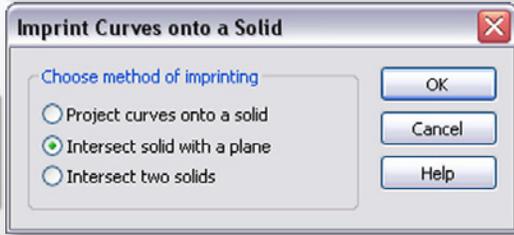


We will now imprint a line onto the model to create new edges that separate existing faces. This allows geometry to easily separate from the model.

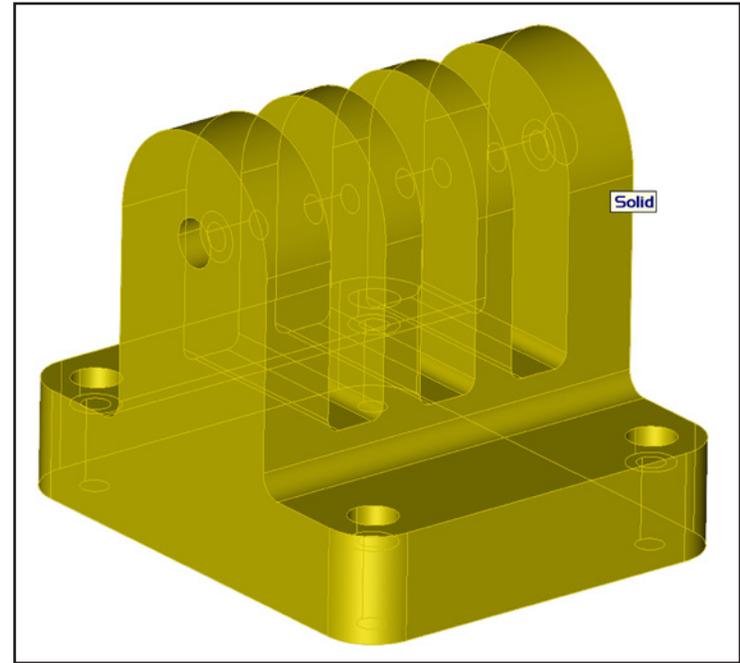
Select **Modify > Topology > Imprint**



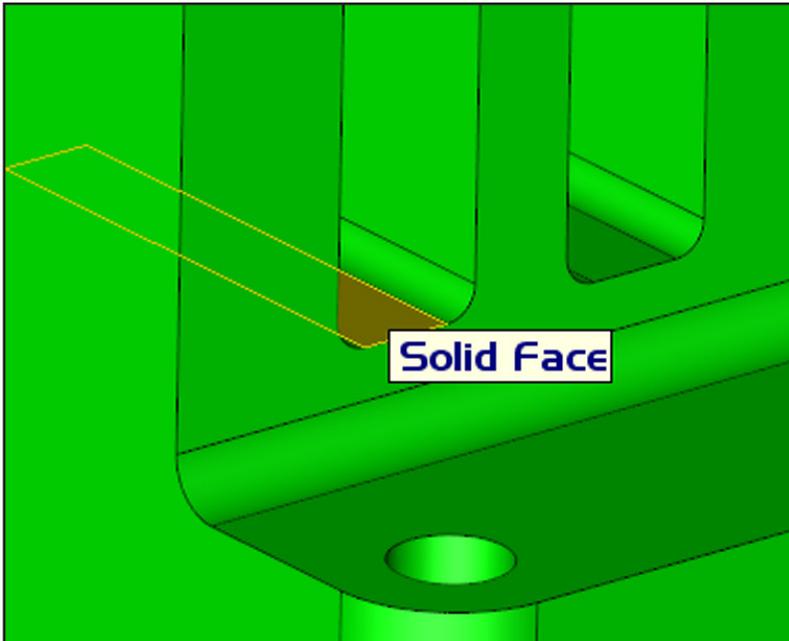
Select **Intersect solid with a plane**.



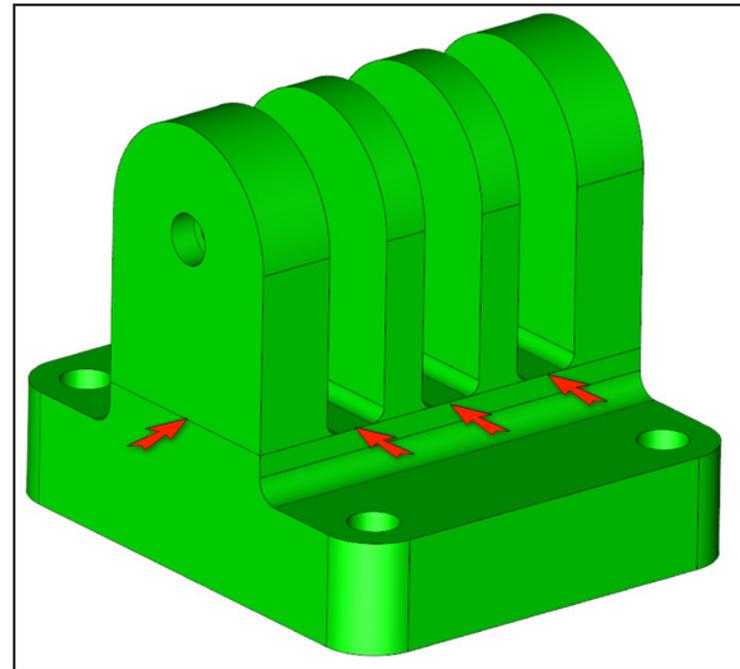
Select the solid for imprint.



Select a face at the base of the tabs, as shown.
Use spacebar to toggle through selection options if needed.



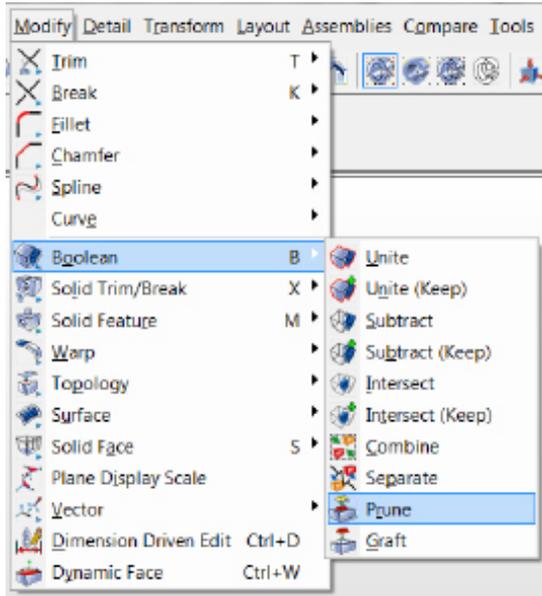
Your model should now look like this.



Top View

We will now perform some 'cut & paste' type functions, using geometry on the model.

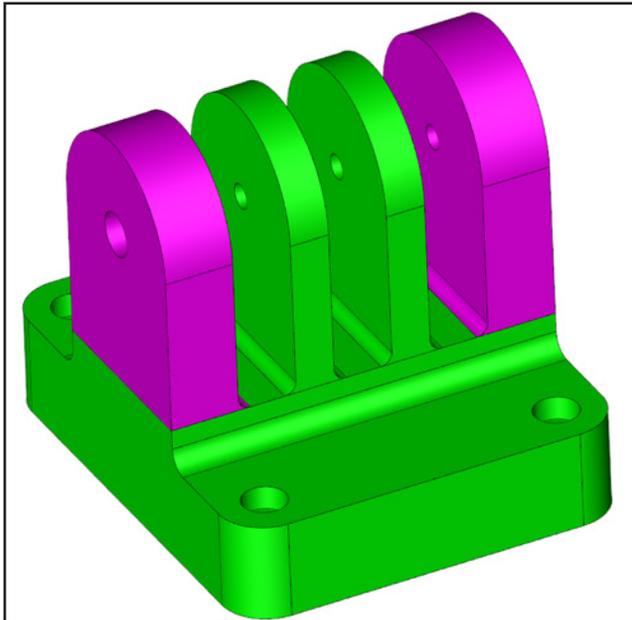
Select Modify > Boolean > Prune



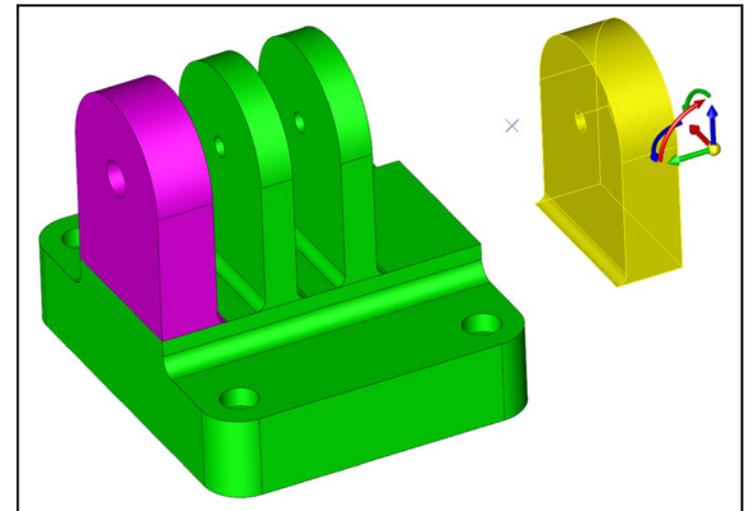
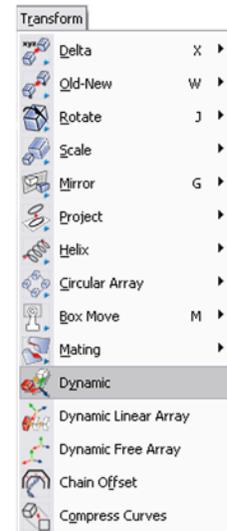
Select 'Cut', 'Feature', and 'Boss'. The geometry we are cutting satisfies the 'boss' characteristics.



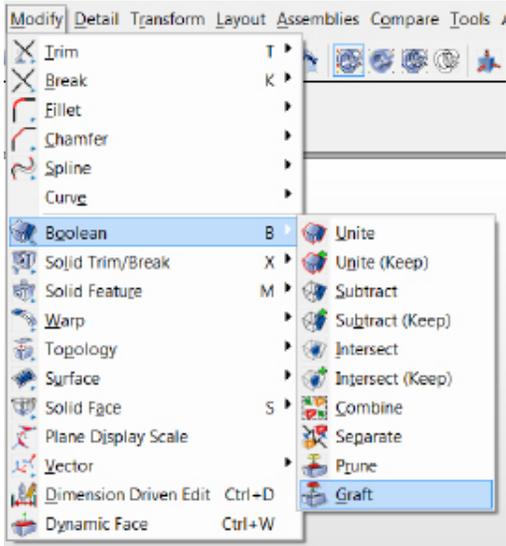
Select the front and rear tabs.
Hit Accept 3x to complete operation.
These bosses are now separate solids.



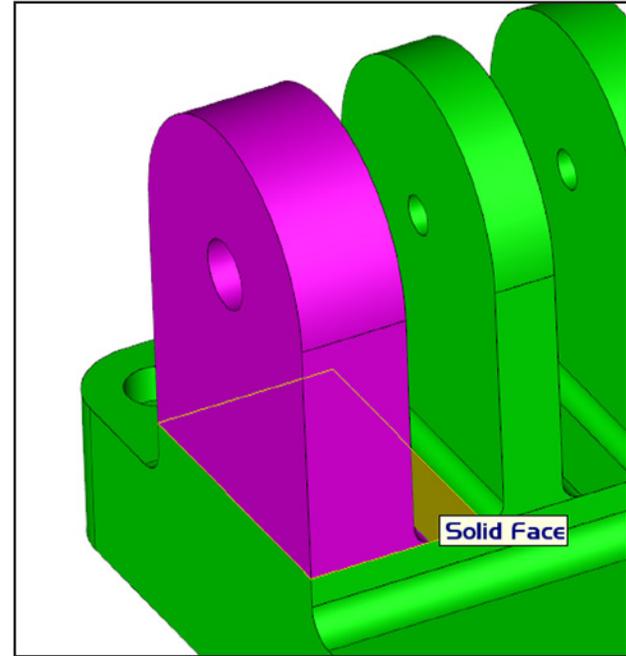
Select Transform > Dynamic to move the separate solids around. Hit ESC when done. If you hit Accept select undo before going to the next step.



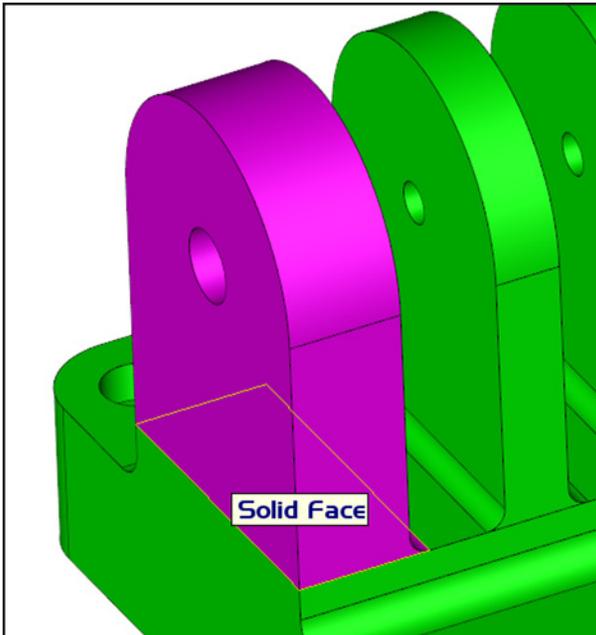
Select Modify > Boolean > Graft



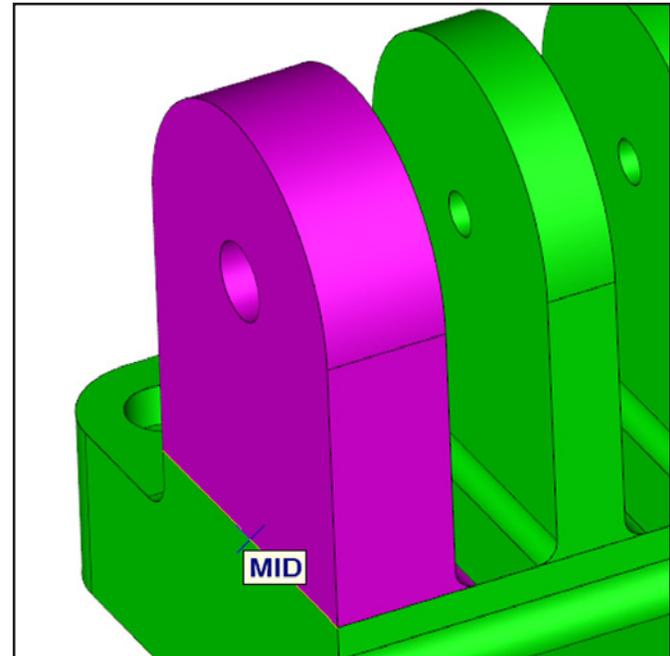
Select the target face as shown.



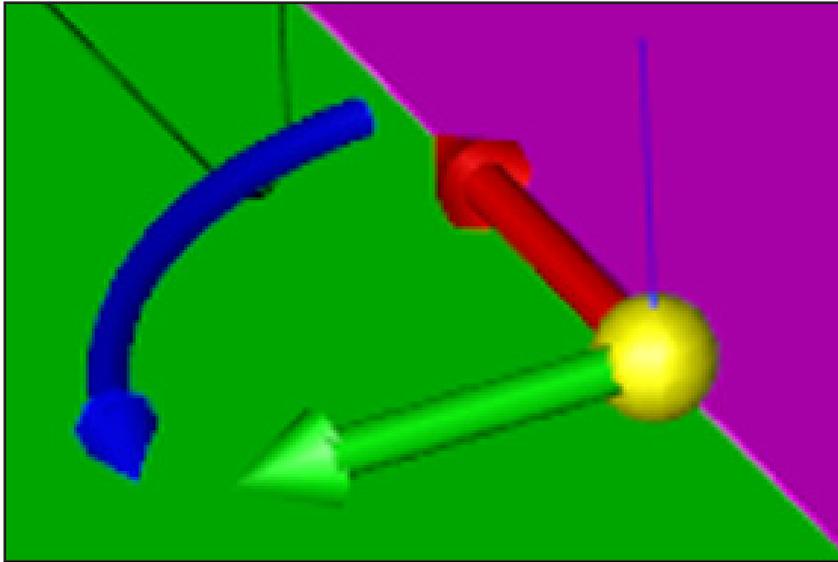
Select the opposing face (bottom face of boss) as shown.
Use spacebar to toggle through selections if needed.



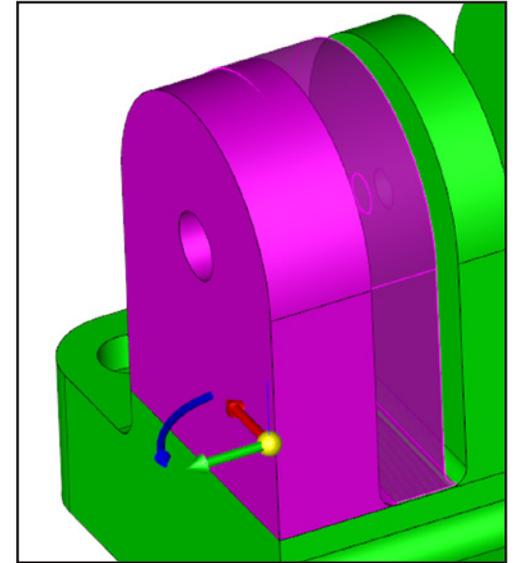
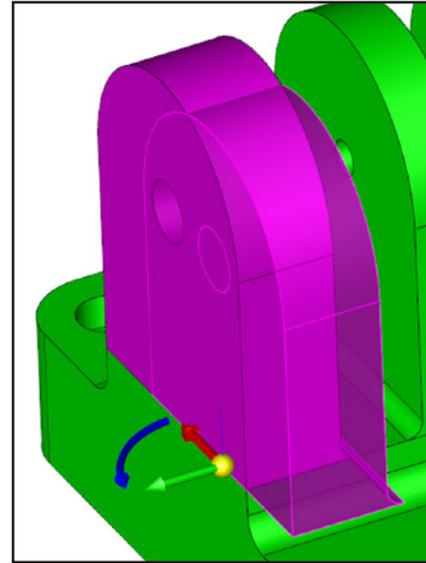
Select the midpoint as shown for boss base position.



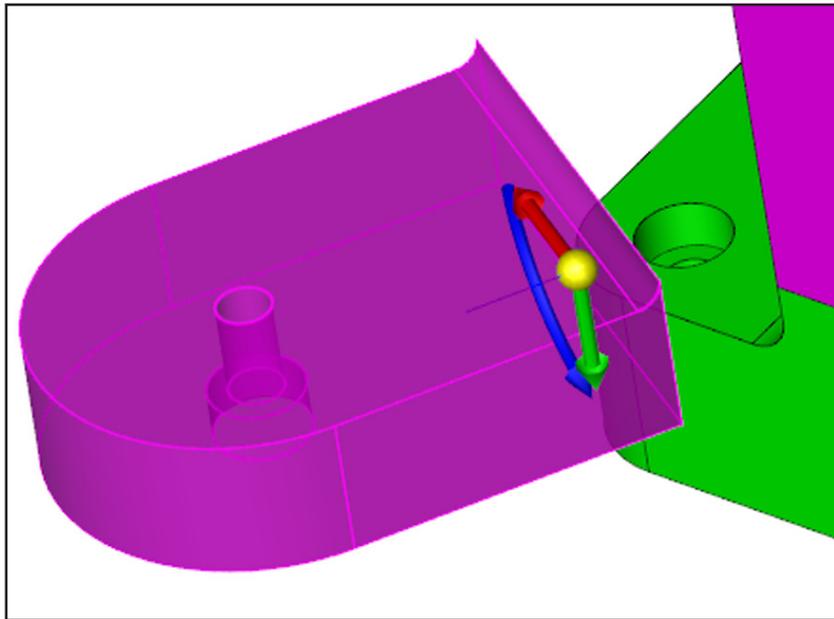
A 3D Handle will appear at the midpoint.
Click & drag the arrows to manipulate the boss.



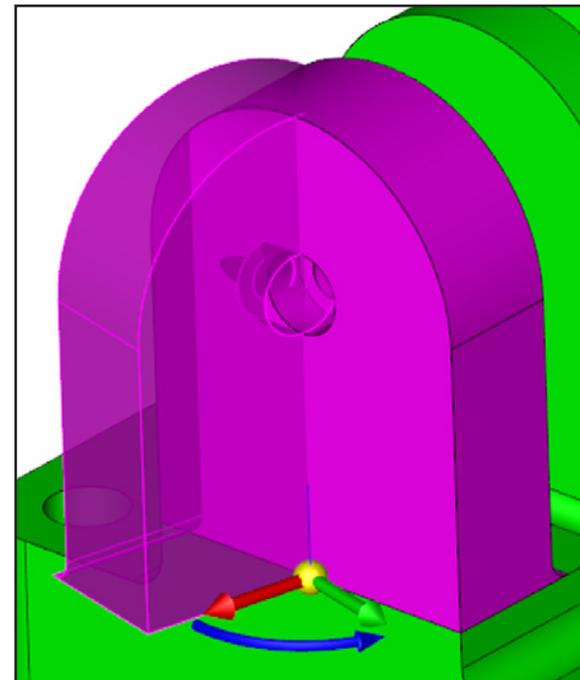
The red and green arrows move only along their indicated axis.



The yellow sphere moves the entire part anywhere it is dragged.

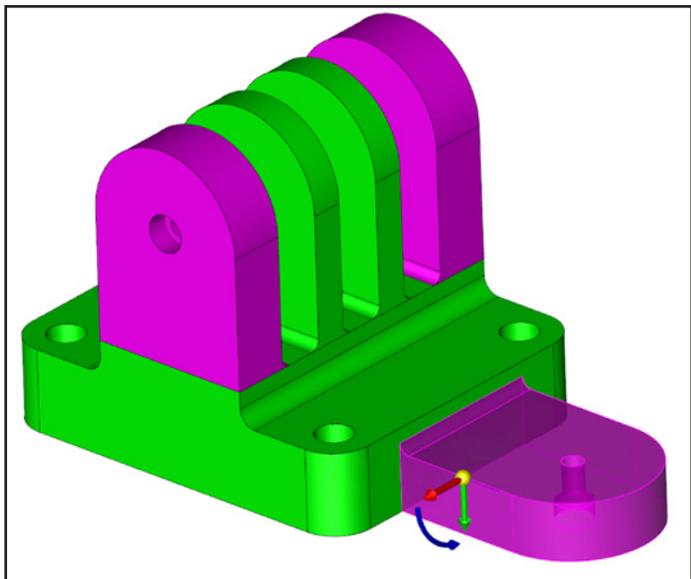


The blue arrow rotates.



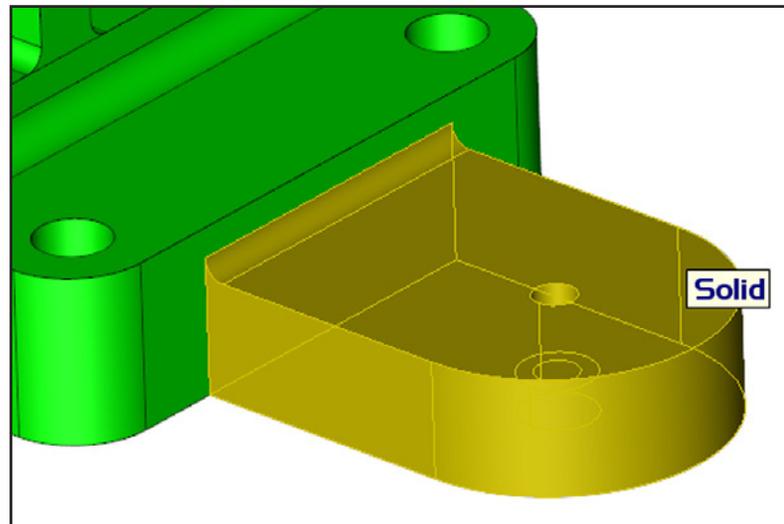
Click & drag the yellow sphere to move the boss to the position indicated below and hit Accept.

To temporarily turn off position snapping, hold Ctrl while dragging the part.

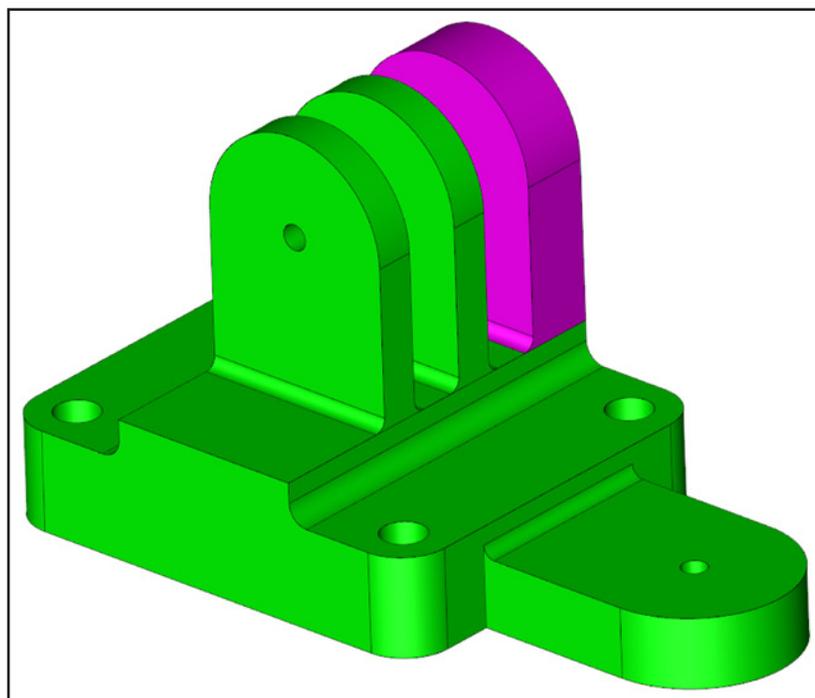


Select the Delete Multiple icon 

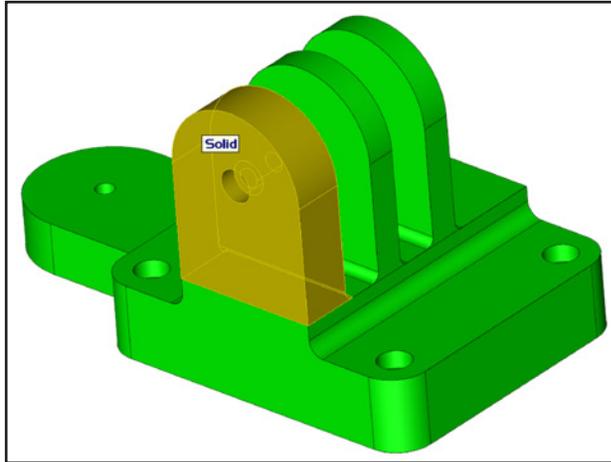
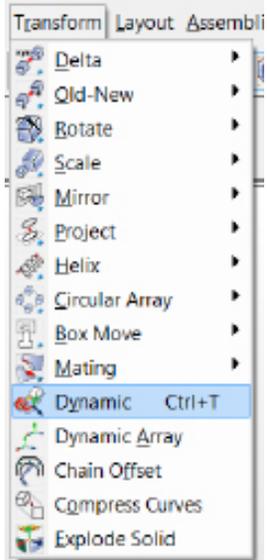
Hover the cursor over the new tab and use spacebar to toggle until only the tab is highlighted. Select and hit Accept. This deletes the extra copy of the geometry that grafting leaves behind.



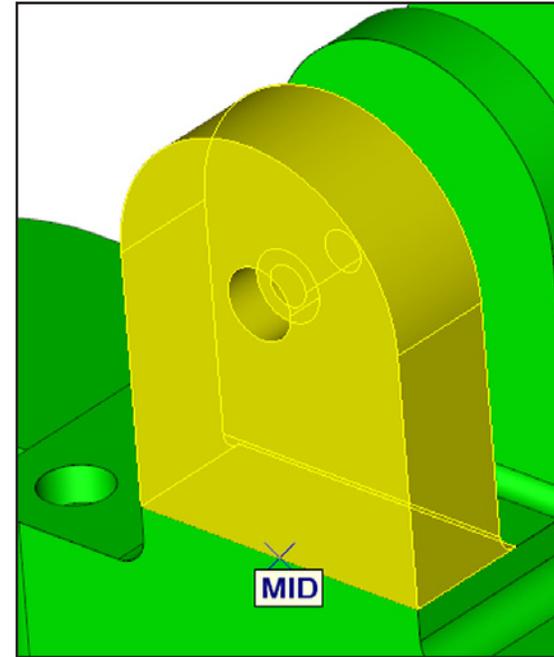
Now the newly-placed tab is unified again with the base as one solid.



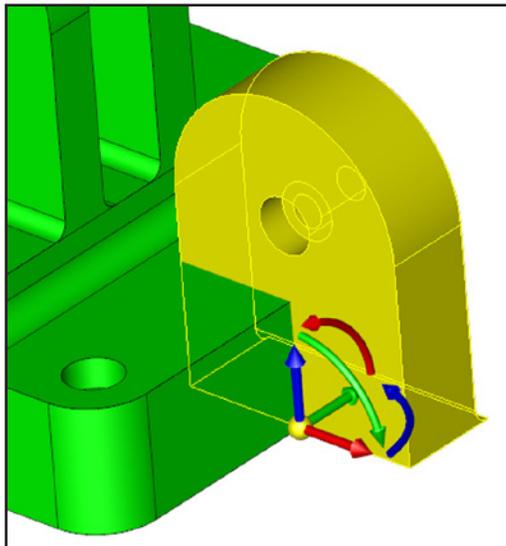
We will now move the other boss, using Dynamic Transform.
 Select Transform >Dynamic
 Rotate the model for better viewing of the boss.
 Select the remaining boss and Accept.



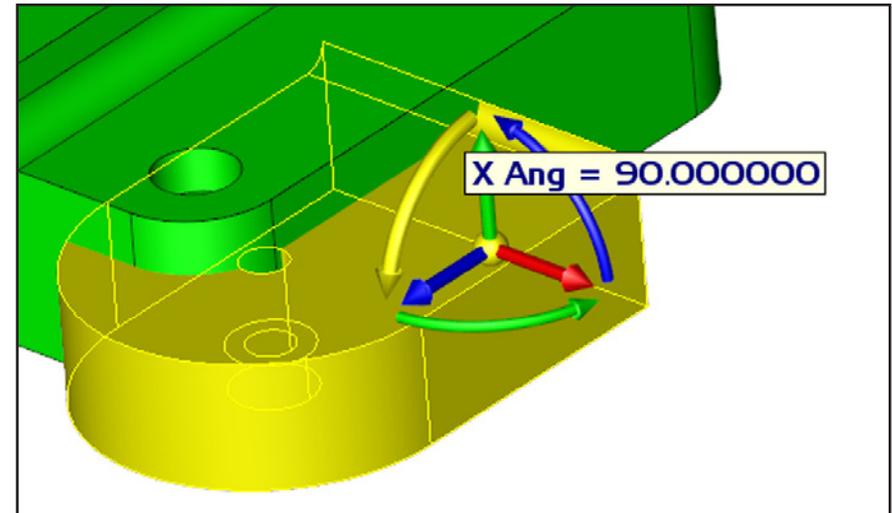
Select the midpoint as shown for the base point.



The 3D DynaHandle appears at the midpoint. This handle behaves similarly to the Graft 3D handle, except all three axes can rotate independently.



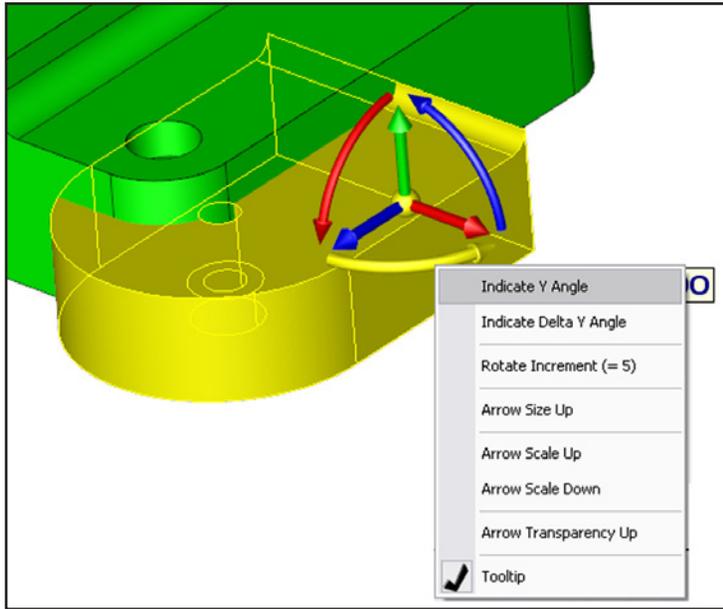
Select the Red rotation arrow with the Left Mouse Button and hold it down and drag until the X Ang=90.



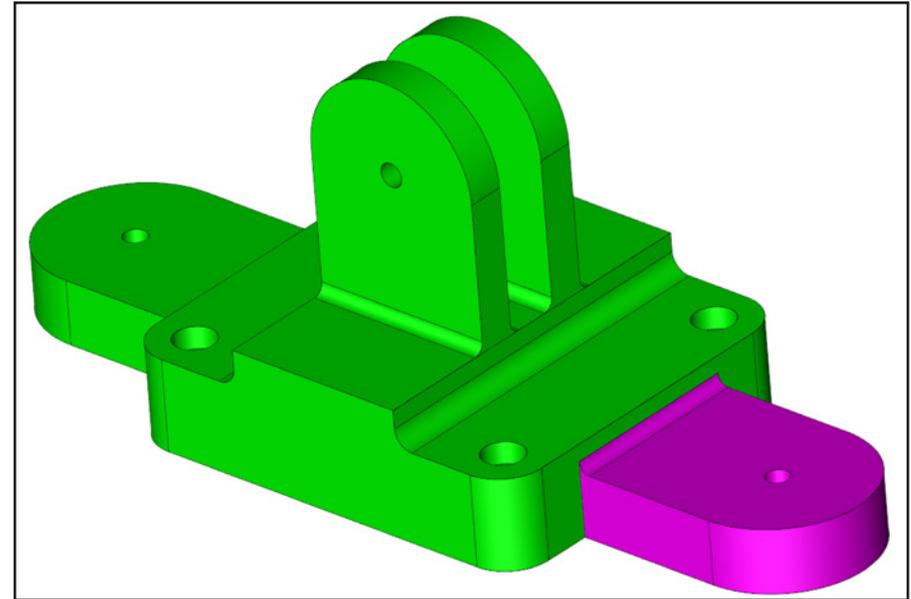
Move the boss to the indicated position. Allow it to snap to the edge midpoint.

HINT: The angle will rotate at 5 degree increments by default.

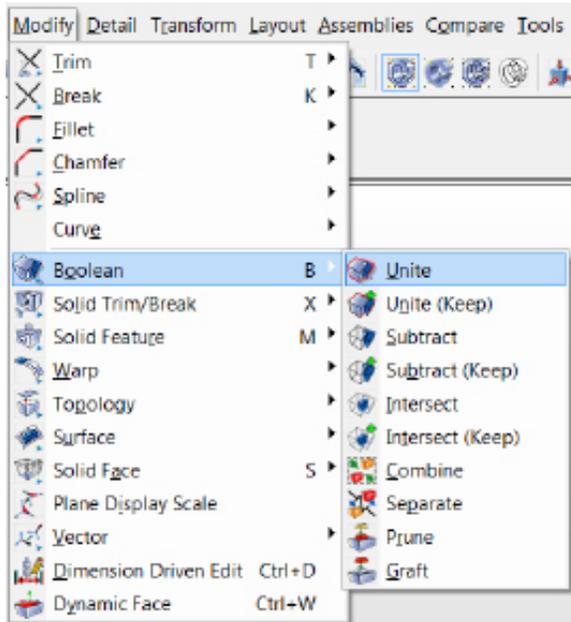
Right-click the Green rotation arrow as shown.
Select the first option 'Indicate Y Angle'.
Enter 90, Accept, then Esc. in the conversation bar.



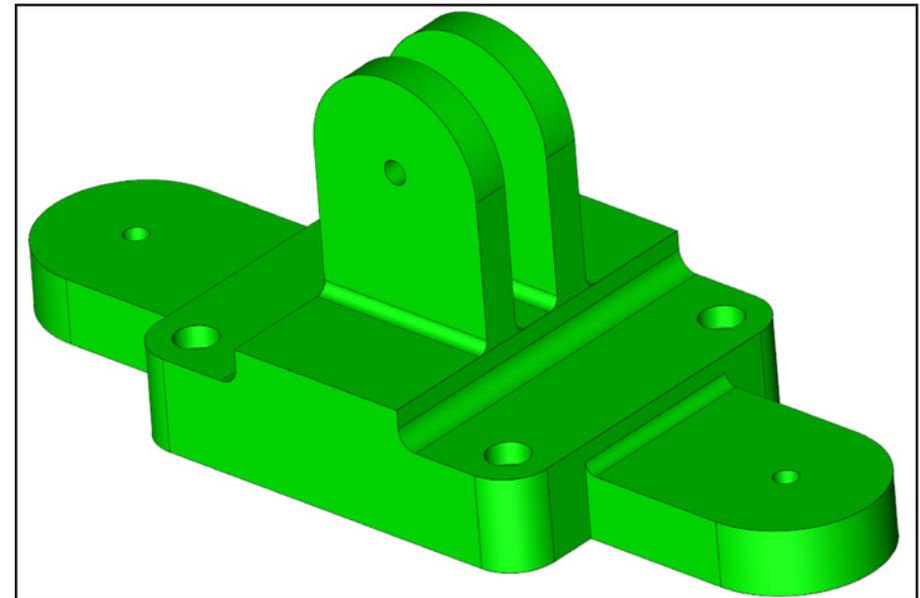
Model should now look like the one below after moving the boss.



We must unite the two solids.
Select Modify > Boolean > Unite
Select the large green solid and the boss, and Accept.



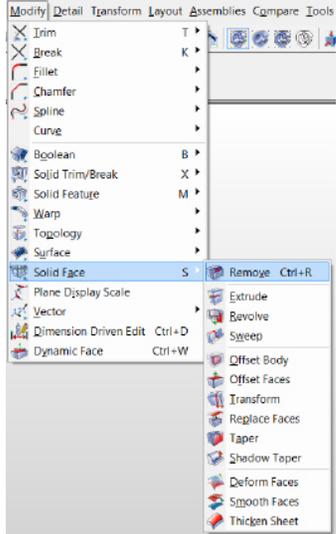
This is now one solid as shown below.



We will now use the Remove Feature function to simplify the model geometry.

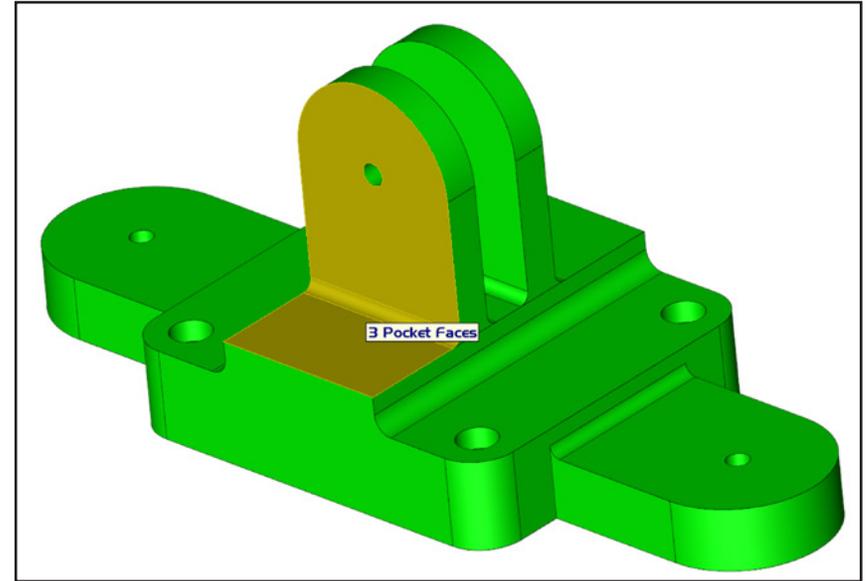
Select Modify > Solid Face > Remove

Select 'Feature' to specify the type of faces to be removed, then select 'Pocket'.



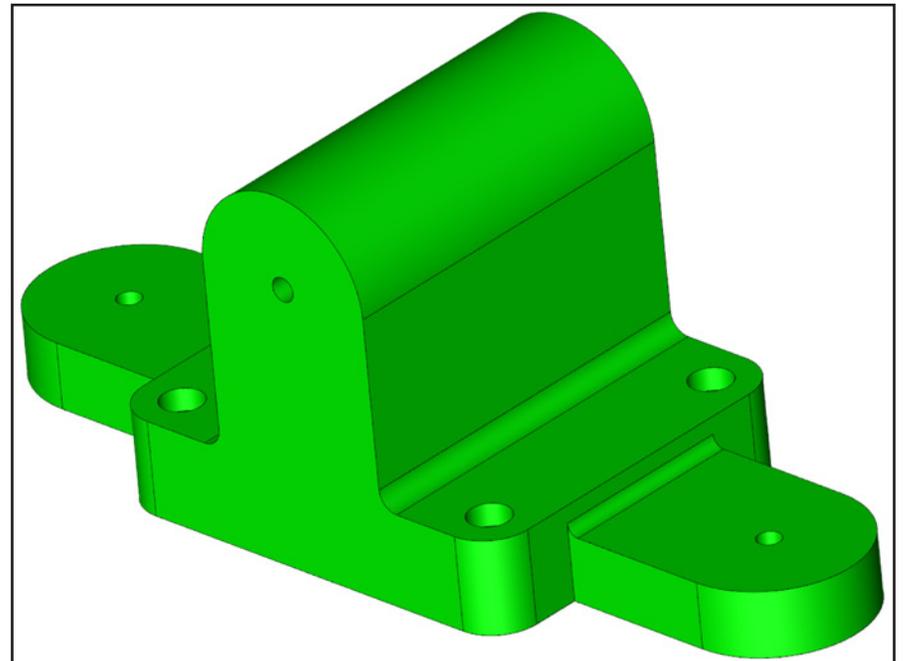
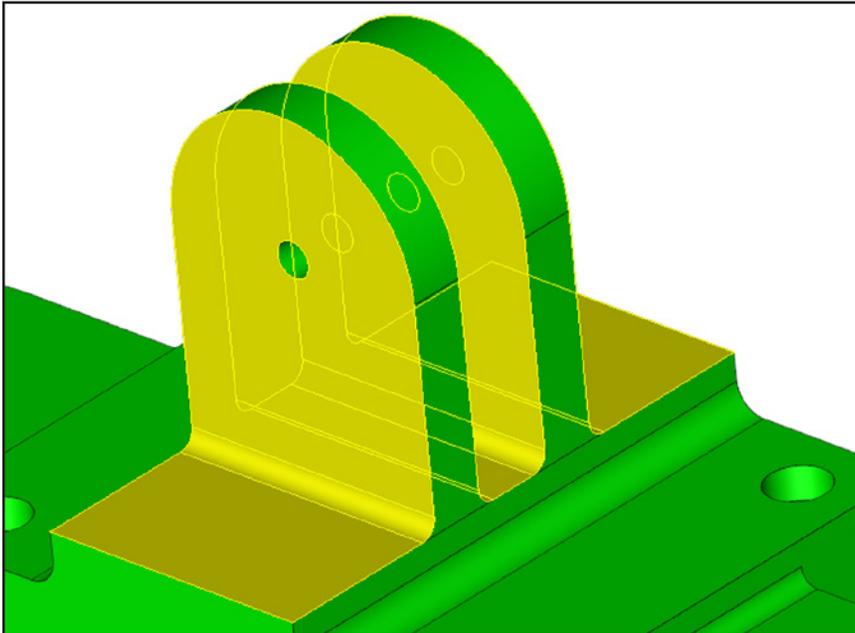
NOTE: A 'Pocket' is characterized by a group of faces that form a cavity in the model.

Hover the cursor over the model and select the Pocket as shown. Tooltips should appear saying how many faces compose each pocket.



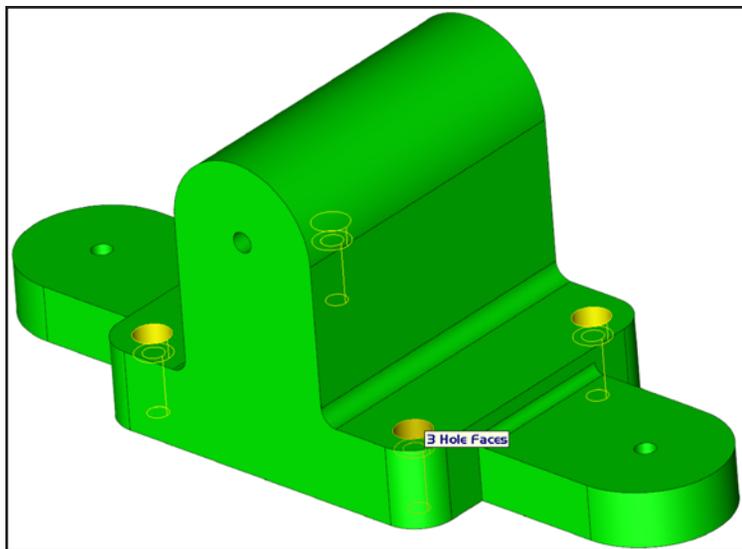
Hover the cursor over the model and select the Pockets as shown. Accept 3x.

After the three pockets are removed, your model should look like this.



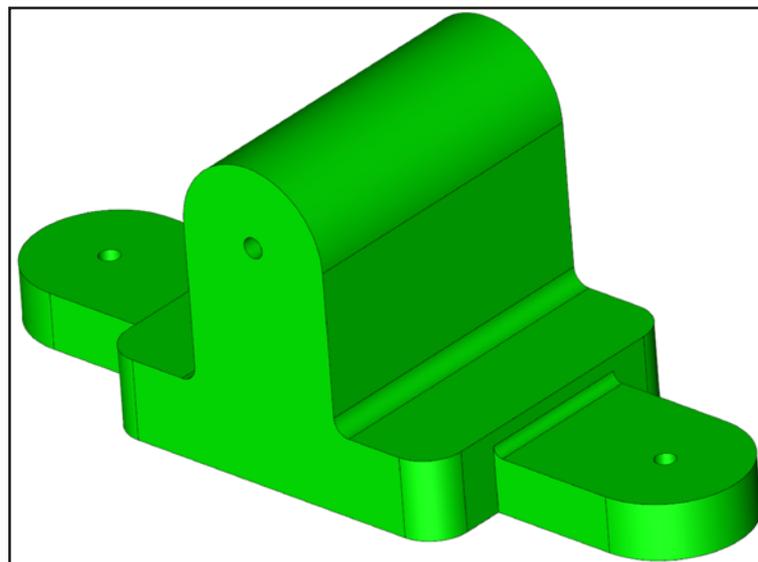
Staying in the Feature Removal function, reselect 'Feature' then select 'Bump'.

Hover the cursor over the model and select the four bore hole 'Bumps'. Accept 3x.



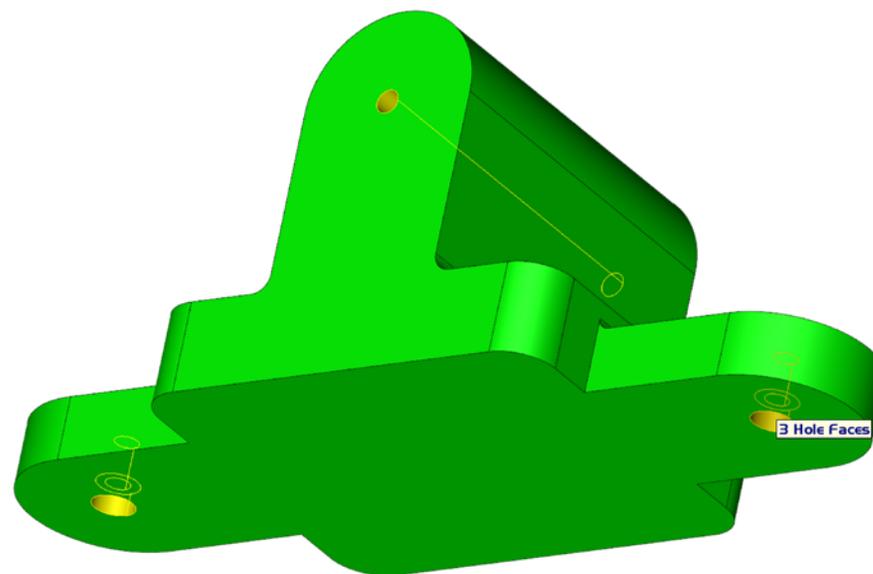
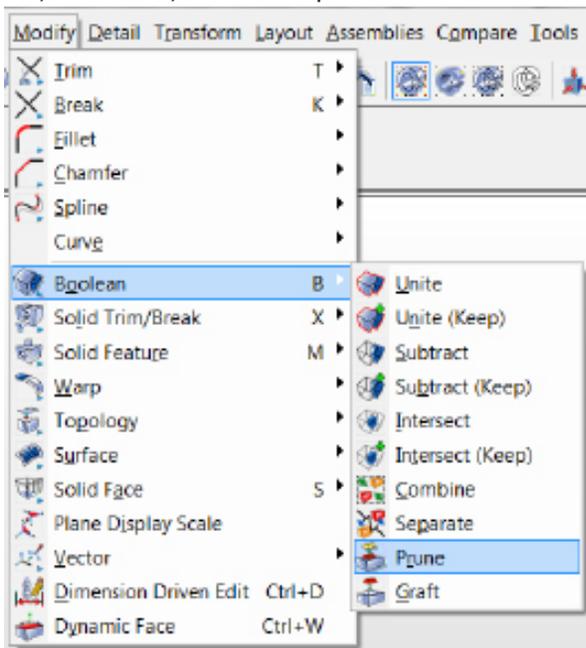
NOTE: A 'Bump' is characterized by a group of faces that compose either a cavity or a protrusion on the model.

Your model should now look like this.

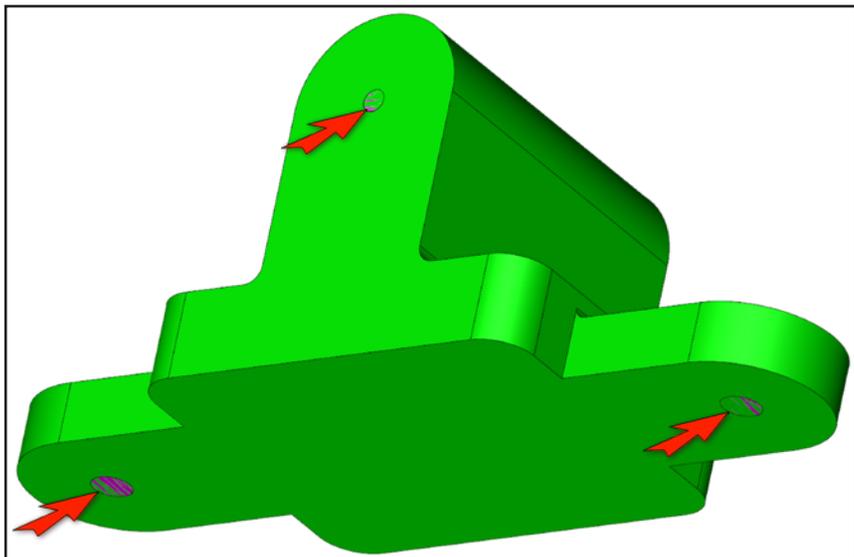


We will use Prune to remove the remaining holes. Select Modify > Boolean > Prune. Select 'Cut', 'Feature', and 'Bump'.

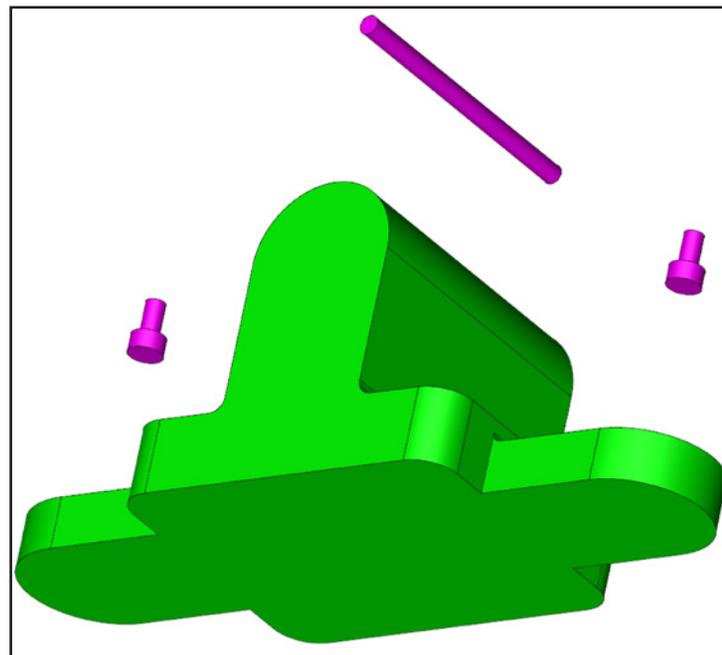
Select the remaining holes as shown. Hit Accept 3x.



The Prune function fills in the holes, leaving behind the hole geometry. This geometry can be moved, deleted, hidden etc.



Use Generic Move to move the model away from these hole geometries.

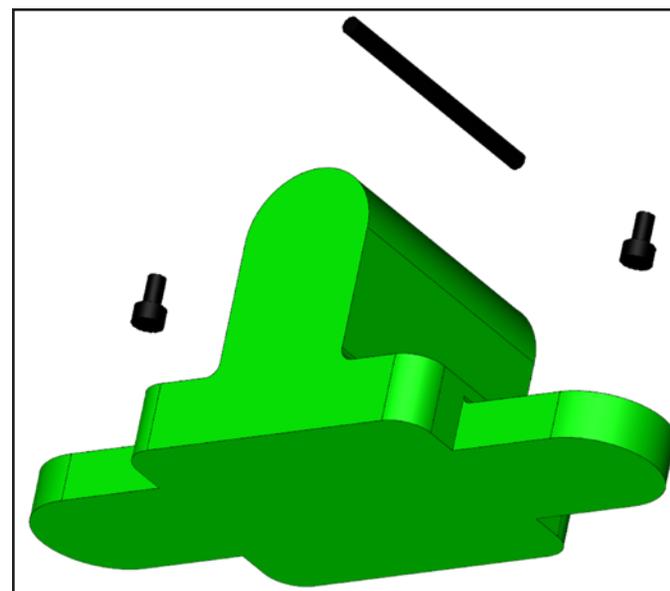


You can either use  to delete this geometry, or select the 'Blank Entities' icon  to temporarily hide it.

Once you select the Blank Entities icon, select 'Blank'. Now select the hole geometries and Accept.

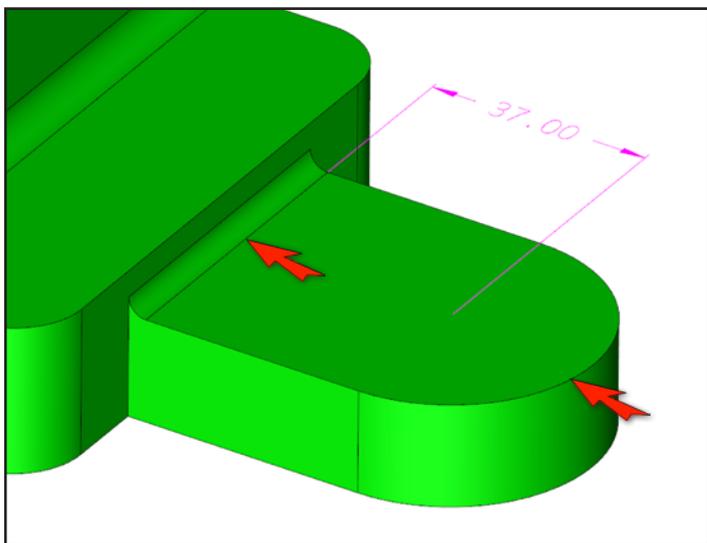


To unhide a previously-blanked entity, select the 'Unblank Entities' icon . All blanked/hidden entities will appear in black. Select which entities you wish to unhide and Accept.

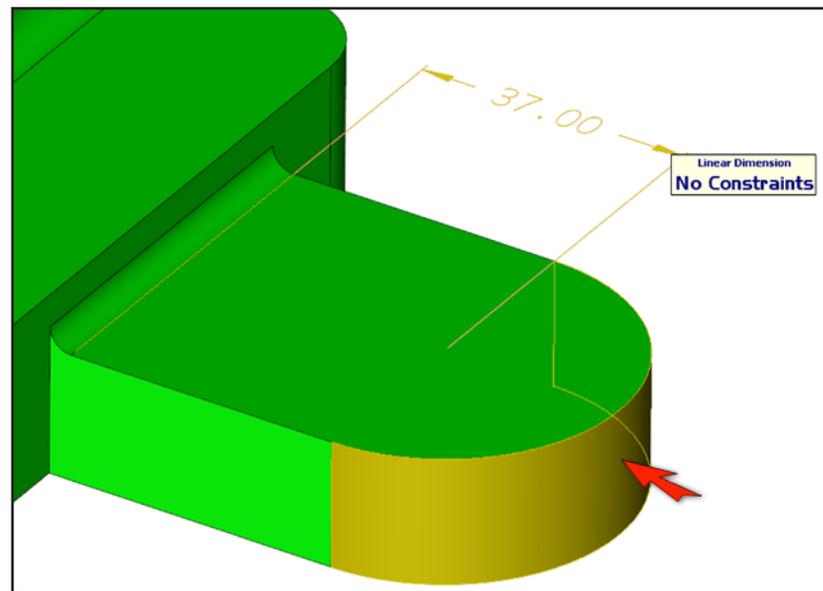


We will now turn this model into a sheet metal part. Some edits must be made first.

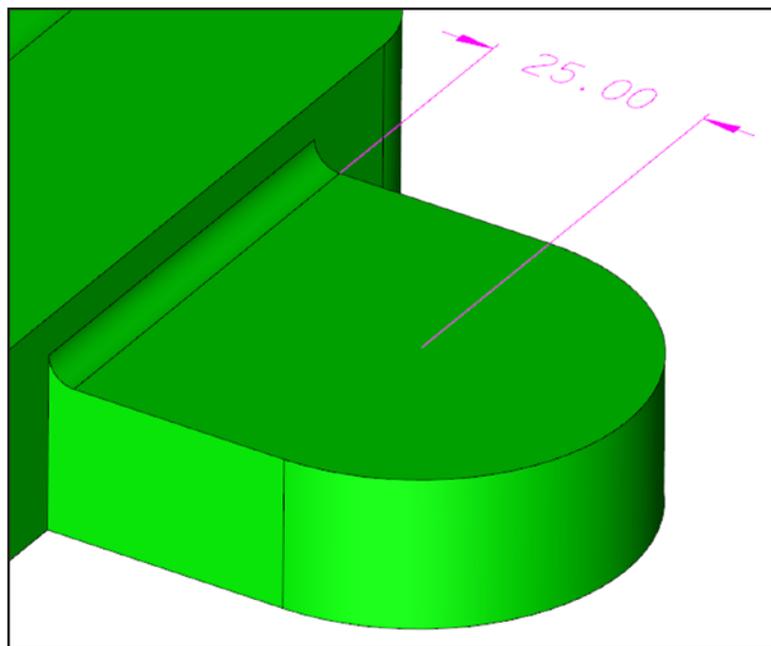
Use DDE to select the tab edges shown. Change distance to 25.



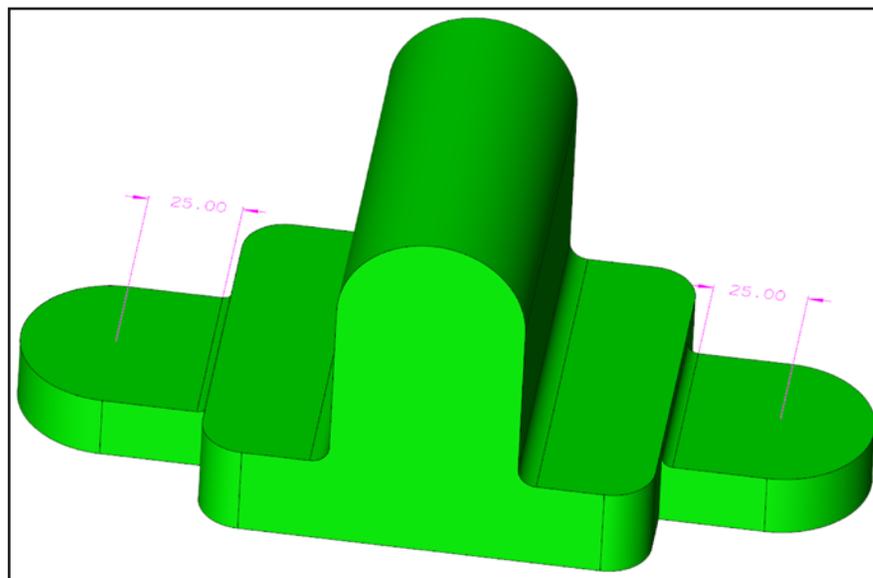
Make sure you highlight only the face shown. Edit both tabs. Delete dims afterward.



The tab should now look like the one below.

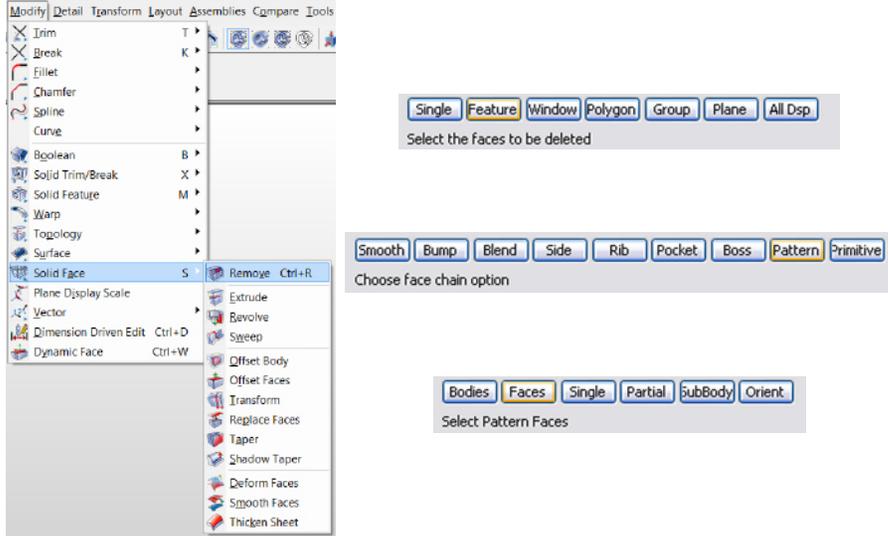


Do the same for the tab on the other.

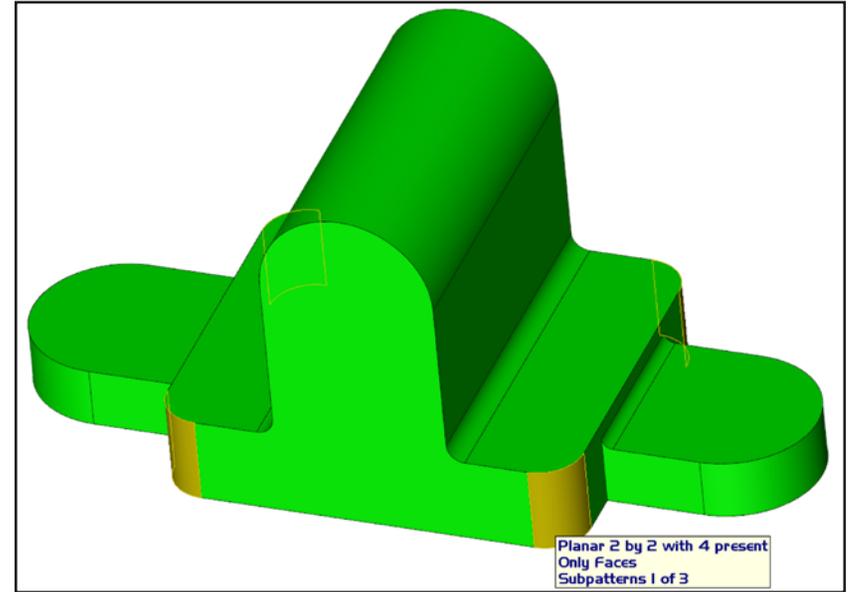


Select Modify >Solid Face >Remove

Select 'Feature', 'Pattern', and 'Faces'.

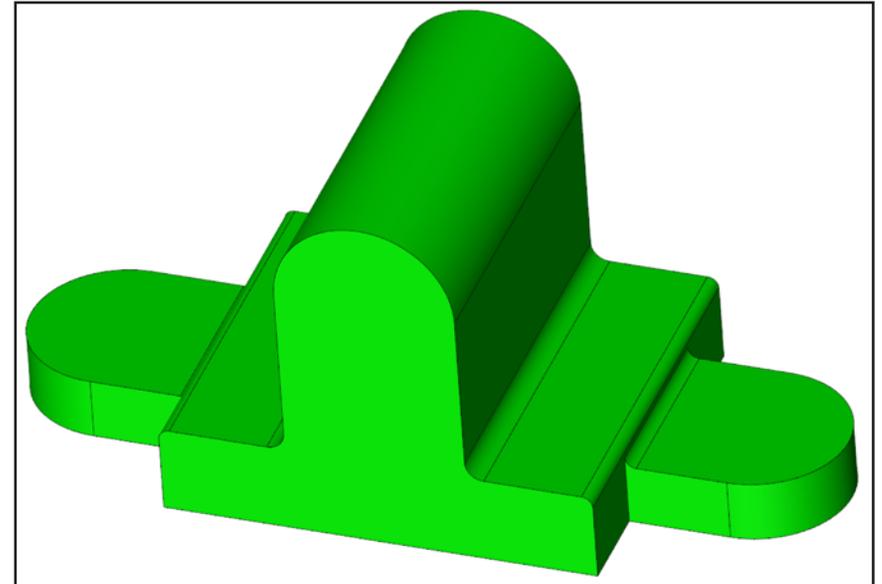
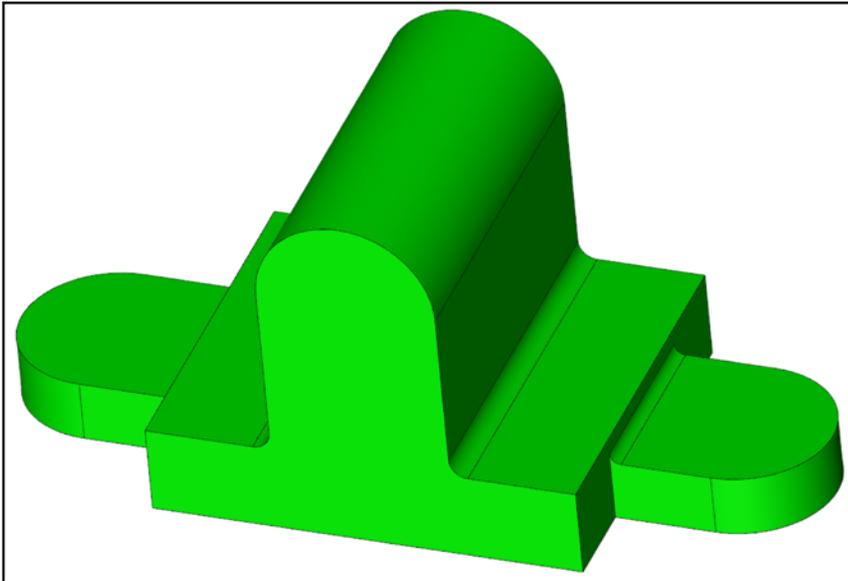


Select one of the base 12mm blends. All others should highlight. Hit Accept 3x.



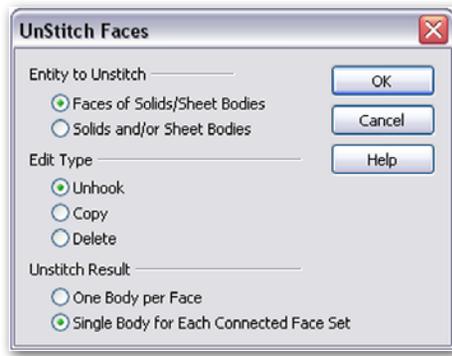
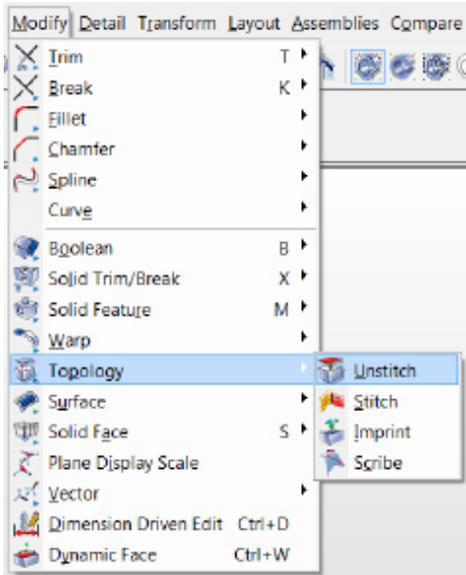
The solid should now look like the one below.

Create 3mm blends  on the two edges, as shown.

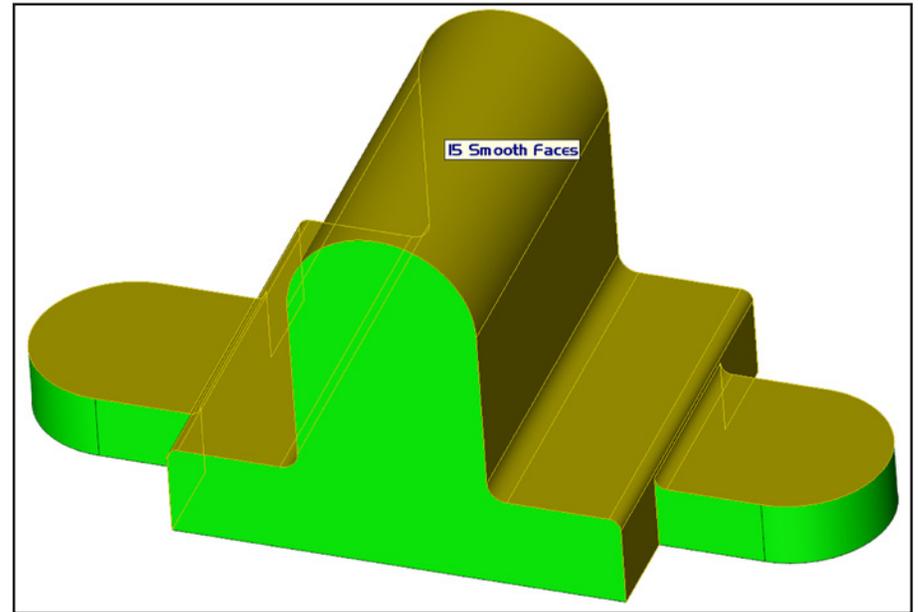


Select Modify >Topology >Unstitch

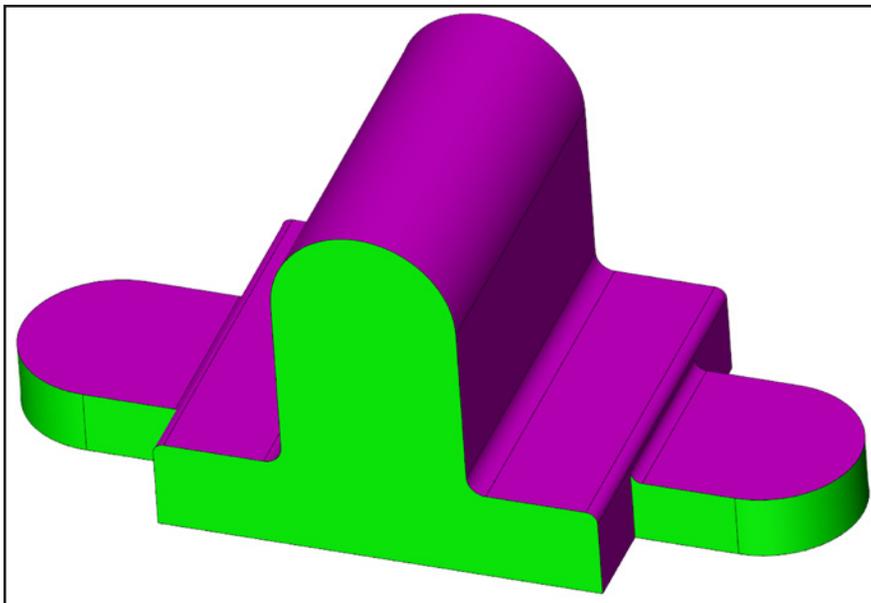
Select options as shown.



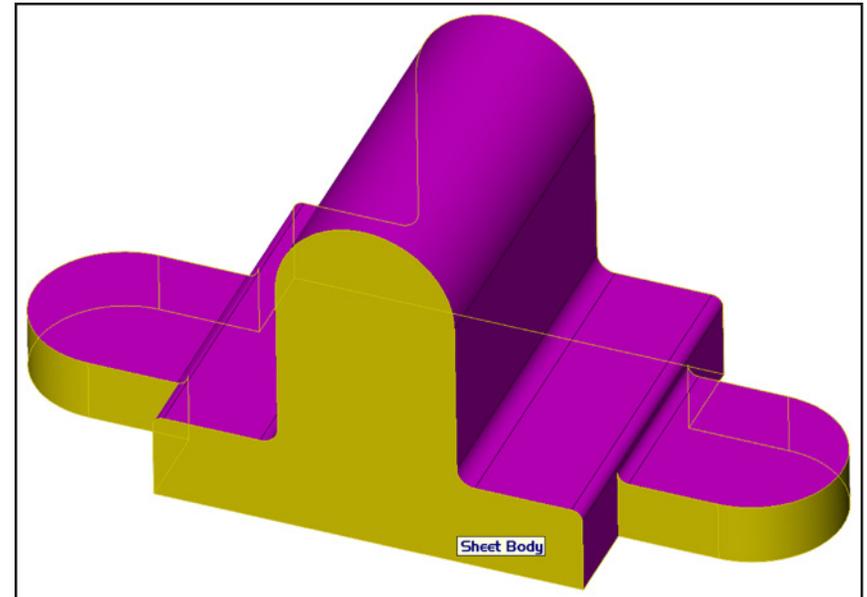
Select 'Feature', 'Smooth', then hover mouse over model until you see this selection of one continuous smooth group of faces. Accept 3x.



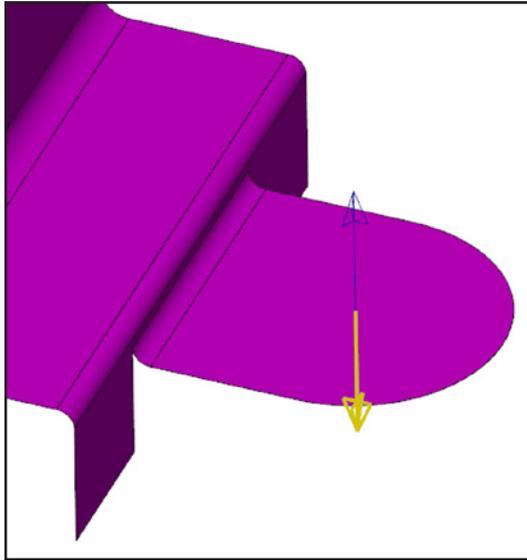
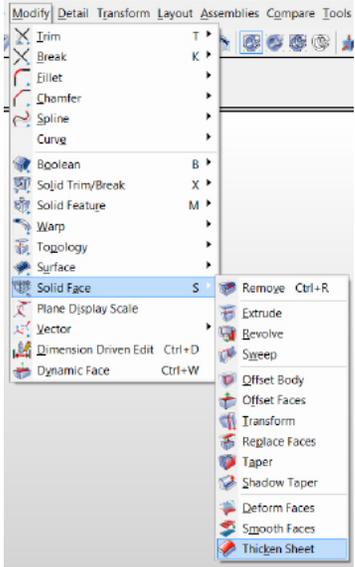
Solid should now look like the one below.



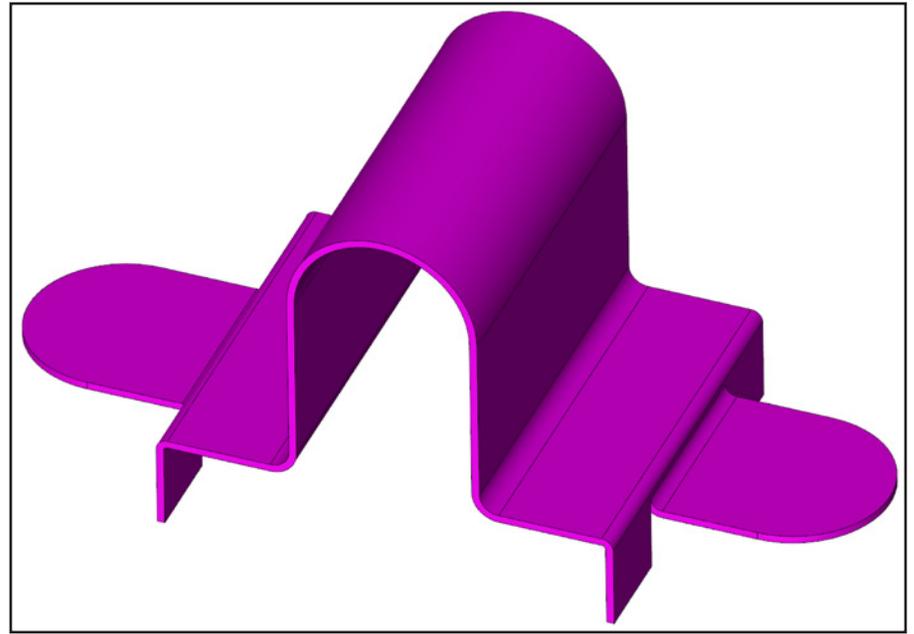
Delete  the solid below.



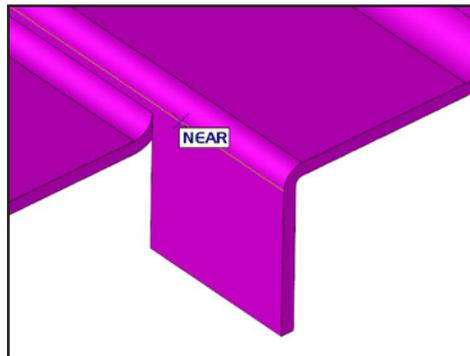
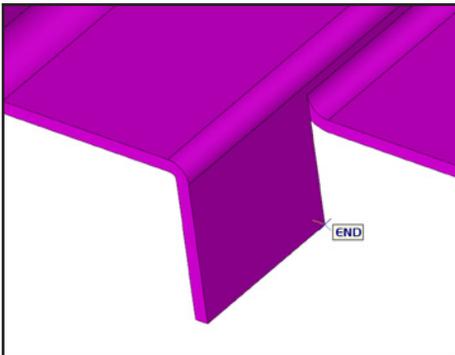
Select Modify >Solid Face >Thicken Sheet
Specify 2mm for thickness.
Select the top sheet just created, then the downward arrow.



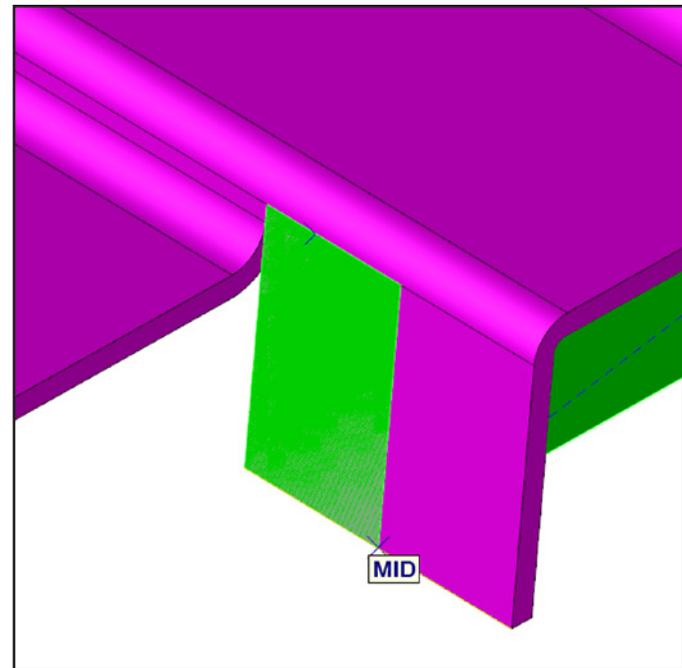
The solid should now look like the one below.



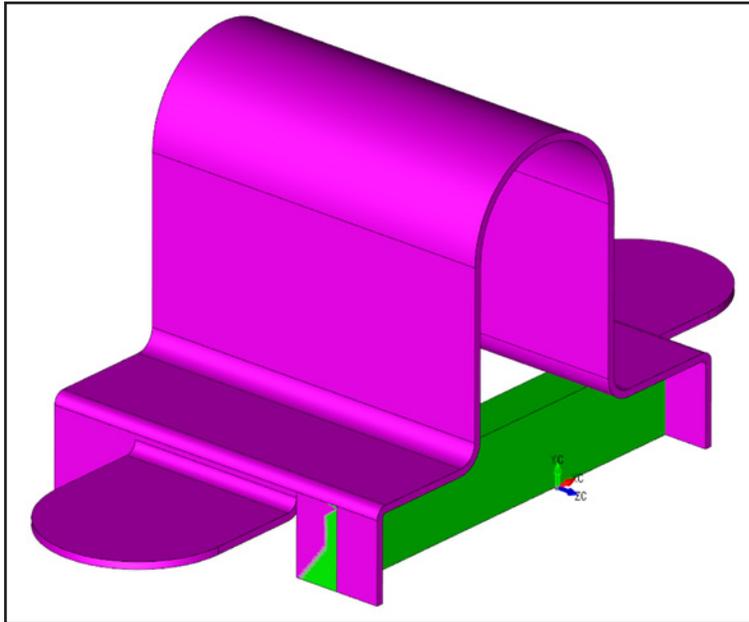
Change the color up top for new geometry.
Make sure you're in CP=2.
Sketch a primitive block as shown.
Hold Shift key while placing 2nd corner.



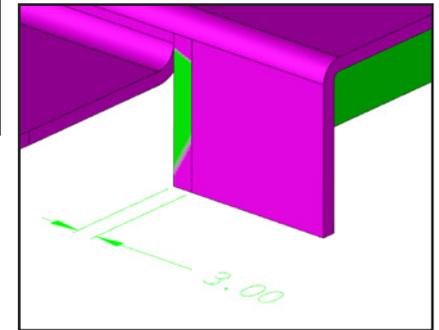
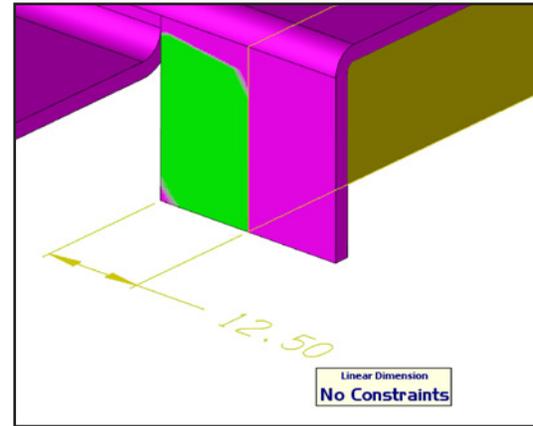
Select the 3rd point as shown.



Model should now look like the one below.

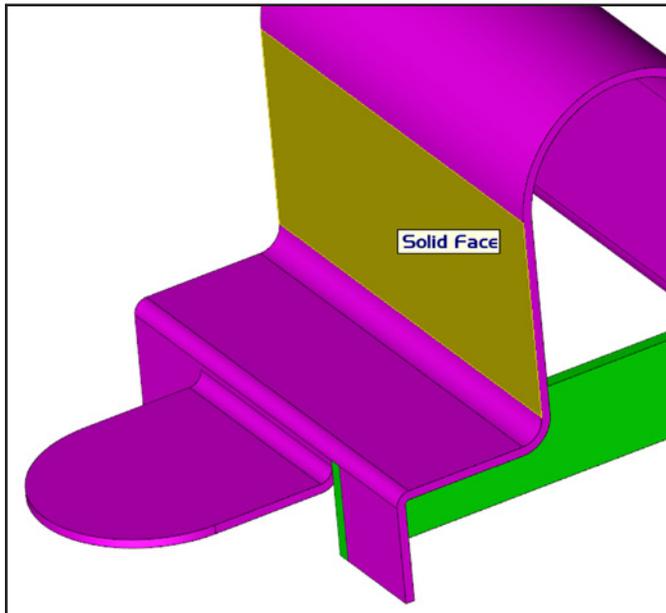


Use DDE to make the block width 3mm. Only highlight the right side of block to keep the left side stationary with the dim change.



Select the CPlane  icon.

Select the face shown below to position CPlane.

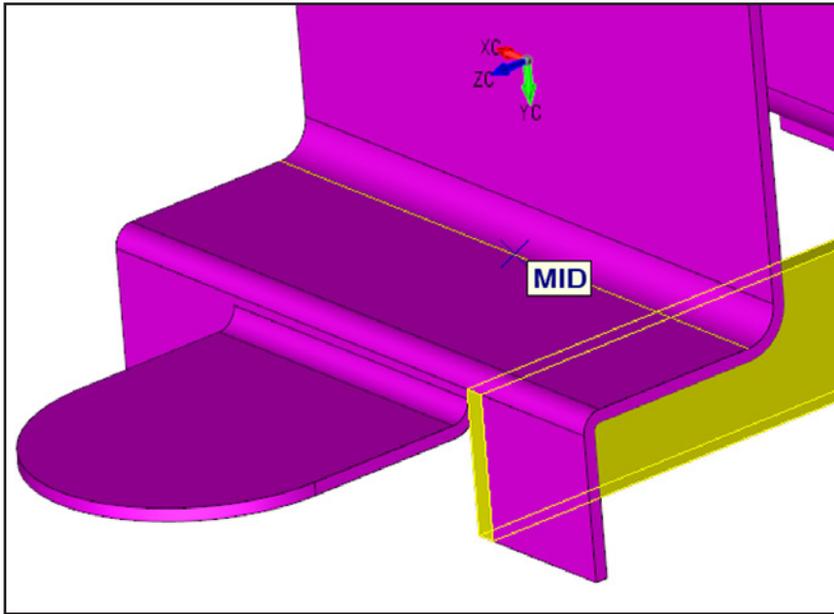


Select Transform > Mirror > Copy
Select the new block and Accept.
Select '1 Position Vertical'.

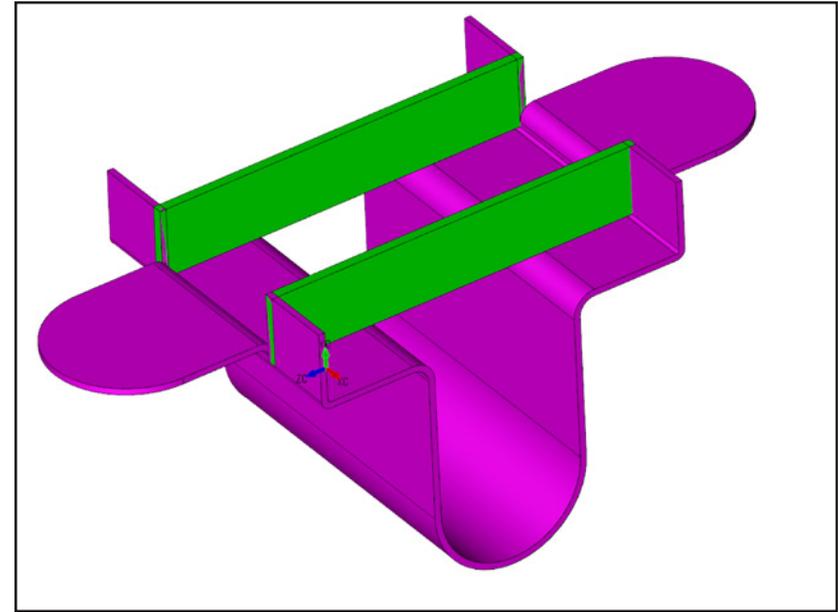


Choose method for defining mirror plane

Select the indicated midpoint, then Accept.

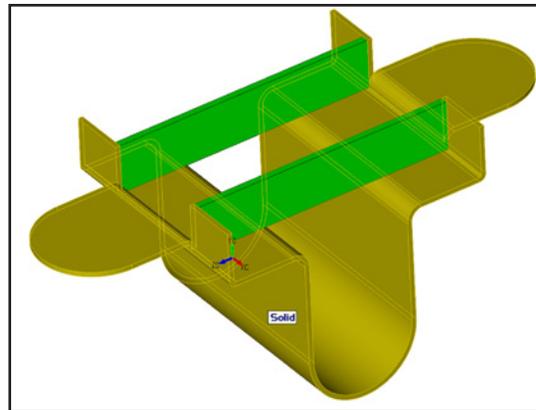
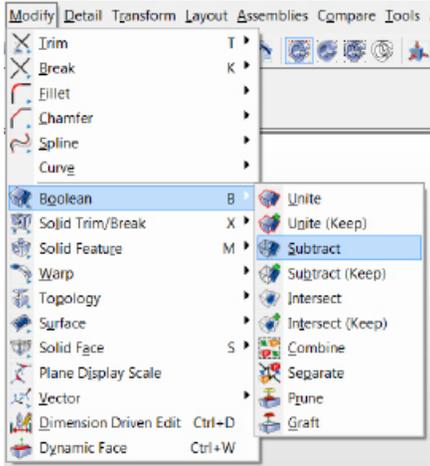


You should see this.

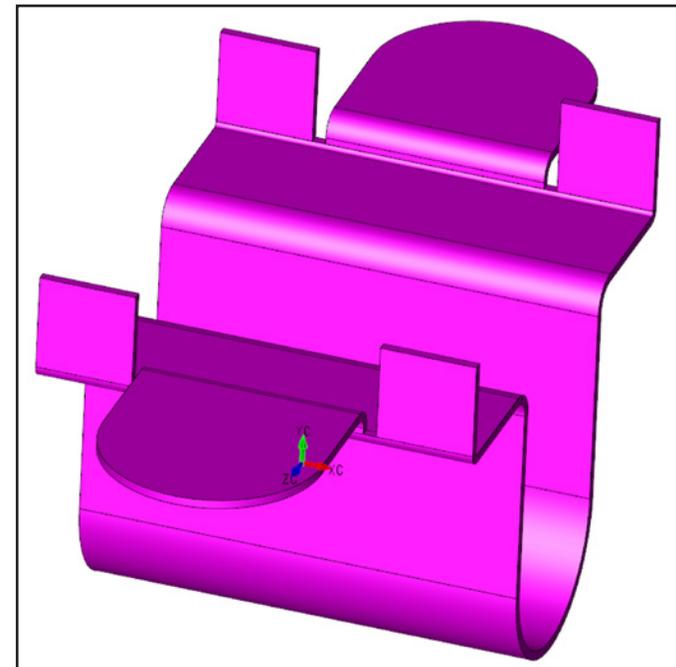


Select Modify > Boolean > Subtract

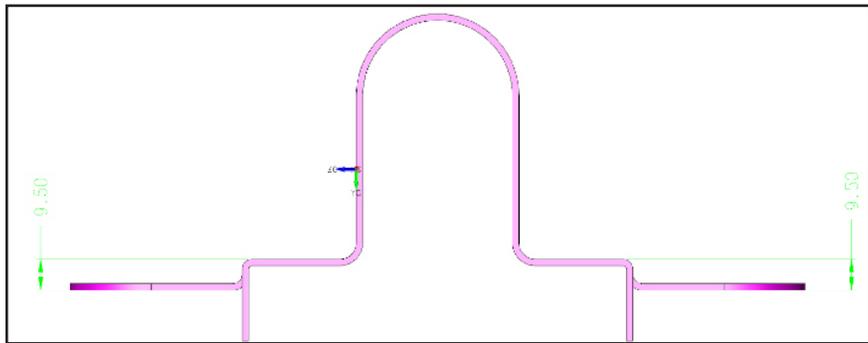
Select the hinge, then box-select the entire model to select the two blocks to subtract. Accept.



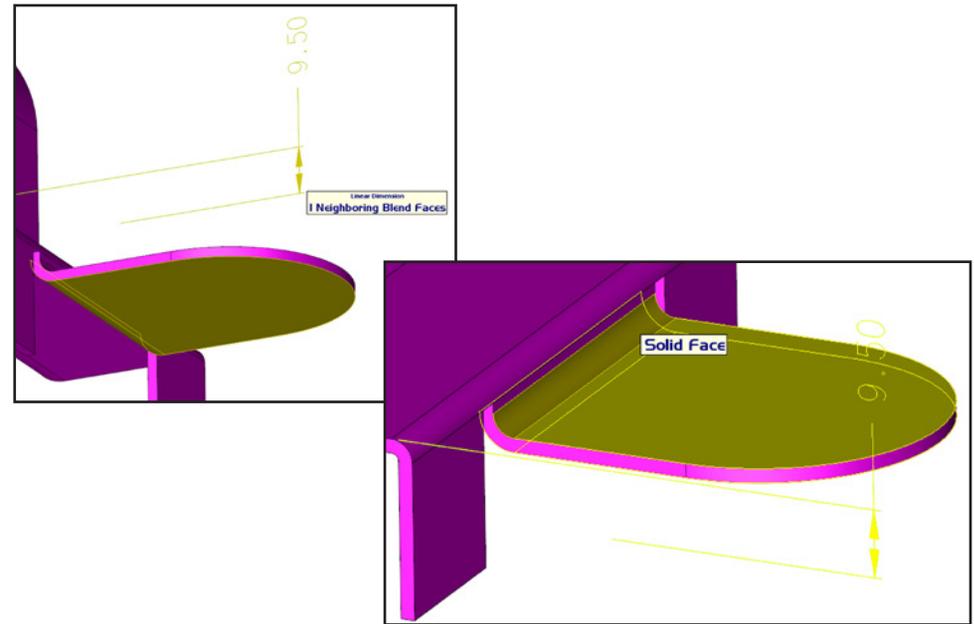
You should now see this.



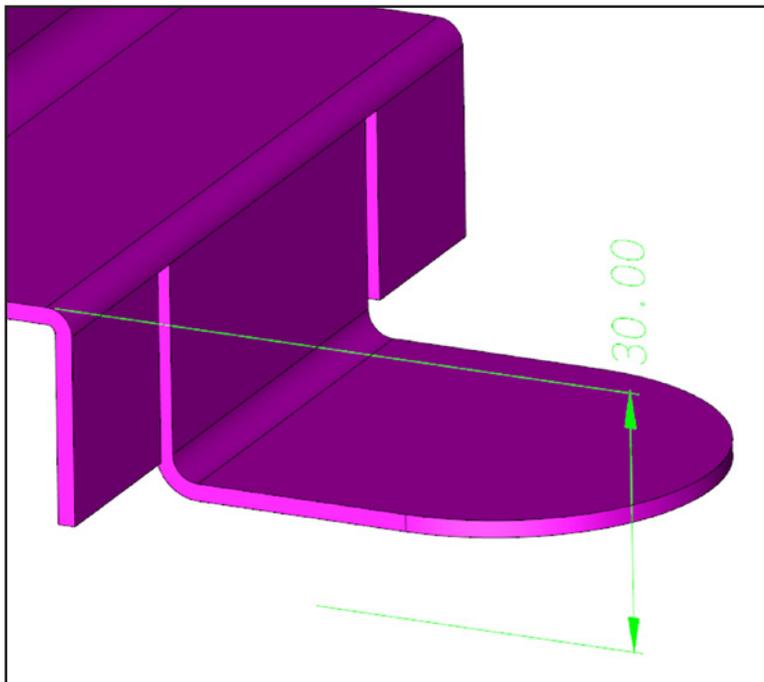
Use DDE to place the following dimensions.



Highlight and select the bottom tab face.
Use 'ADD' to include all tab faces as shown.

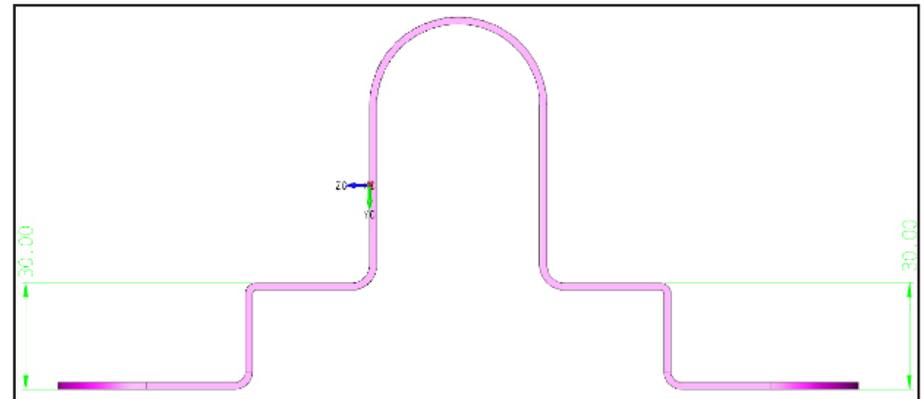


Change to 30mm.



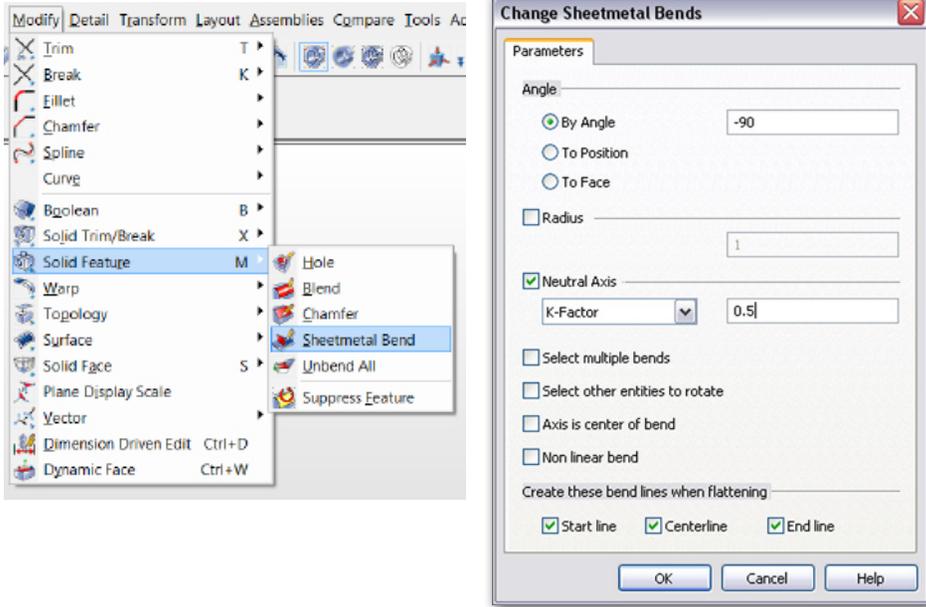
Do the same thing to both tabs.

The model should look like the one below.

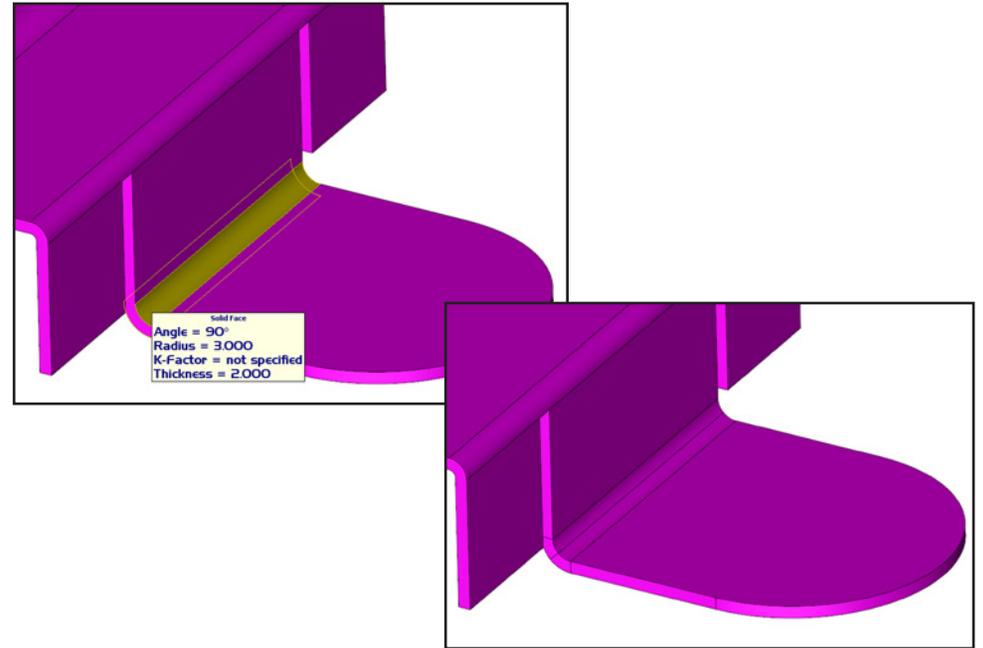


Select Modify >Solid Feature >Sheetmetal Bend

Select options in dialogue box as shown.

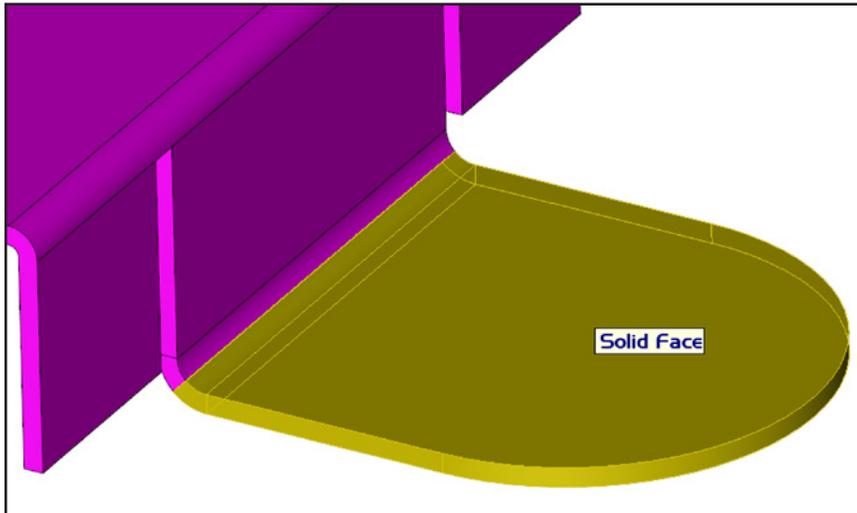


Select the blend as shown.

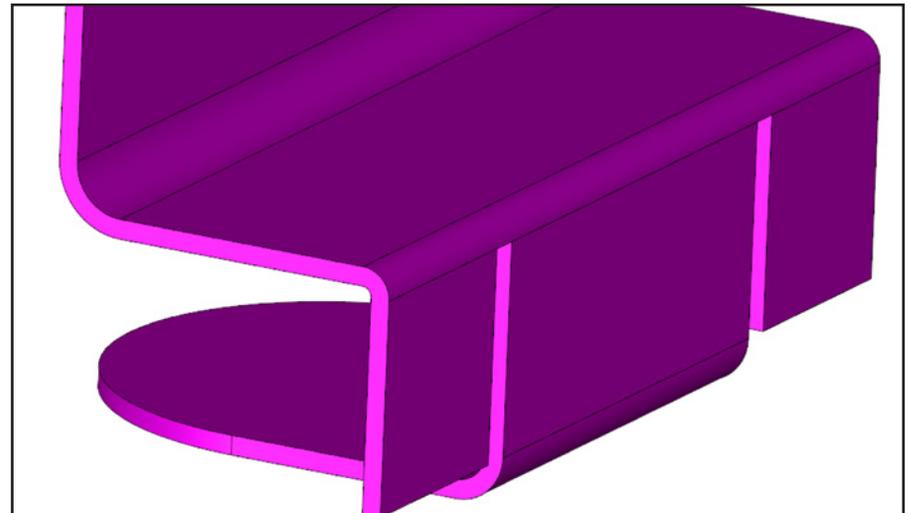


It should now look like this:

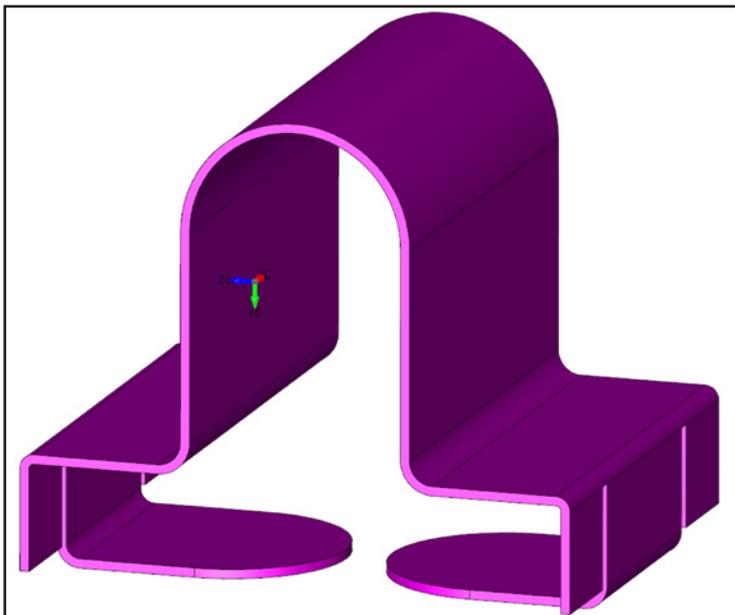
Select the tab to bend, as shown.



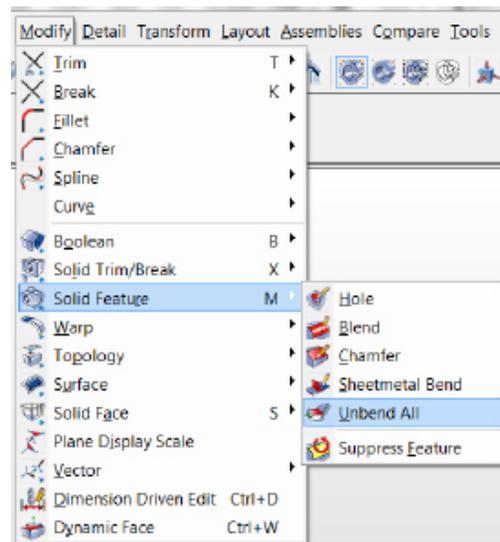
You should now see this. Apply to other side of model.



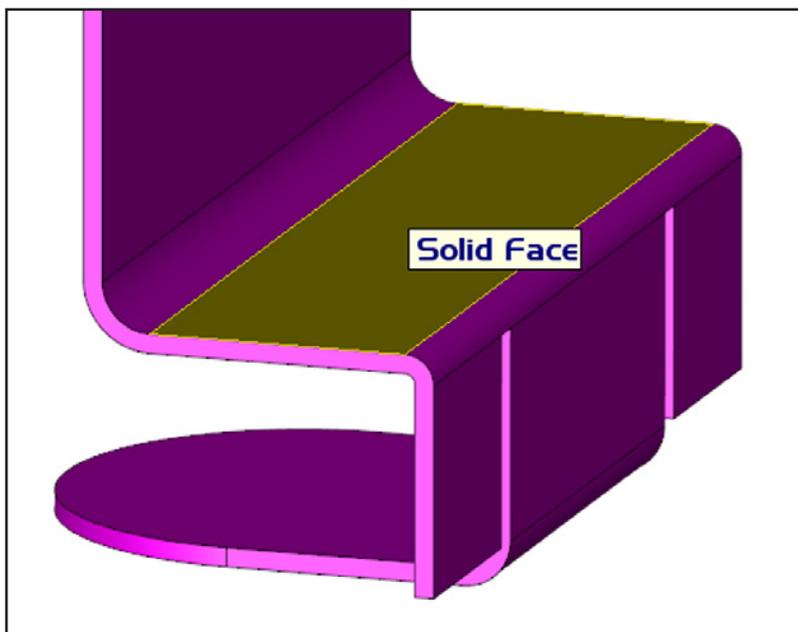
Your model should now look like the one to the left.



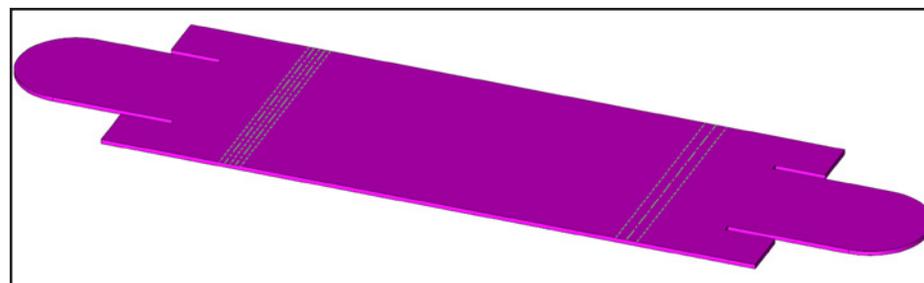
Select Modify >Solid Feature >Unbend All
Select options as shown.



Select the face to unfold from, as shown.



You should now see this. You may need to unfold a few times in segments.
Simply keep selecting a top face.



Please watch for future updates on our website as we continue to add more functions and subjects for you to try.

More KeyCreator Training:

Kubotek University

Training

www.kubotek3d.com

