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## Tutorial 1. Create rectangular PRL punch

Set up file locations:

1. Click **Tools, Options, System Options, File Locations**. **Add** the follow paths:

Show folders for:	Folders:
Design Library	C:\Training\MY PRL\Library Features
Document Templates	C:\Program Files\3DquickPressV3\3DQP Templates

2. Select **Drawings** and uncheck **Automatically scale new drawing views**

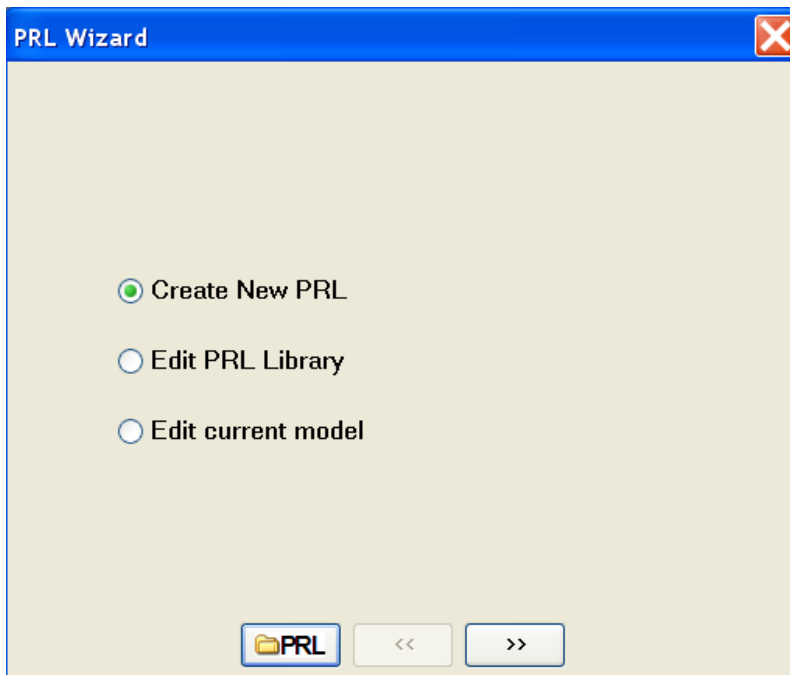
Set new template (PRL) path

3. Select **3DquickPress** menu **option** and go to **3DQP options/System Paths** and select (...) next to **3DquickPress Templates** and set to **C:\training\MY PRL**.
4. Any time you change the PRL template path you must also change the Local Dieset Assembly template path. Select (...) next to **3DquickPress Local Dieset** path and set to **C:\training\MY PRL\DieSetAssemblyTemplate**.
5. Pick **OK** until the Options window closes.

Create a rectangular blank punch

1. Click **3DQuickPress, 3DQuickTools, Utilities, PRL Wizard**

2. Click **Create New PRL** and then click **>>(Next)** button

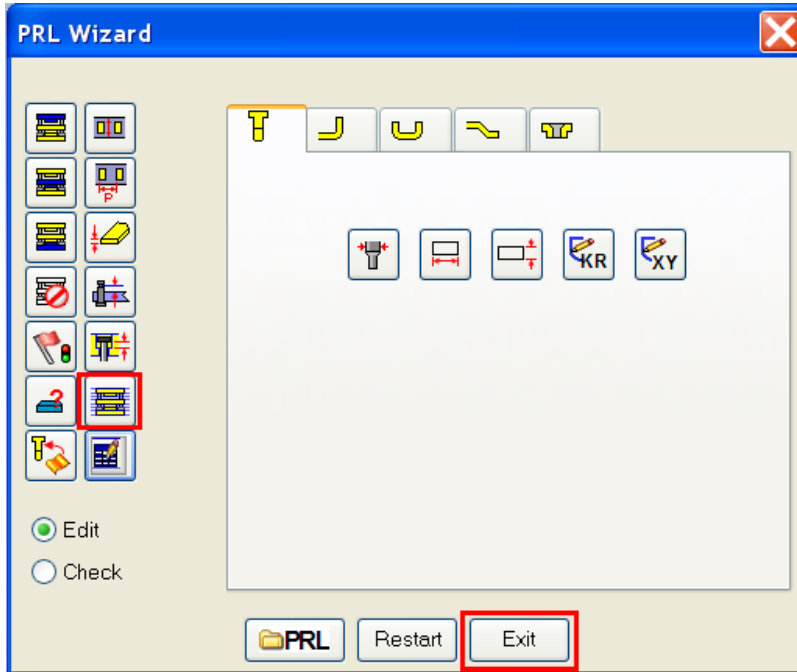


3. Click **User Defined**, Input PRL name = **R01** and then click **Next** Button

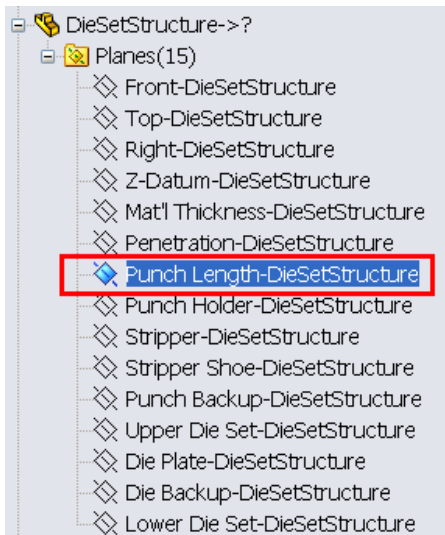
4. Click **Existing** and select **Rect. Blank Punch** and then click **Next** Button

5. Click **New Part** and check **Open for Edit** and then click **Finish** Button

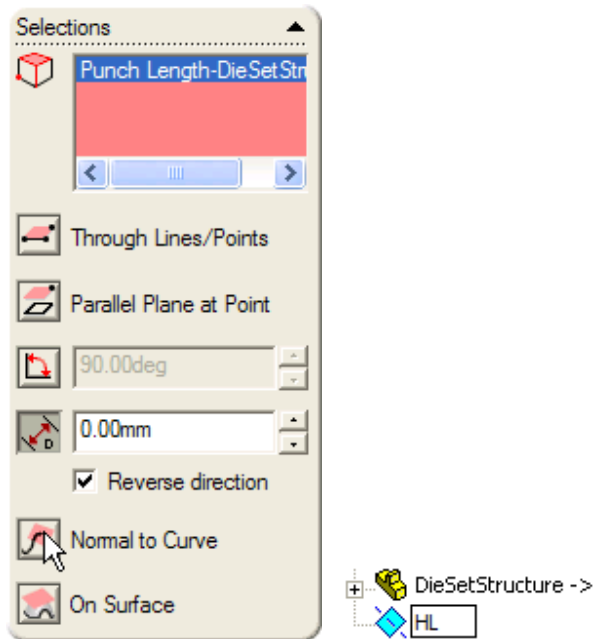
6. Click **Insert Die set Structure** to insert Die set Structure from **<PRL>\PunchDesignTemplate\01\DieSet Structure**, Click **Exit** to finish



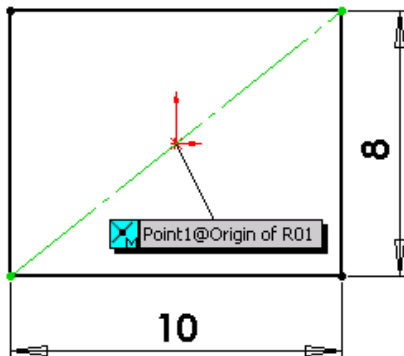
7. Expand **DieSetStructure** and select **Datum Plane Punch Length**



8. Click **Insert, Reference Geometry, Plane, Offset** from the **Punch Length Dieset Structure** at a distance of **0**, check **Reverse direction**. Click **OK** to finish.



9. Rename the datum plane to **HL**

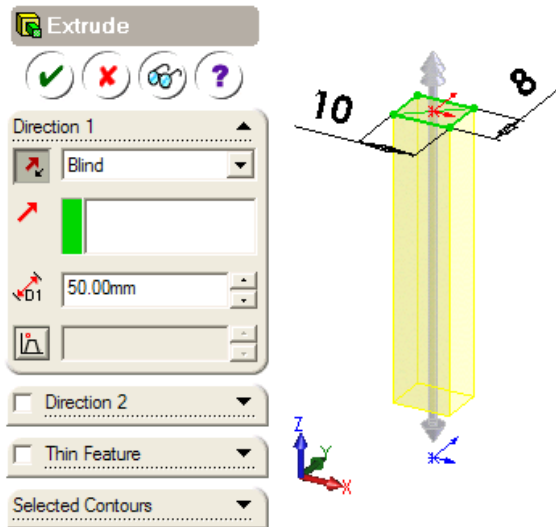


10. Select **HL** and click **Insert, Sketch**, rename the new sketch to **BaseSketch** from feature tree

11. Click **Tools, Sketch entities, Rectangle** to create a 10mm x 8mm rectangle

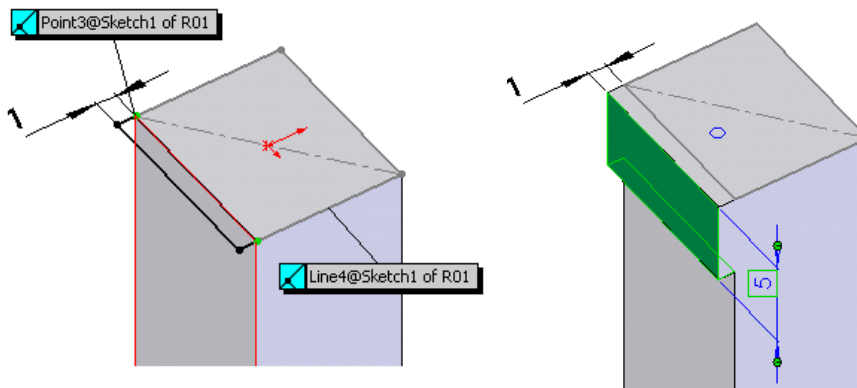
12. Click **Tools, Sketch entities, Centerline** to create a diagonal and add a **mid point** relationship with **Origin**.


13. Click **Insert, Base/Boss, Extrude** and set the parameters as below, click **OK** to finish

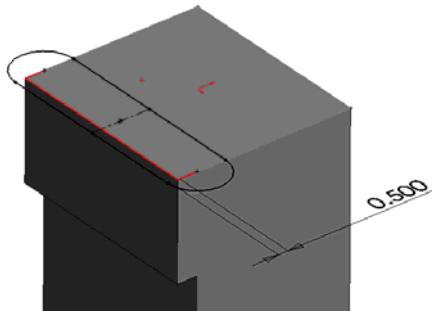


14. Show **BaseSketch** by expanding **Extrude1** and **RMB** select **BaseSketch** and select **Show**

15. Create a 1mm width rectangle with end points coincident with the 10mm x 8mm sketch, Boss extrude it 5 mm as below



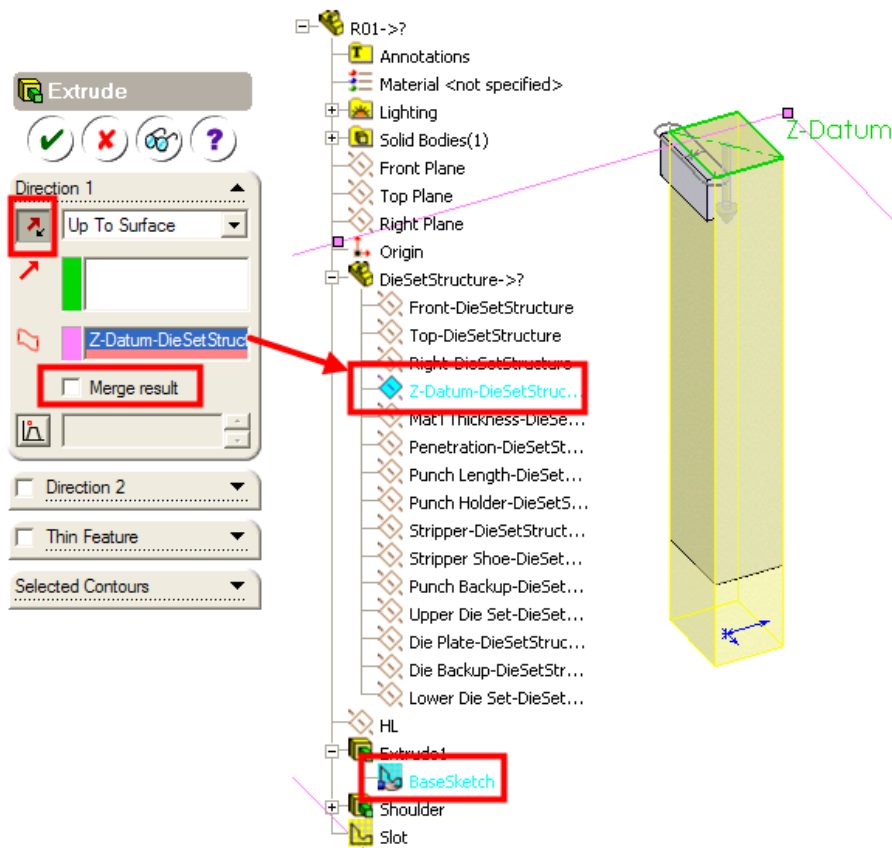
16. Select **HL**, **Insert**, **Sketch**, click  from 3DQuickPress Sketch Tools, delete the length dimension and constrain the end point to the edge of the block. Set the width to 0.5mm. Click OK to finish.



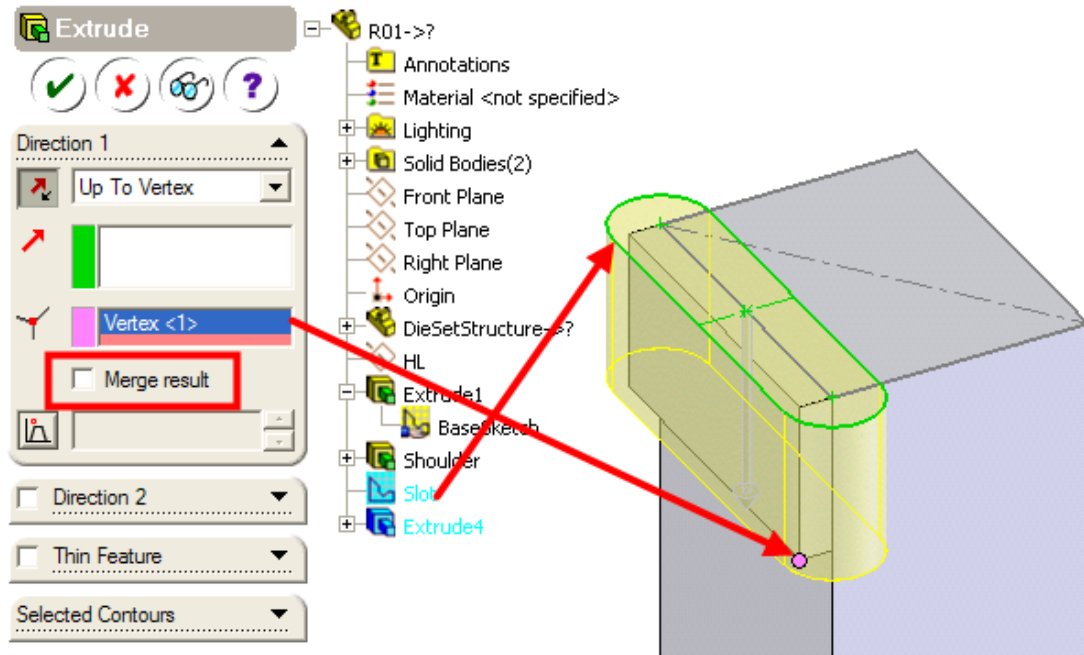
17. Rename the sketch to **Slot**

Create the hole bodies

18. Select **BaseSketch** and click **Insert, Boss, Extrude** as below

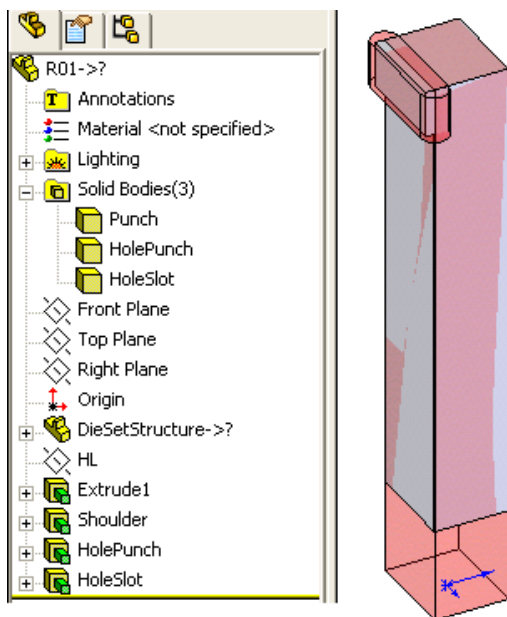


19. Select **Slot** and click **Insert, Boss, Extrude** as below




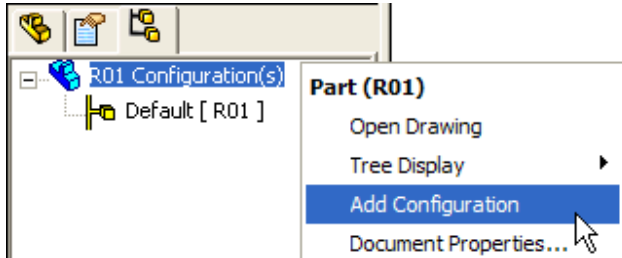
20. Rename the bodies to Punch and HoleSlot, HolePunch, set the hole color to Red and transparent.

Click **File, Save**

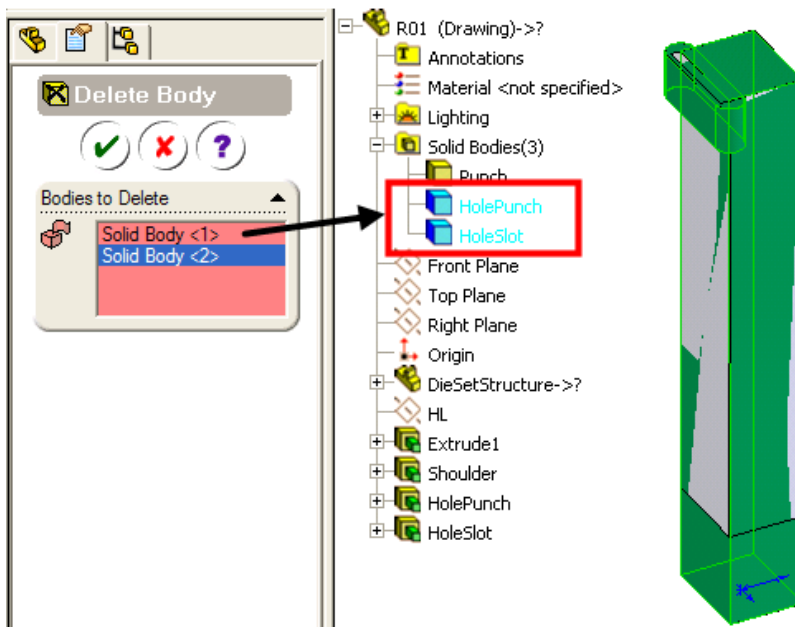



Create drawing set up PRL parameters

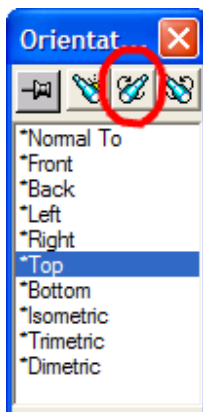
21. Click the configuration tab , add a configuration and name it to **Drawing**



22. Click **Insert, Feature, Delete Body**, select bodies **HolePunch** & **HoleSlot**.



23. Click  **Front view** and press **Space Bar**, select Top and click update button, click OK when the warning window pops up.



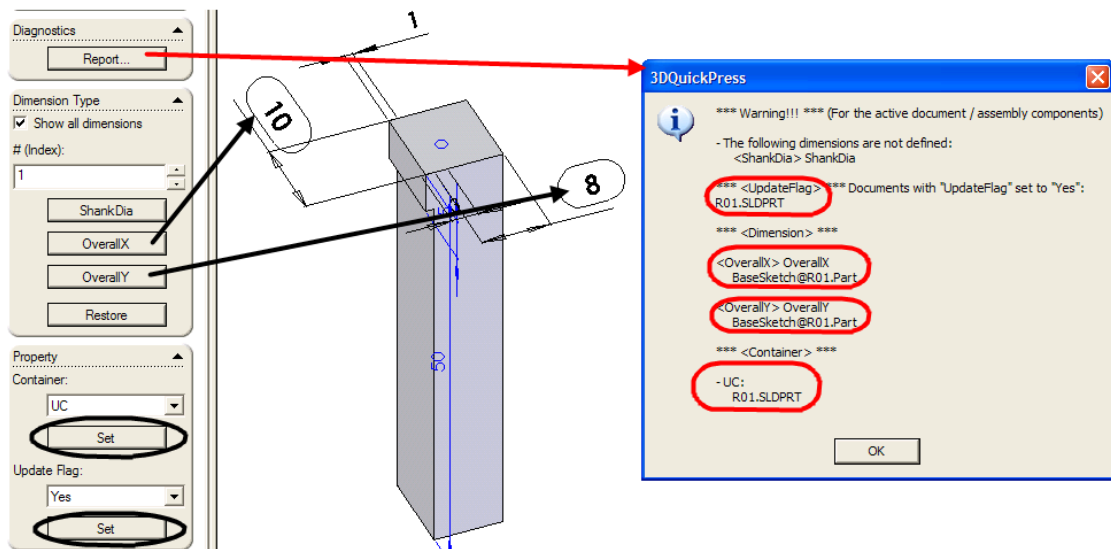
24. Click **3DQuickPress**, **Punch Design**, **Define PRL** to define the punch as a PRL.

25. Select dimension **10** and click **OverallX**

26. Select dimension **8** and click **OverallY**

27. In **Container**, select **UC** and click **Set** button

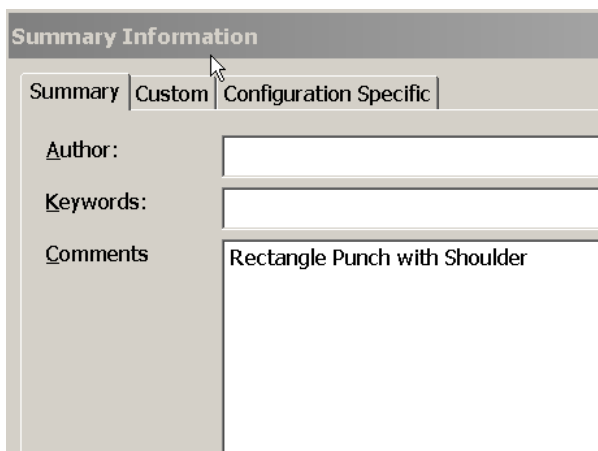
28. In **Update Flag**, select **Yes** and click **Set** button



29. Click the **Report** button for checking purposes. Click **OK**

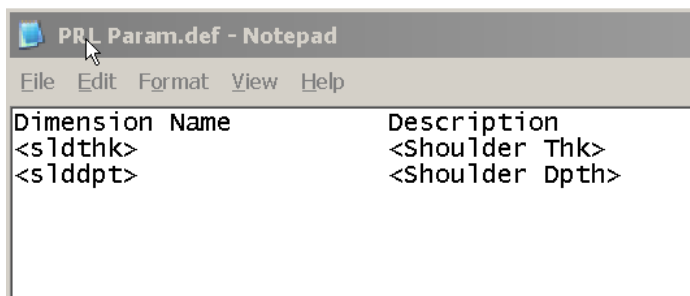
30. Click **OK** to finish

31. Add a description for the PRL Preview Window by editing the part properties and select **Summary** tab and add the following to the **Comments** field



32. To add your own PRL Parameters copy an existing file called prl param.def from the existing PRL INS1 to the R01 folder—use Windows explorer externally from SW. C:\Program Files\3DQuickPress\PRL\PunchDesignTemplate\Metric\User Defined\Rectangular\INS1\PRL Param.def.

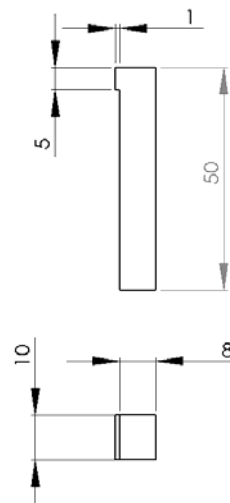
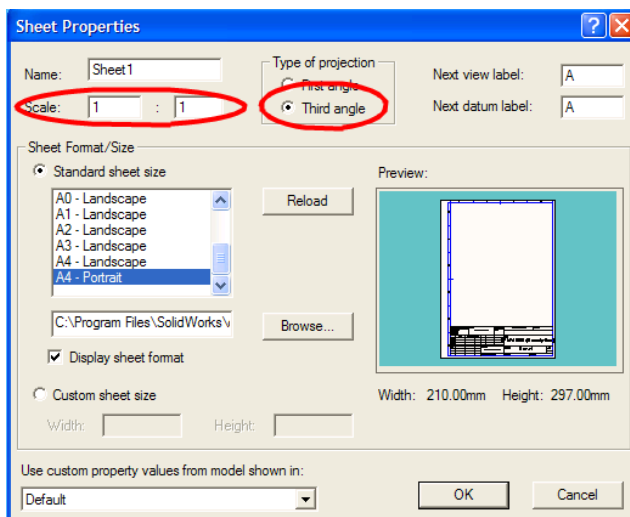
33. Edit this file with Wordpad or Notepad and change the dimension and description columns as you see here and save as same name in r01 folder and close text editor.



34. In SolidWorks, repeat step 24 thru 26 to connect the two new parameters to the the proper dimensions. Note: Do not select the same dimensions as step 25 and 26.

35. Click **File, New**, select a drawing template and then select A4-Portrait sheet size. Press **ESC** key if Model View property manager pops up.

36. Use **RMB** in the drawing area, set the projection to Third Angle and 1:1 scale



37. Click **Insert, Drawing Views, Model**, click next button and select Right view, and then bottom view. Add details afterward.

38. Click **Insert, Annotation, Block** and insert the block C:\training\annotations\XYPos.sldblk block to the drawing.
39. Save the draw as R01.sldrw under the same folder as the part.
40. Click **Windows**, select **R01.SLDPRT**, set the part configuration back to **Default**.
41. Save all files and the PRL rectangular punch is defined.
42. Use Punch Design assembly in last punch design assembly created and use this punch to create the lancing punch.

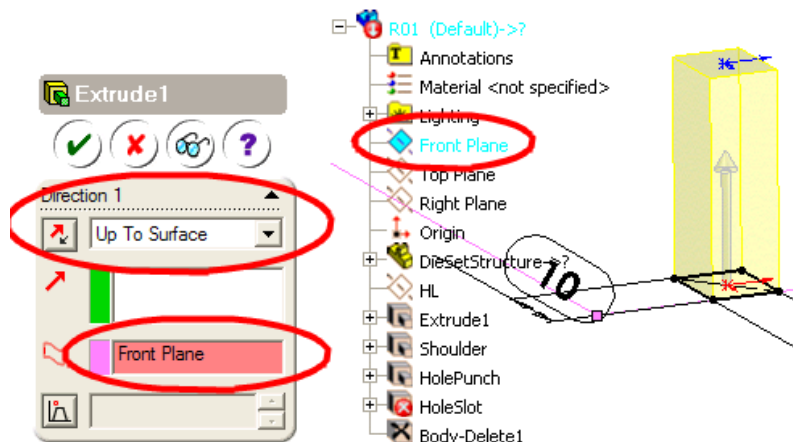
**Tutorial finished**

## Tutorial 2. Create rectangular PRL assembly

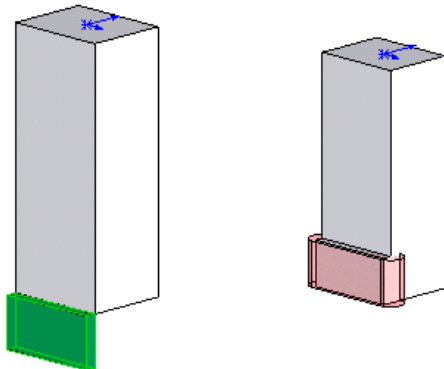
1. Click **3DQuickPress, 3DQuickTools, Utilities, PRL Wizard**
2. Click **Create New PRL** and then click **Next** button
3. Click **User Defined**, Input PRL name = **R02** and then click **Next** Button
4. Click **Existing** and select **Rect. Blank Punch** and then click **Next** Button
5. Click **Copy From** and select **R01** and check **Open for Edit** and then click **Finish** Button
6. Click **Exit** Button of **PRL Wizard**
7. Current document should be R02.sldprt, Save as **R02D.sldprt**

All file operations are inside Folder R02

8. **RMB** select **HL**, select **Edit Feature**, select **Die Plate – Dieset Structure** as the datum plane
9. **RMB** select **Extrude1**, select **Edit Feature**, change **End condition** to **Up to surface** and select **Front Plane** of **DieSetStructure** part (not the front of R02)



10. Reverse the extrude direction of Shoulder and HoleSlot-- if necessary.



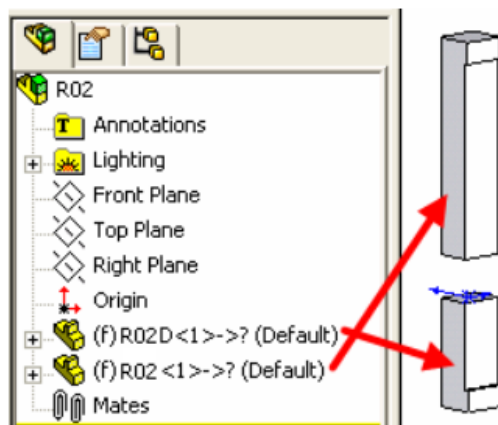
11. Switch to configuration **Drawing**, save..

12. Create a drawing for **R02D.SLDPRT** and save the drawing

13. Switch to **R02D.SLDPRT** , switch configuration to default, and hide hole bodies.

14. Create a new assembly in Folder **R02** and save the assembly to **R02.SLDASM**

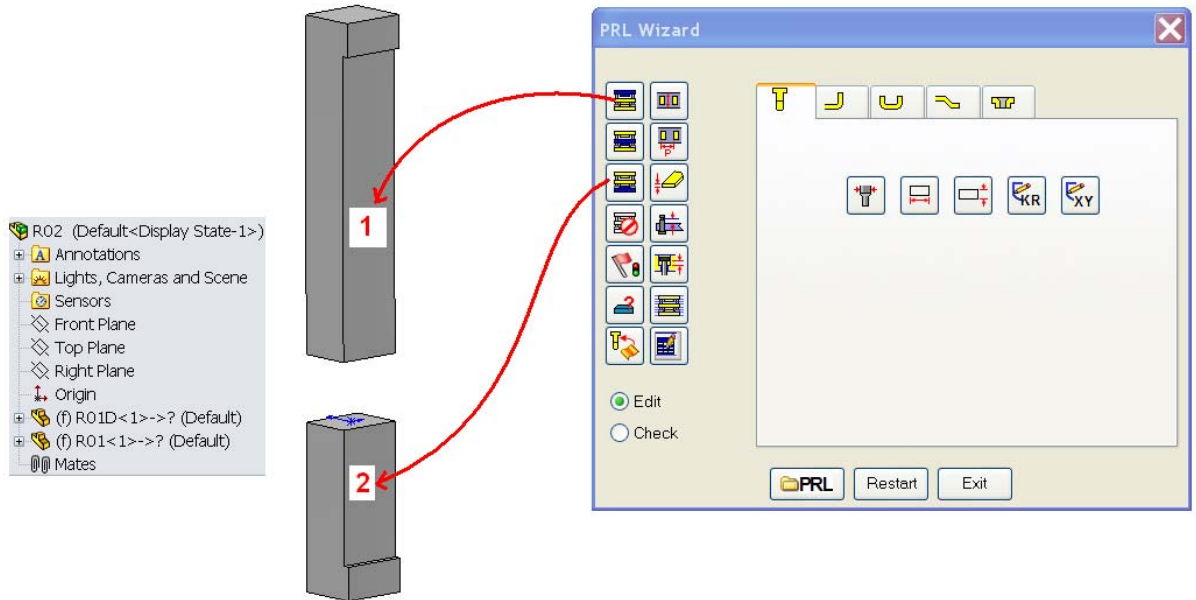
15. Insert **R02.SLDPRT** and **R02D.SLDPRT** to this assembly at the origin of the assembly-**very important!**



16. Click **3DQuickPress**, **3DQuickTools**, **Utilities**, **PRL Wizard**

17. Make sure that your current window is **R02.SLDASM**, Click **Edit Current Model** and then click **Finish**.

18. Click at (1) and click **UC Button** , click at (2) and click **LC Button** 



19. Click **File, Properties, Summary** tab, Add “**Simple punch & Die**” to comments field.

20. Save the assembly

**Tutorial end**

## Tutorial 3. Cutting punch customization

Topics covered:

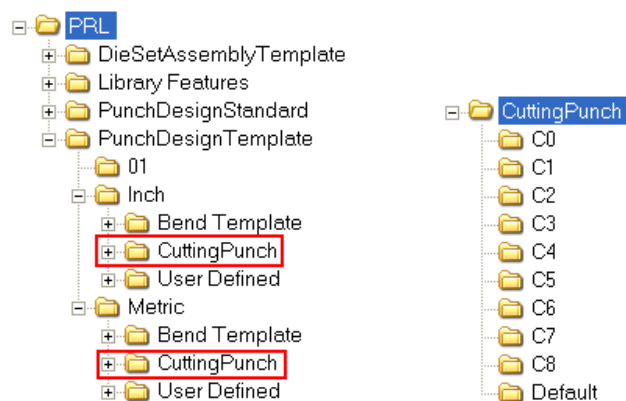
- Understanding cutting punch PRL structure
- Fine tune cutting punch parameters
- Customize cutting punch by creating a variation
- Add ejector
- Punch with shear
- Create preview bitmap
- Cutting punch location

Cutting PRLs were introduced in 3DQuickPress 2.1.4 and all data is located under **<PRL>\<PunchDesignTemplate>\<Unit>\CuttingPunch**

Where:

**<PRL>** is the folder specified by 3DQuickPress Options for 3DquickPress Templates.

**<Unit>** is Inch or Metric folder. You should always customize PRL in either unit folder and copy your work to the alternate unit folder and then change the units afterward.



Each folder under **Cutting punch** is representing different cutting punch type and following basic guidelines.

### Guidelines for cutting punch files:

The Folder name and Top level component name must be the same; this applies to all 3DQuickPress PRLs. For cutting punch, a good practice is to have main punch part document have the same name as the containing folder. See Fig.2

A bitmap for preview of cutting punch. If this file does not exist, 3DQuickPress will use SolidWorks file preview bitmap.

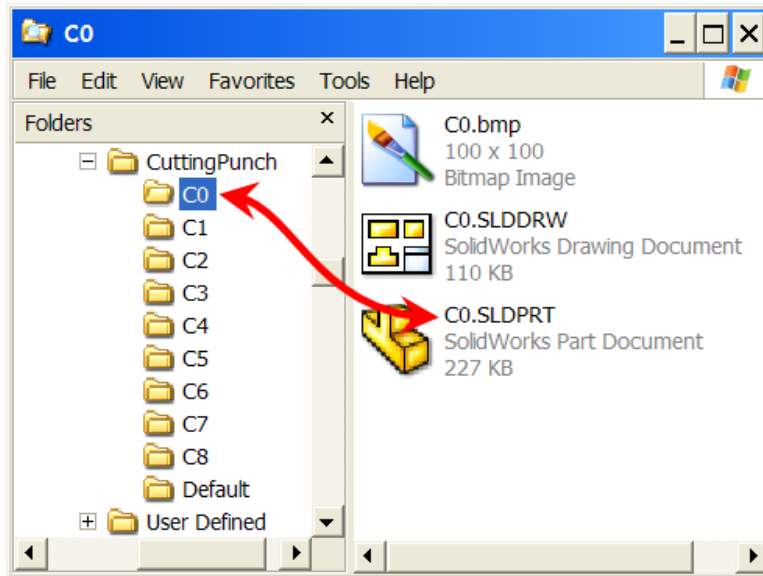


Figure 1 Simple cutting punch only containing a part, the bitmap C0.bmp is for preview purpose

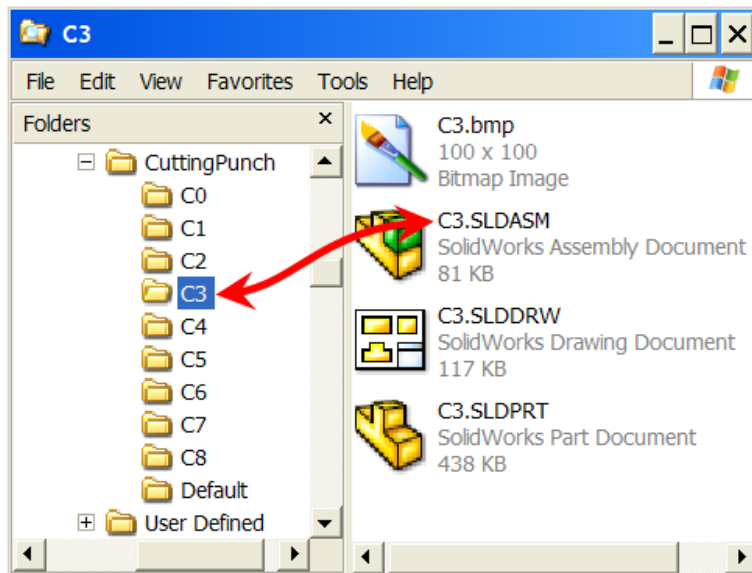


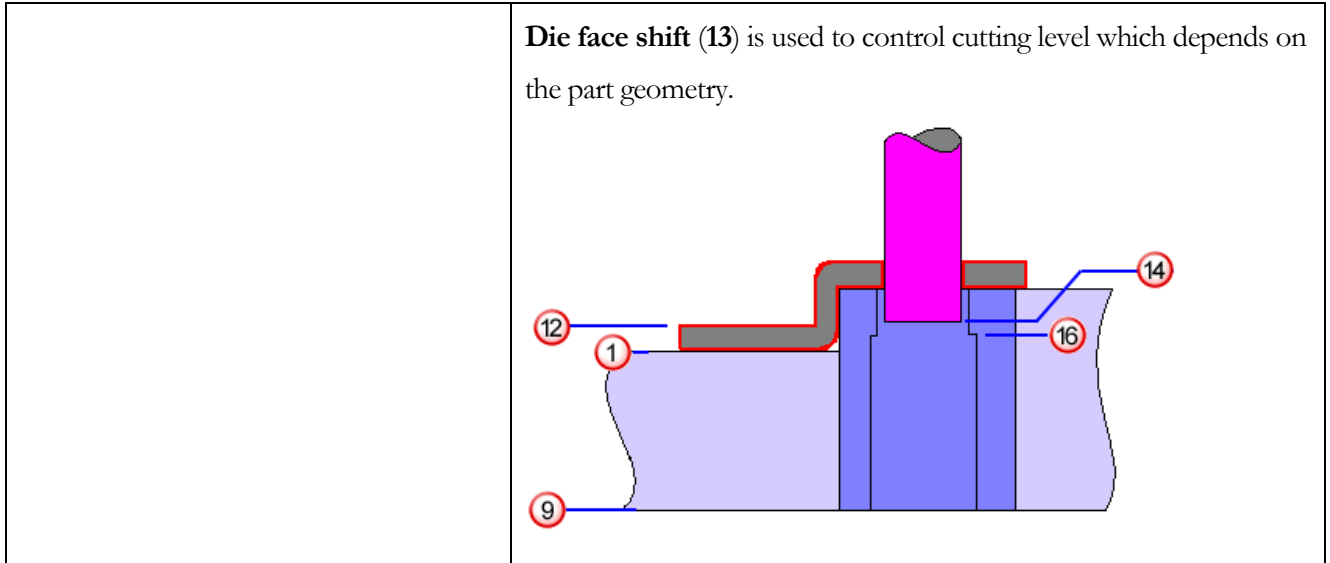
Figure 2 A Cutting punch assembly; it is a good practice to have the main punch part document have the same file name as the folder.

## Cutting punch details

### Reference planes

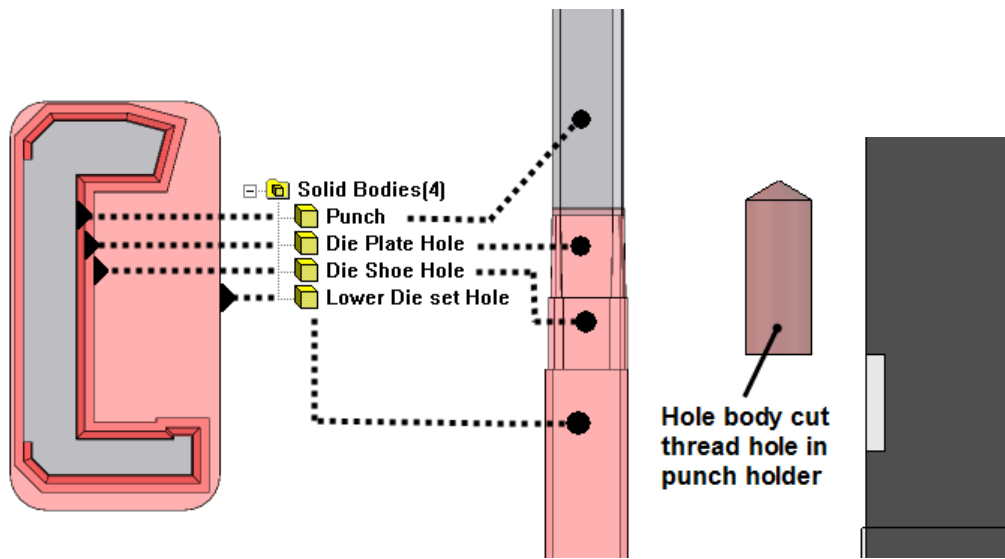
Cutting punches are driven by reference planes.

<pre> Origin ├── DieSetStructure-&gt;? │   ├── Front-DieSetStructure │   ├── Top-DieSetStructure │   ├── Right-DieSetStructure │   ├── Z-Datum-DieSetStructure (1) │   ├── Penetration-DieSetStructure (2) │   ├── Punch Length-DieSetStructure (3) │   ├── Punch Holder-DieSetStructure (4) │   ├── Stripper-DieSetStructure (5) │   ├── Stripper Shoe-DieSetStructure (6) │   ├── Punch Backup-DieSetStructure (7) │   ├── Upper Die Set-DieSetStructure (8) │   ├── Die Plate-DieSetStructure (9) │   ├── Die Backup-DieSetStructure (10) │   ├── Lower Die Set-DieSetStructure (11) │   └── Mat'l Thickness-DieSetStructure (12) ├── Die face shift (13) ├── Shift control ├── Shifted Penetration depth (14) ├── HL (15) ├── Punch │   ├── (-) Sketch1 │   ├── PH │   │   ├── PH Hole │   │   │   └── PH HoleSketch │   ├── SBP │   │   ├── SBP Hole │   │   │   └── SBP HoleSketch │   ├── SP │   │   ├── SP Hole │   │   │   └── SP HoleSketch │   ├── DP │   │   ├── DP RefPlane (16) │   │   └── DP Hole │   ├── DS │   │   ├── DS Hole │   │   │   └── DS HoleSketch │   └── LDS │       ├── LDS Hole │       │   └── LDS HoleSketch </pre>	<p>Datum planes are imported from <b>DieSetStructure</b> and used to determine the default size and holding level of cutting punches</p> <p>Length of cutting punch is the distance between (3) &amp; (2)</p> <p>Penetration depth is the distance between die face and punch tip</p> <p>Punch is retained by punch holder plate</p> <p>Datum planes created inside the cutting punch document are used to handle variations.</p> <p>HL(15) is used to control holding level variation</p>
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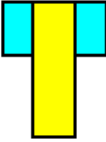
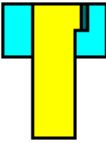

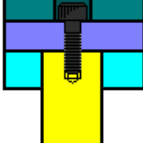
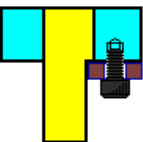
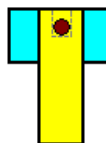
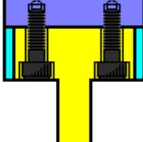
**Hole bodies**

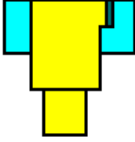
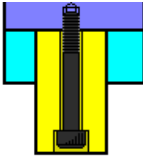
Holes bodies in cutting punch are used to cut die plates and clearance for retaining components.



**Retaining method and Step punch**

Retaining location and holding profile is controlled by sketches KR & XY respectively. KR stands for Key reference. Relations are created on top of these 2 sketches to model retaining features like groove and shoulder. Holding profile is controlled by XY sketch and is a rectangle by default. If you want to create a round shank, you can create a circle with diameter driven by X.

Folder	Description	Preview	Controlled by
<b>C0</b>	Plain		Nothing
<b>C1</b>	Flange		KR
<b>C2</b>	Groove type by Key		KR
<b>C3</b>	Fixed by screw from top		Nothing
<b>C4</b>	Full Flange type by Key		KR
<b>C5</b>	Pin		KR
<b>C6</b>	Shoulder by Screw		XY

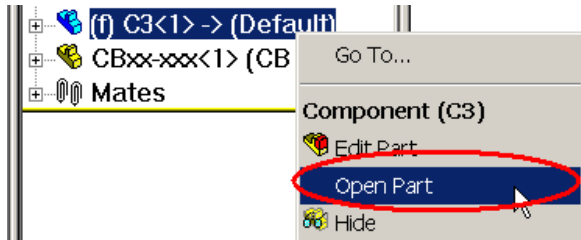
<b>C7</b>	Stepped punch		XY
<b>C8</b>	Screw from bottom		Nothing

### Lab 1 Fine tune punch parameters

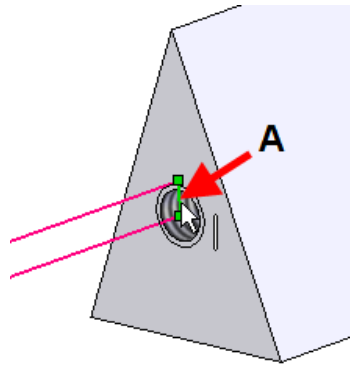
Modify C3 to support multiple screws by:

- Modifying the hole body to cover the thread hole
- Pattern the hole body
- Delete the first instance of the pattern as it overlaps with the original body
- Pattern the Socket Head Cap Screw

- 1) Open /My PRL/PunchDesignTemplate/Metric/CuttingPunch/C3/C3.sldasm
- 2) Right Click select C3 from Assembly Tree and click Open Part

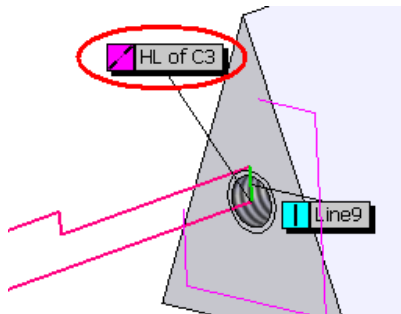


- 3) Right Click Sketch4 and click Edit Sketch

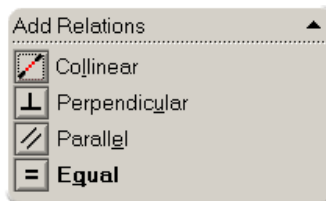
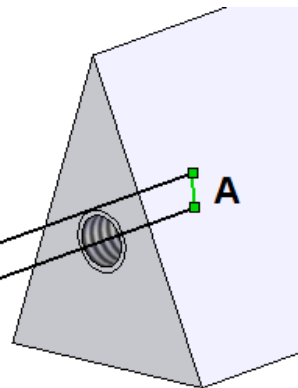
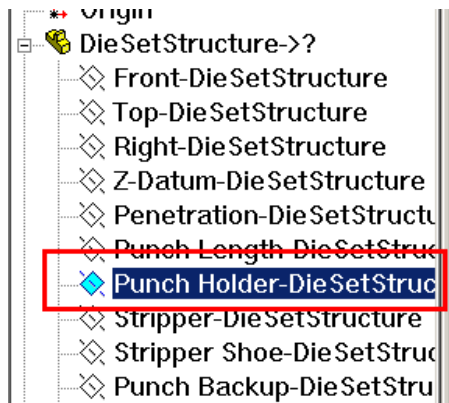


4) Double click on Line A

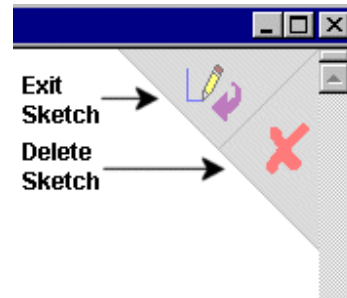
and select **HL of C3**, press Delete



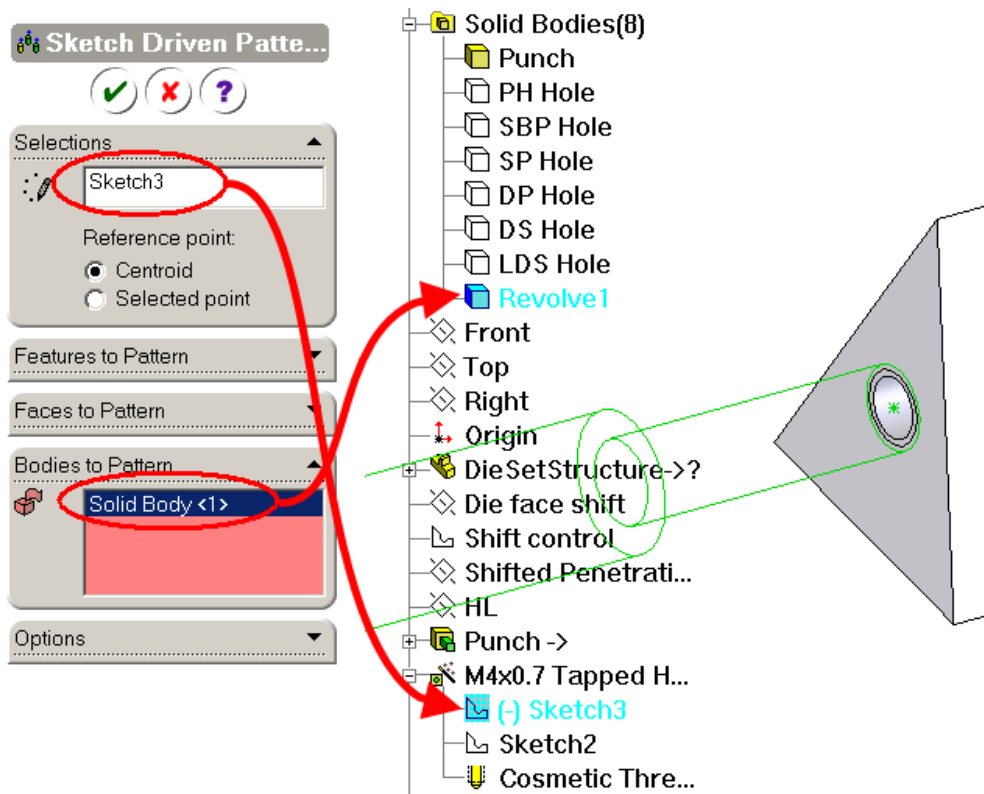
5) Select Line A and Punch Holder-DiesetStructure



6) Click Add Relations and Click Collinear

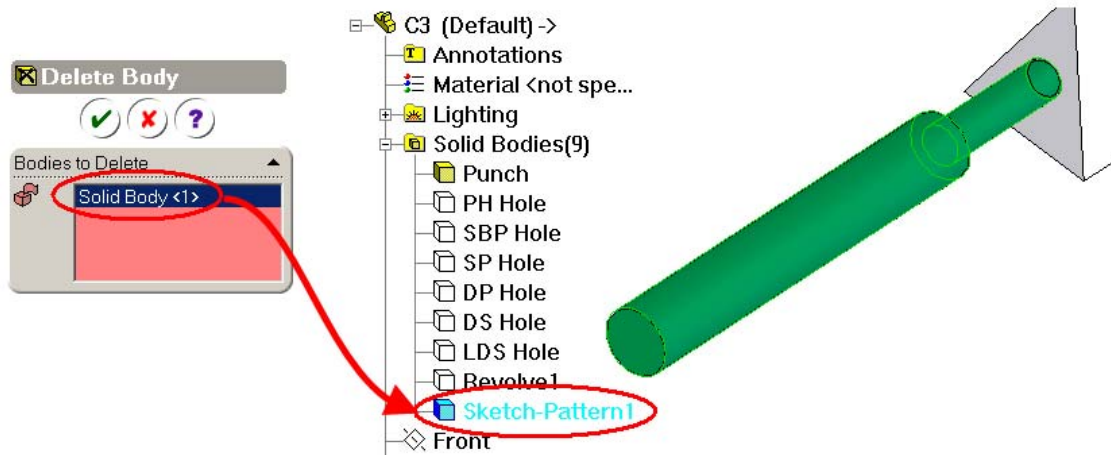


- 7) Click **Exit Sketch** of the confirmation corner to finish
- 8) Click **Insert, Pattern/Mirror, Sketch Driven Pattern**.
- 9) Select **Sketch3** under **M4x0.7 Tapped Hole** and **Revolve1** from Solid Bodies folder. Click **OK** to



finish

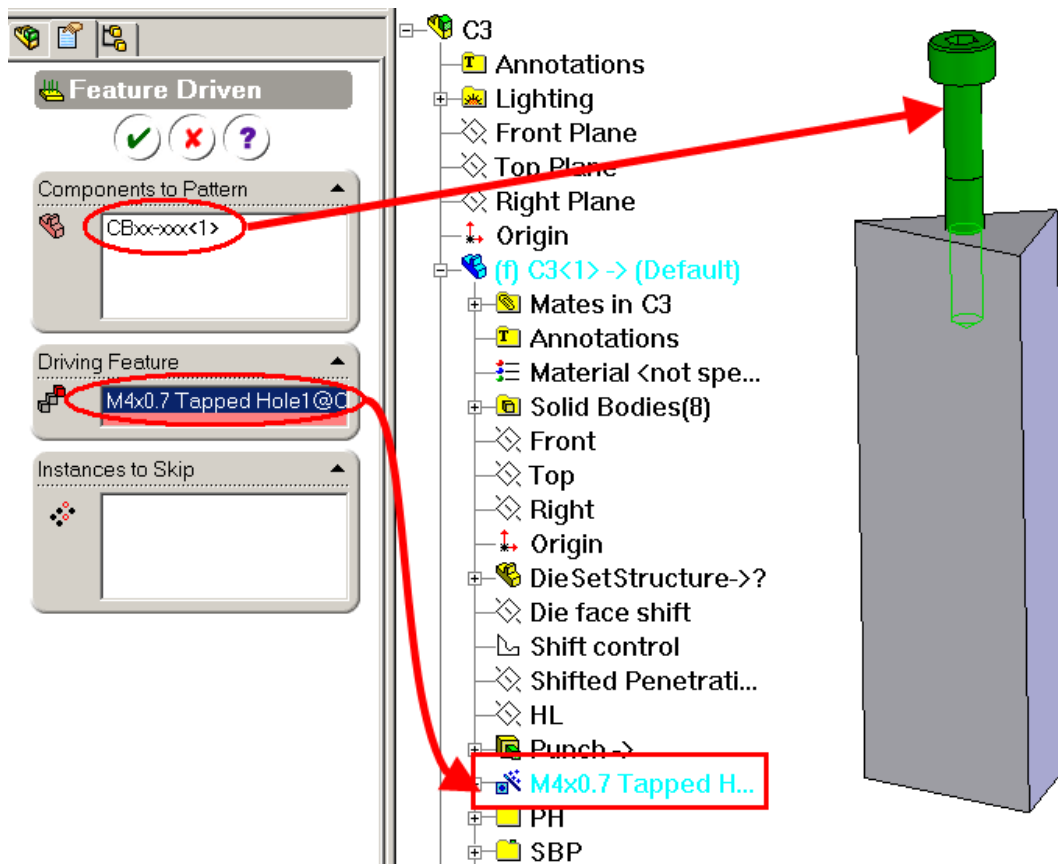
10) Click **Insert, Features, Delete Bodies** and select **Sketch-Pattern1** in Solid Bodies Folder



11) Click **Window, C3.SLDASM** to switch back to the assembly window

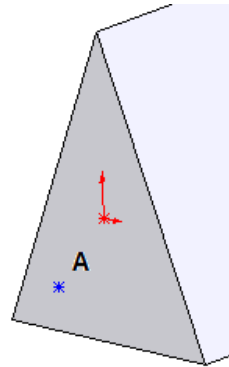
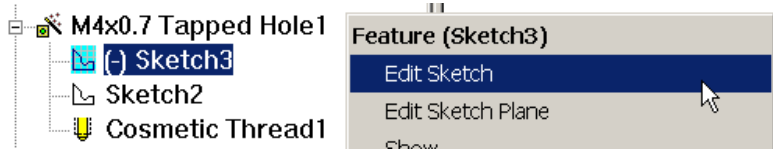
12) Click **Insert, Component Pattern, Feature Driven**

13) Select **CBxx-xxx** and **M4x0.7 Tapped Hole** for Component to Pattern and Driving Feature respectively, click **OK** to finish



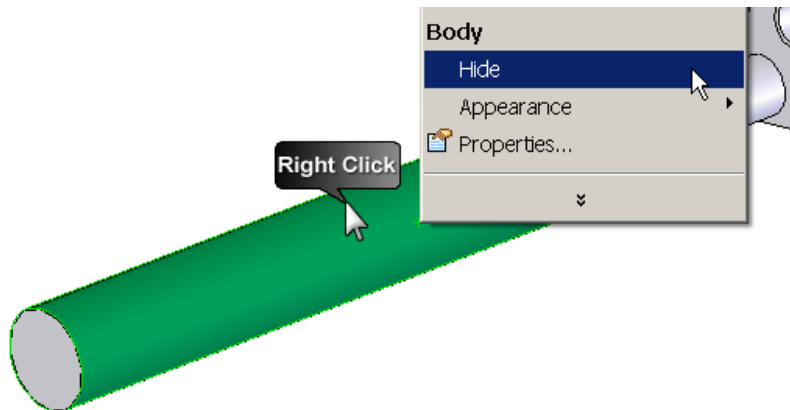
14) Click Window, C3.SLDPRT to switch back to the cutting punch part window

15) Right click on sketch3 and click Edit sketch



16) Insert point at A and click OK to finish

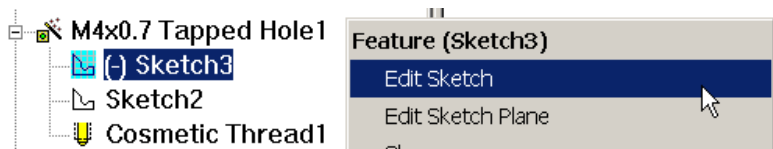
17) Right click on the new hole body and click Hide



18) Click Window, C3.SLDASM . The number of screw should be updated to 2

19) Click Window, C3.SLDPRT to switch back to the cutting punch part window

20) Right click on sketch3 and click Edit sketch



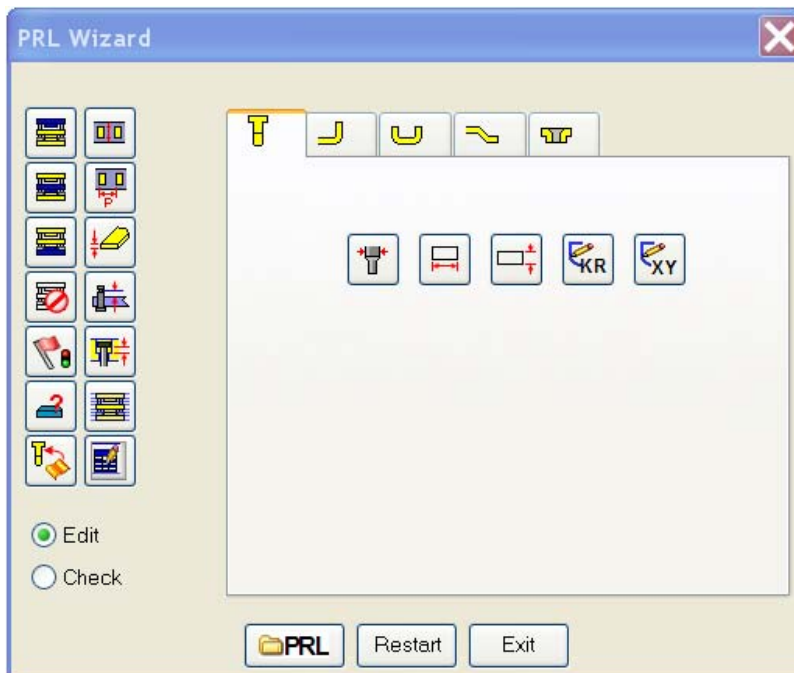
21) Select Point A and press **Delete**

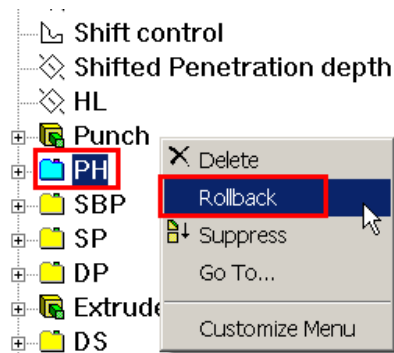
22) Click Window, Close All.

## Lab 2 Create a new cutting punch C9

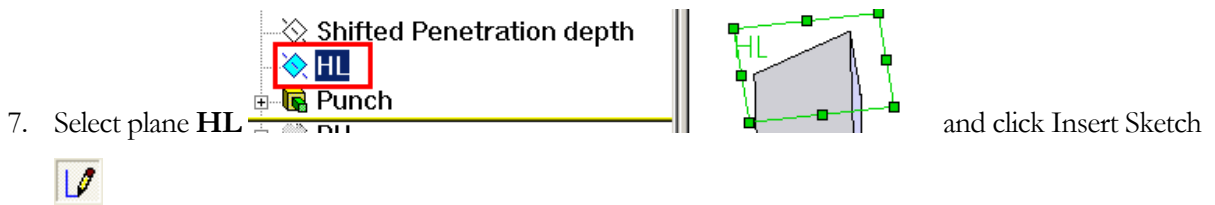
Create a new cutting punch from existing cutting punch by:

- Use Solid Works Explorer to duplicate and rename C1
  - Add XY sketch
  - Modify die plate hole body
  - Modify Lower Die set hole body
1. Click **3DQuickPress, 3DQuickTools, Utilities, PRL Wizard**
  2. Click **Create New PRL** and then click **Next** button
  3. Click **Piercing Punch**, Input PRL name = **C9** and then click **Next** Button
  4. Click **Cutting Punch** and then click **Next** Button
  5. Click **Copy From** and select **C1**, click **Open for Edit** and then click **Finish** Button. **C9** is open in SolidWorks and we are ready to add a XY sketch. You can leave the PRL Wizard open.



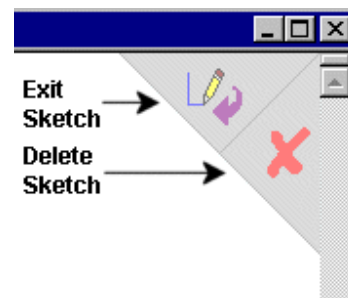
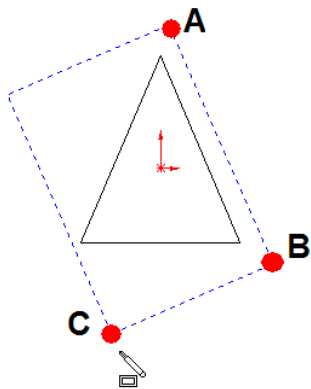


6. Right click on Folder PH and click Rollback

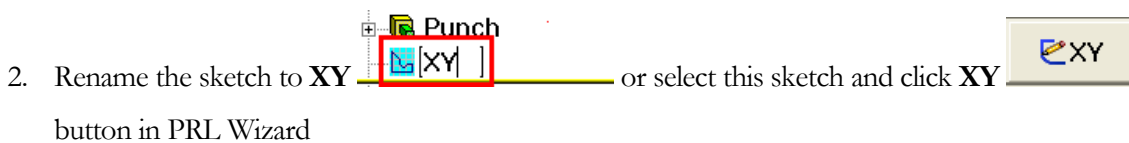


7. Select plane HL and click Insert Sketch

8. Click Tools, Sketch Entities, Parallelogram, click on A, B and then C to create a parallelogram

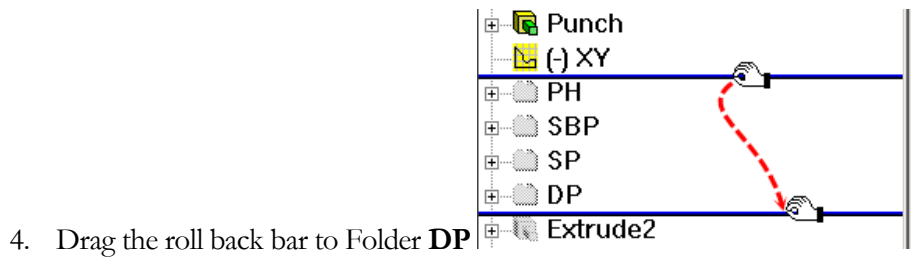


1. Click **Exit Sketch** of the confirmation corner to finish

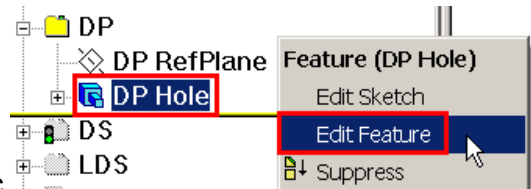


2. Rename the sketch to **XY** or select this sketch and click **XY** button in PRL Wizard

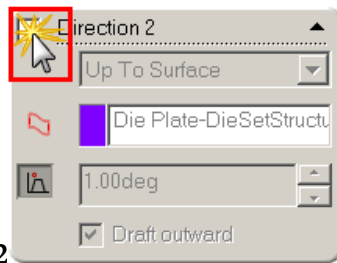
3. The default die plate hole is tapered and we are going to change it to stepped punch.



4. Drag the roll back bar to Folder **DP**

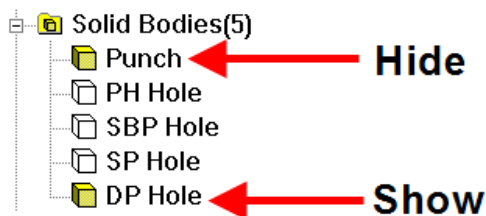


5. Right mouse click **DP Hole** and click **Edit Feature**



6. Uncheck **Direction 2** and click **OK** to finish.

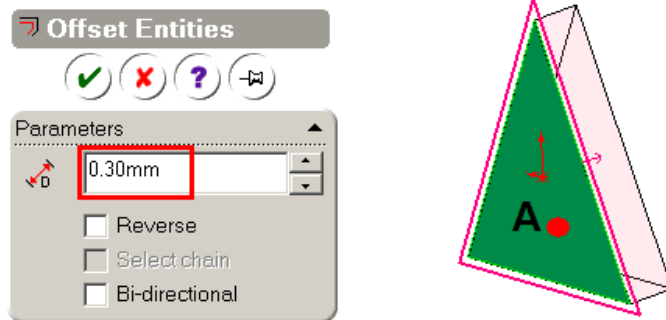
7. Expand Solid Bodies Folder, right click to hide Punch and show DP hole




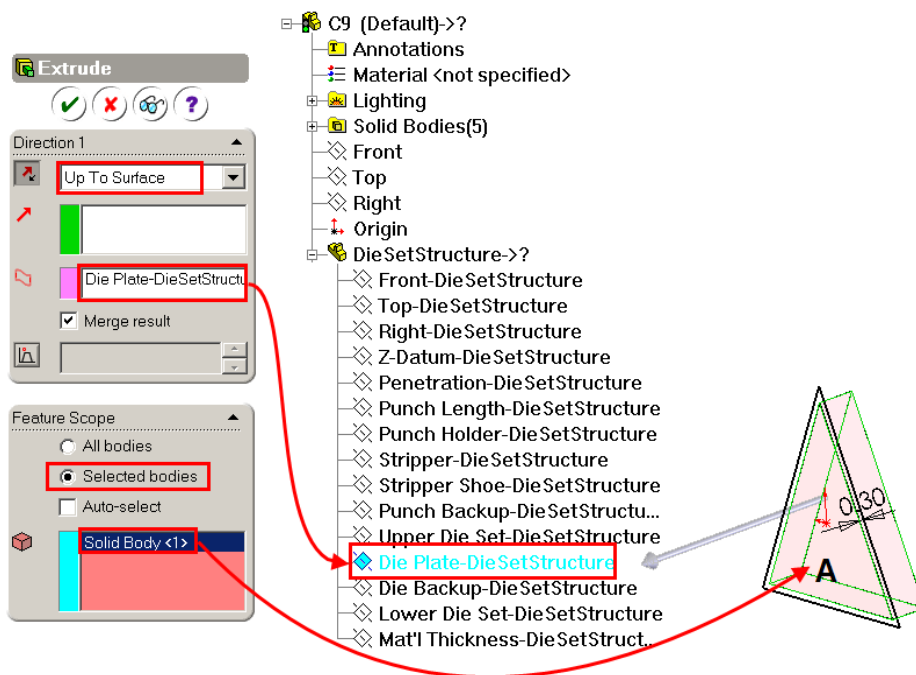
8. Select Plane **DP RefPlane** and click **Insert Sketch**



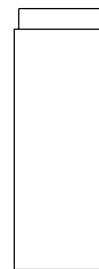
9. Select Face **A** and click **Offset Entity** . Input **0.3mm** for the offset distance. Click **OK** to finish



10. Click **Insert, Boss/Base, Extrude** , select **Up to Surface** for the end condition, Select **Die Plate-DieSetStructure**, check **Selected Bodies** and select **A**. In the Feature Scope selection box make sure you are selecting the DP Hole body from the Solid Bodies folder in the Feature Manager.



11. Click **OK** to finish and you should have a new hole body like this



12. The next is to modify the hole body of Lower Die set. The original design is an offset of the cutting profile and now we will make use of the XY sketch to create a rectangular opening.

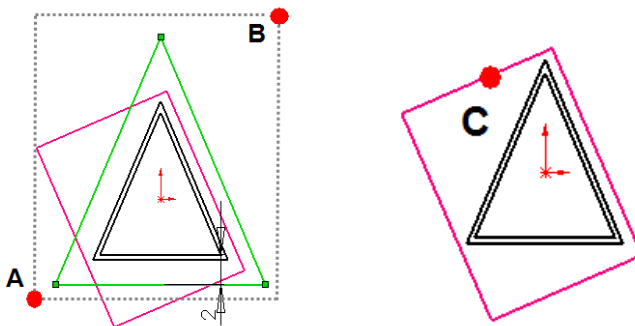
13. Right click the roll back bar and click Roll to End



14. Expand **LDS** folder and Right Click **LDS HoleSketch** and click Edit Sketch

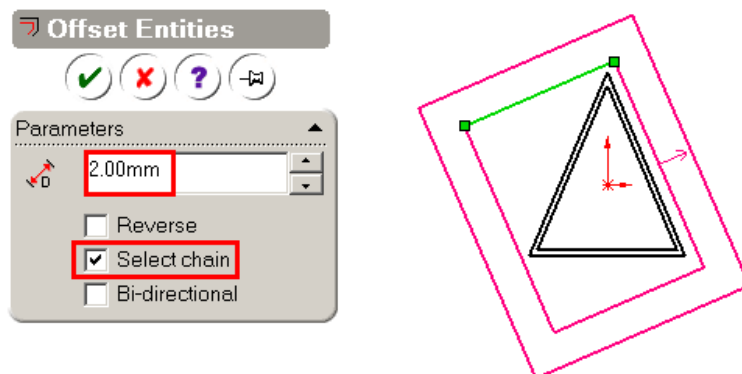


15. Delete all entities by window selection at A,B and press **Delete**

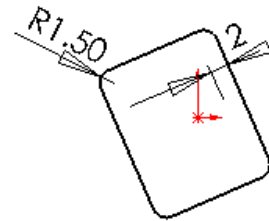



16. Select line from XY sketch at **C** and click **Offset Entity** . Input **2mm** for the offset distance.

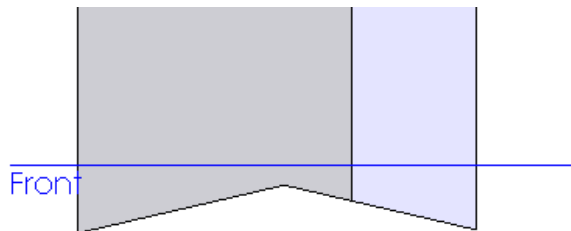
Check **Select chain** to offset the whole profile.




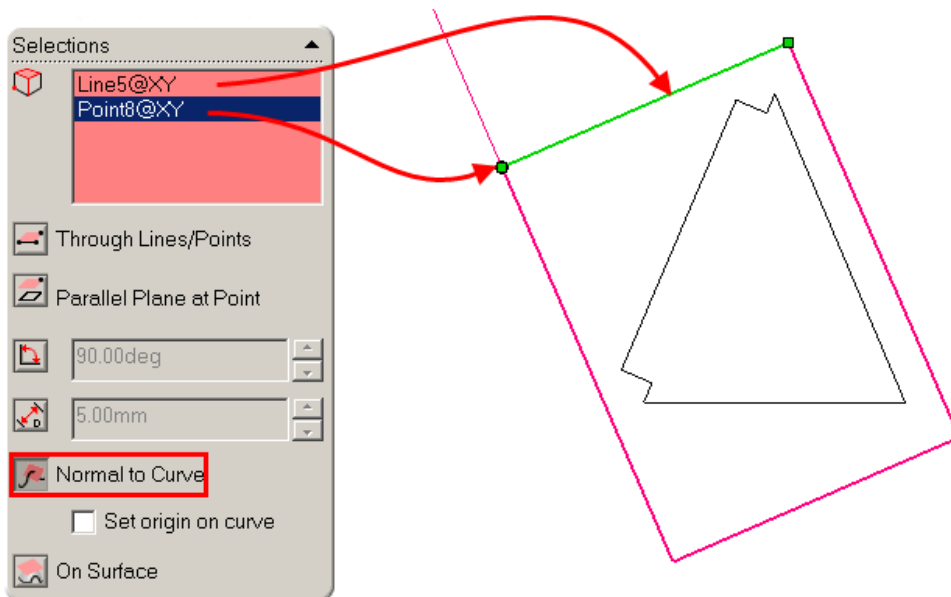
17. Click OK to finish offset





18. Click **Fillet**  and break the 4 sharp corner by a radius of **1.5mm**
19. Exit Sketch and you now have a new hole body for Lower Die Set
20. The next step is to modify the punch with shear to reduce cutting force





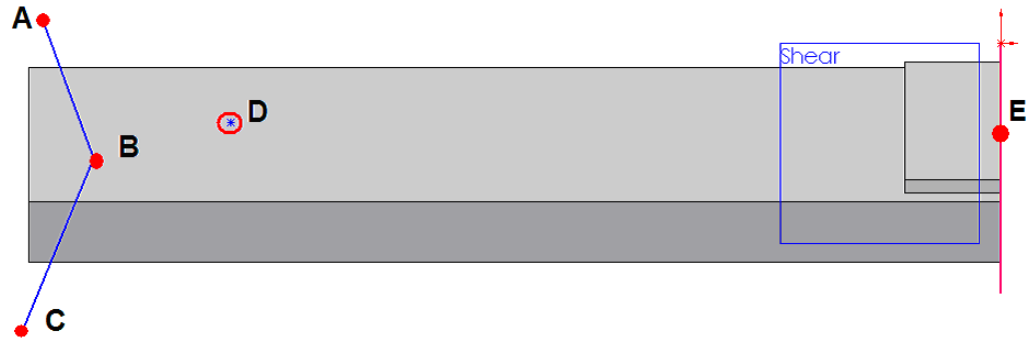
21. Click Insert, Reference Geometry, Plane  and select Point and Line, check Normal to Curve and click OK to finish







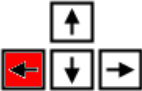
22. Rename the plane to Shear  **Shear**
23. Click on **Plane Shear** and click **Insert Sketch** 

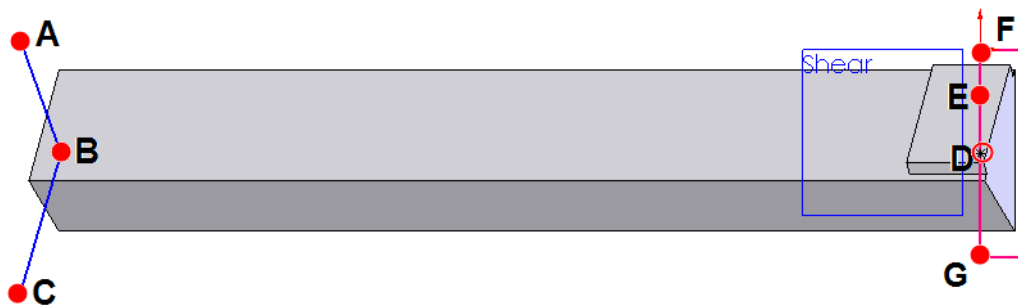
24. Set the **view / normal to the Shear Plane** by clicking Normal To 

25. Click **Line**  and click on **A, B, C** to create 2 lines. Click **Point**  and click on **D** to create a sketch point.








26. Click Add Relation , Select A, C and click  **Vertical**; Select D, B and click  **Horizontal**; Click E of XY and D and click  **Midpoint**

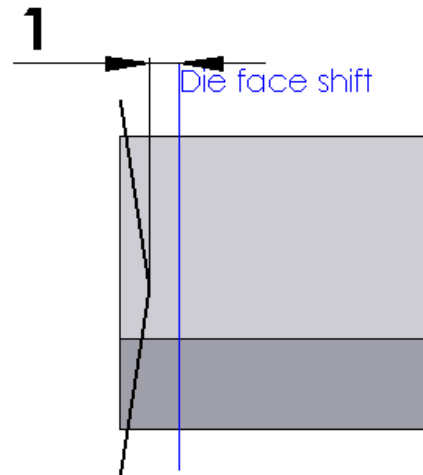
27. Press Left Arrow to tile the view 





28. You should still in Add Relation mode, select **A, F** and click  **Horizontal**; select **C, G** and click

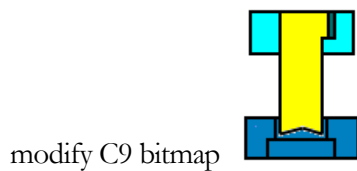


29. Click **Smart Dimension** , click **Die face shift**  **DieSetStructure**  **Die face shift**  **Shift control**  and **B**, click on the screen



and input 1 mm. You should have a fully defined sketch.

30. Click **Extrude Cut**  or click **Insert, Cut, Extrude**
31. Check  **Flip side to cut** and Click **OK**  to finish
32. Customization of C9 is finished, save all file.
33. Use Window explorer to rename C1.slddrw and C1.bmp to C9.slddrw and C9.BMP respectively. And



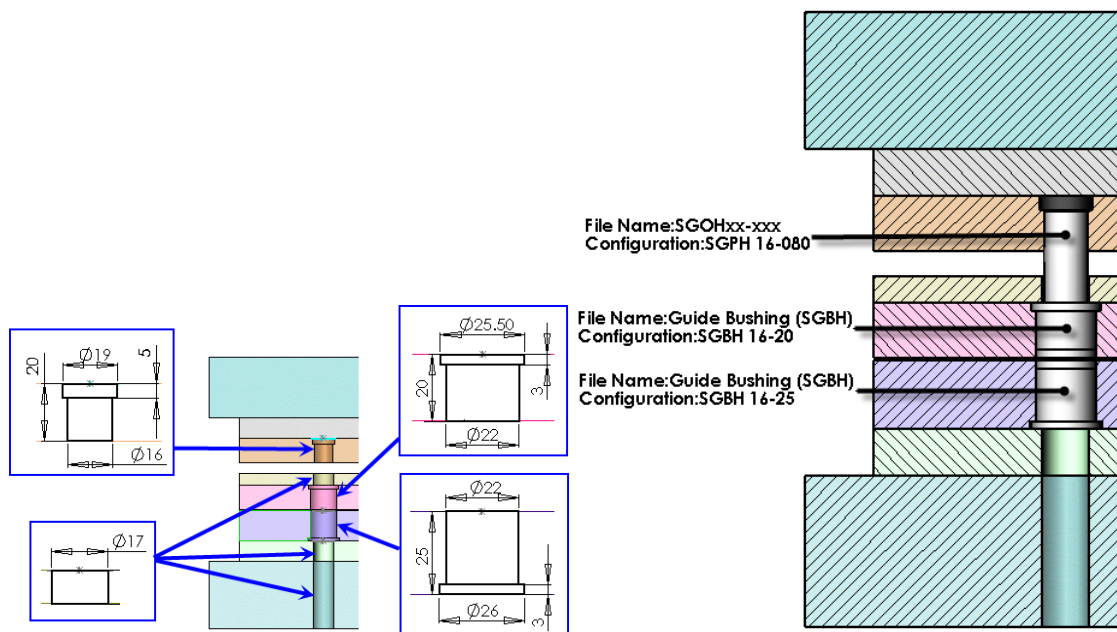
**Cutting punch customization finished.**


## Tutorial 4. Create die set template


Topics covered:

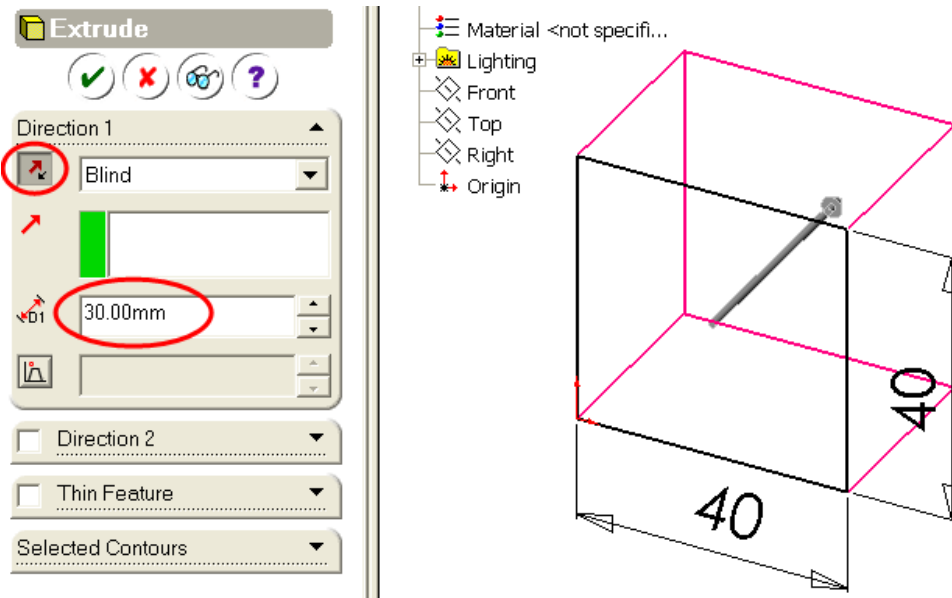
- Create Hole features
- Create Hole groups
- Create your own die set library based on system die set assembly
- Create a SolidWorks Part document to hold all the Layout Sketches for the positioning hole series to pass through multiple plates
- Insert component to the die set structure based on the hole series.

Create Hole features for Guide Pin SGOH 16mm with bushing

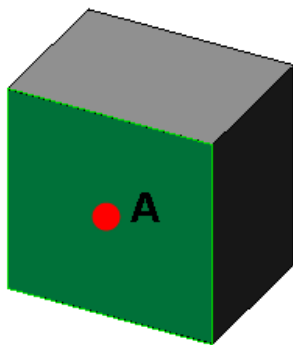


1. For this tutorial you need to copy the \training\Hole Series folder contents to your current PRL directory. This directory should be located under \training\MyPRL\Library features\Hole Series. If there are duplicates copy over them.
2. Click **File, New** to create a new part document
3. Select **Front Plane** from **Feature Manager** and click  **Sketch** to start a new sketch

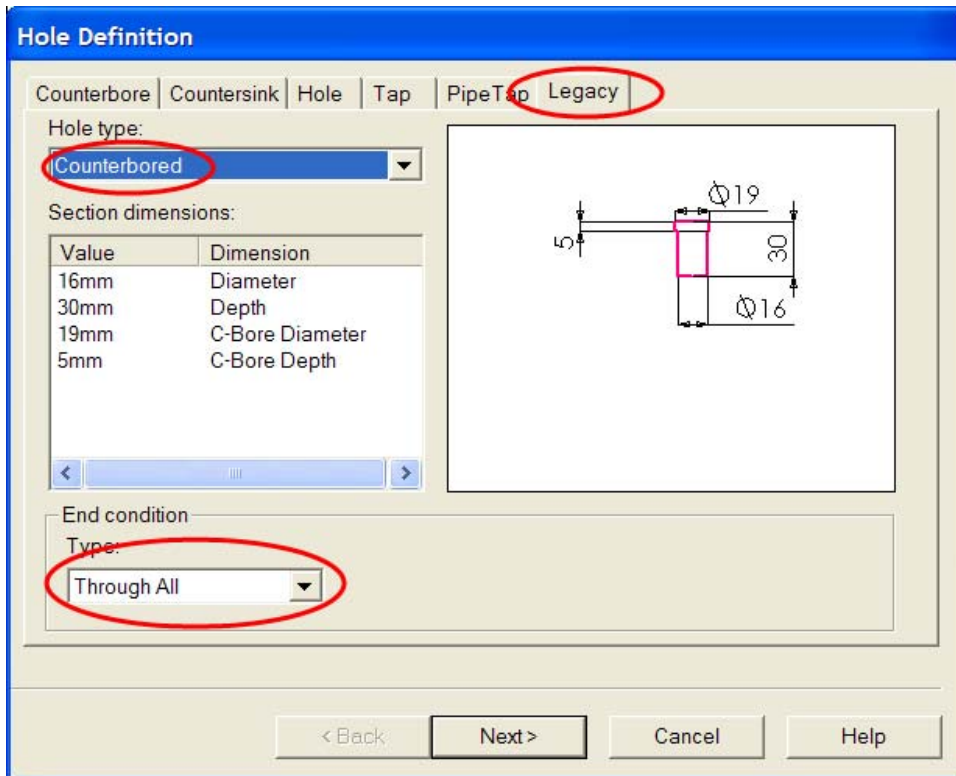
- Click  **Rectangle** and create a 40mmx40mm rectangle
- Click **Insert, Feature, Boss/Base, Extrude** and extrude it in **Reverse** direction with Depth **30mm**



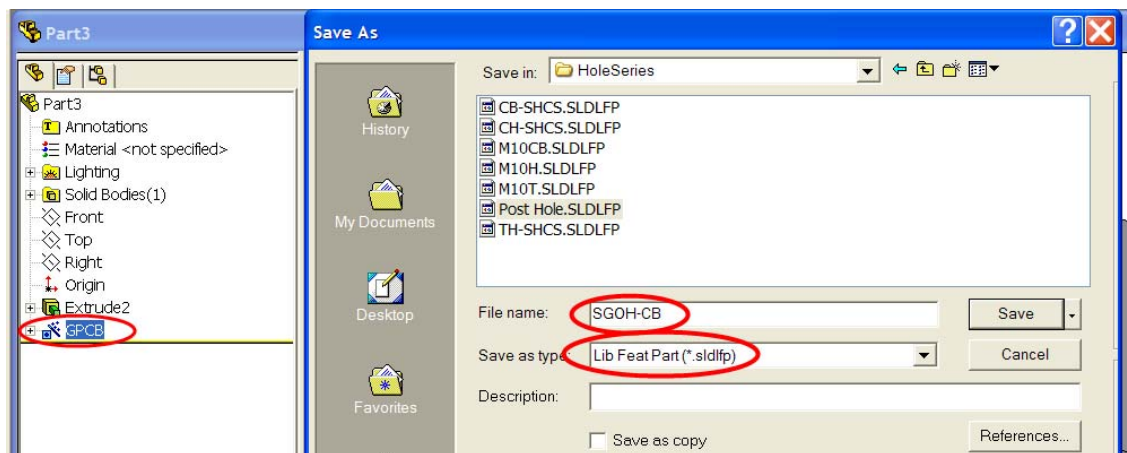
- Click on A and click **Insert, Feature, Hole, Wizard ...**



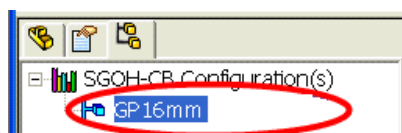
- Go to **Legacy** page and set the information: **Hole Type**=Counterbored, **End Condition Type**=Through All, **Diameter** 16mm, **C-Bore Diameter** = 19mm, **C-Bore Depth**=5mm



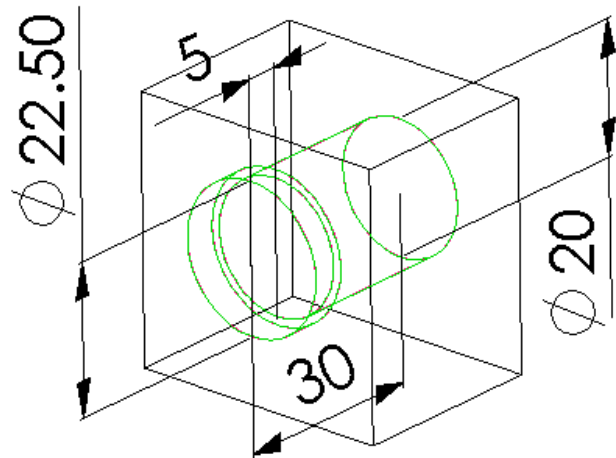
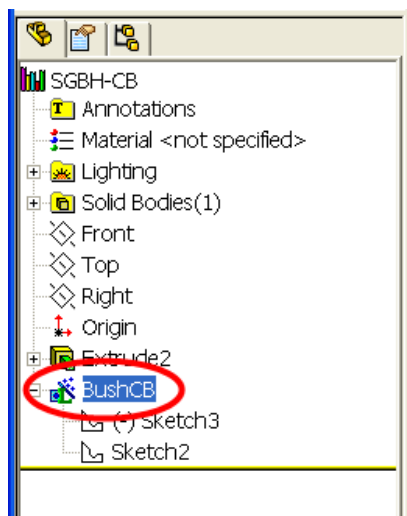
8. Rename the Hole feature to **GPCB**
9. Select **GPCB** and click **File, Save as**, select **Lib Feat Part** and Input **SGOH-CB** for File name



10. Rename the configuration to **GP16mm**



11. Click **File, Save** in the **Hole** series directory under the current **PRL** directory, **Library features\Holes** series.
12. Click **File, Save As**, Input File name **SGBH-CB**
13. Rename Feature GPCB to BushCB
14. Double click on BushCB and change the dimension to: **Diameter 20mm, C-Bore Diameter = 22.5mm, C-Bore Depth=5mm**

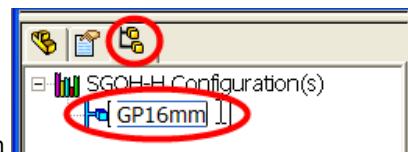
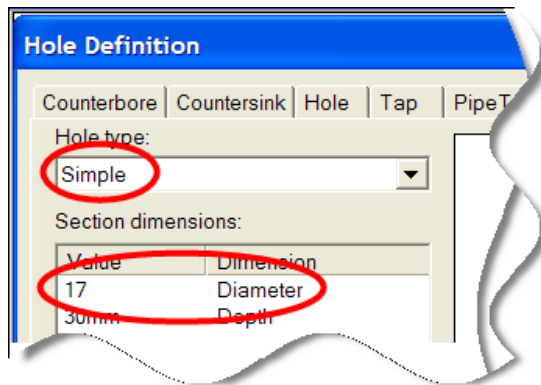


15. Rename the configuration to **Bush16mm**



16. Click **File, Save**
17. Click **File, Save as** Input File name **SGOH-H**
18. Rename **BushCB** to **GPHole**

- Right click **GP\_Hole** and select **Edit Feature**, change Hole type to Hole, Diameter = 17mm



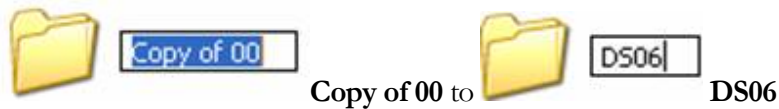
- Rename the configuration to GP16mm

- Click File, Save

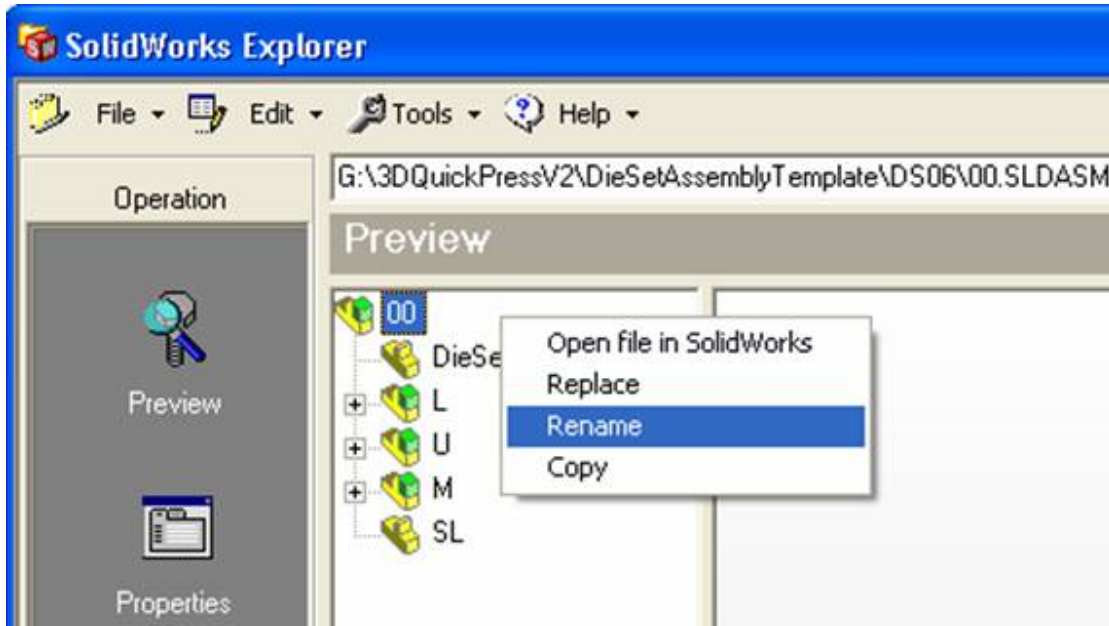
- Click Window, Close All

## Derive a new die set from system template

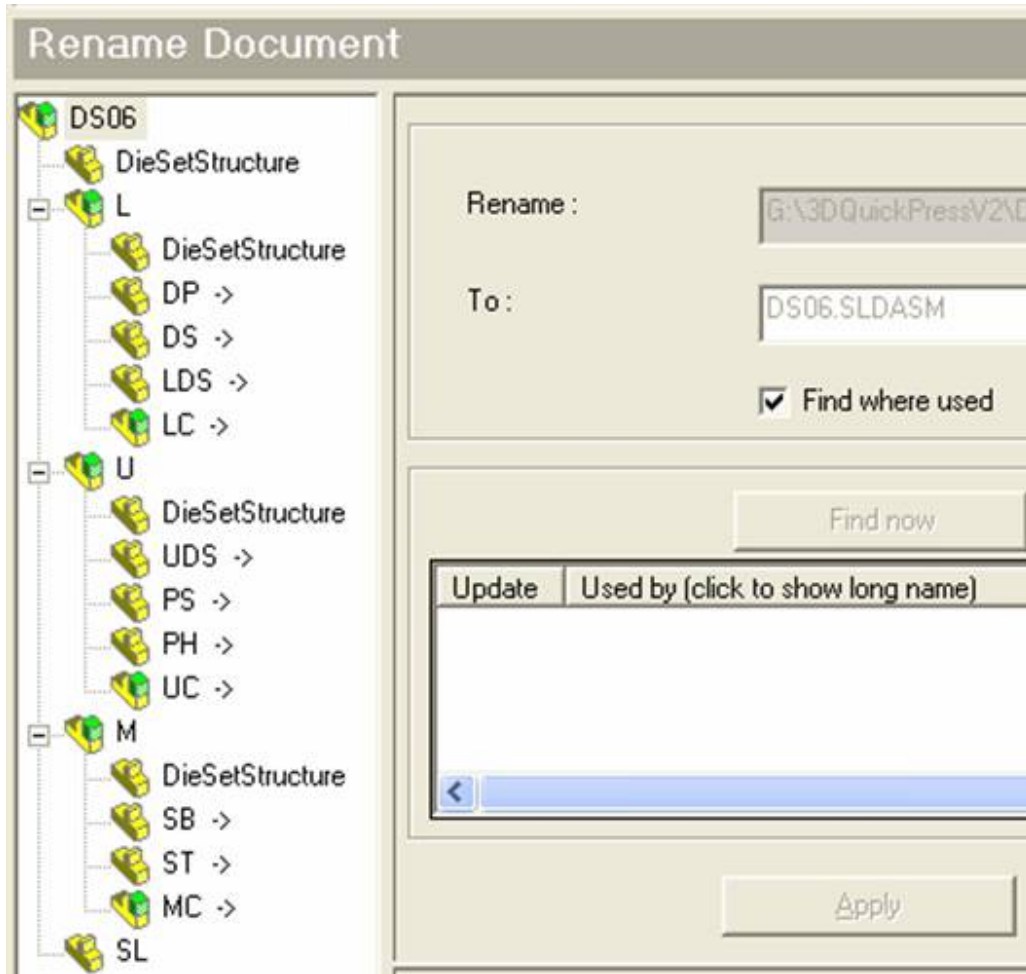
- Launch Windows Explorer
- Go to **My PRL\DieSetAssemblyTemplate**
- Select **00** folder and press **Ctrl-C** and then followed by **Ctrl-V**



- Rename**
- Launch **SolidWorks Explorer** inside SolidWorks **Tools->SolidWorks Explorer..**
- Open **My PRL\DieSetAssemblyTemplate\DS06\00.sldasm**



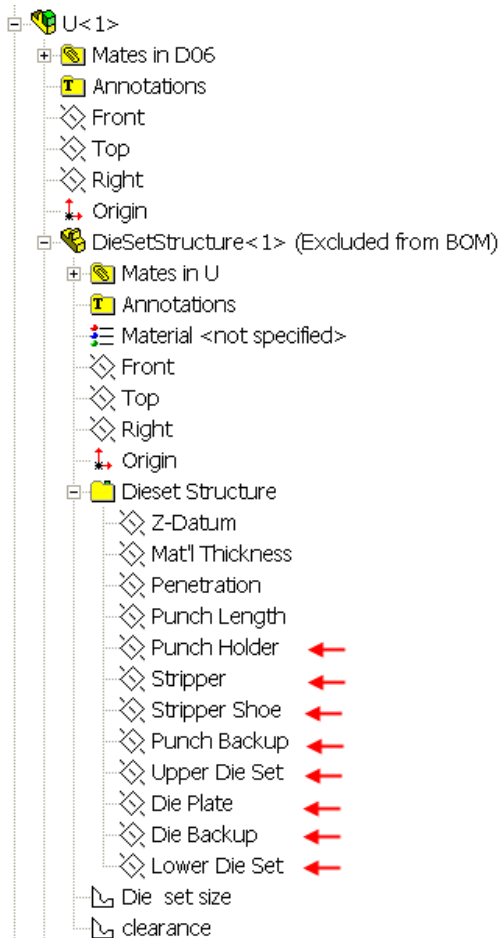
7. Rename it to DS06.sldasm (DiesetStructure.SLDPRT is not allowed to rename, rename it will leads to unexpected results.)
8. Expand the tree and rename the die plate according to your company standards. However, You cannot rename the Diesetstructure, U, M, L, UC, MC, LC, SL or DSCtr parts and assys at this time.



9. Close SolidWorks Explorer.

10. Open **DS06.SLDASM** in SolidWorks

11. Double click on **DieSetStructure** and expand change the naming convention of the reference planes.




## Create a layout sketch Part for holes series


Layout sketch parts (common parts) should be used to maintain the hole-position for components that pass through different sub-assemblies. A typical example is a guide pin which passes through the U, M, L assemblies. By using this technique, you just modify the guide pin layout sketch by changing point locations, or adding and removing points to adjust location and quantities. The associated holes will be updated and components will follow. The following steps are used to create 2 layout sketches--Guide Pins; Stripper bolts in a common part.


When developing a sketch for layout purposes, it is helpful to know which location is the parent location. By placing a circle at this location in lieu of a point it is ease to locate this parent location. The circle has 2 purposes: 1. To have an idea of the hole size. 2. It is the location mate /Parent part with the 1<sup>st</sup> component which is going to be patterned.


No need to insert point to the center of the circle. To do so will create problem when you use Feature Driven Component pattern and BOM problems.


Create and add the “common sketch part” to all main subassemblies assemblies


1. Create a new part, name the file “sketches” and save in the DS06 template folder.
2. Minimize the part window and return to the main DS06 assembly window using the Window menu.
3. Edit the U assembly and select menu items, **Insert / Component / Existing Part** and select “sketches” form the list and select OK  check option to place at Origin and Fix part.
4. Reorder the “sketches” part below the “diesetstructure” part by dragging and dropping the “sketches” part with LMB.

5. Exit “edit component” mode by selecting 

6. Edit the M assembly and select menu items, **Insert / Component / Existing Part** and select “sketches” form the list and select OK  check option to place at Origin and Fix part.
7. Reorder the “sketches” part below the “diesetstructure” part by dragging and dropping the “sketches” part with LMB

8. Exit “edit component” mode by selecting 

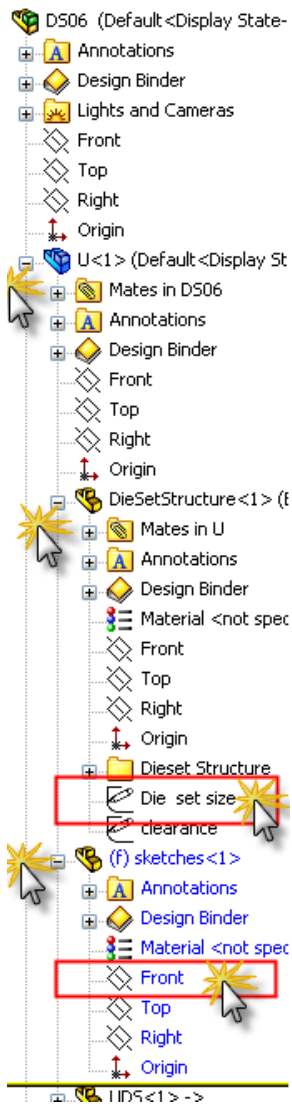
9. Edit the L assembly and select menu items, **Insert / Component / Existing Part** and select “sketches” form the list and select OK  check option to place at Origin and Fix part.
10. Reorder the “sketches” part below the “diesetstructure” part by dragging and dropping the “sketches” part with LMB

11. Exit “edit component” mode by selecting 

12. Save the Assembly--CTRL-S

Derive the “Die set size” sketch into the “Sketches” part for localized reference

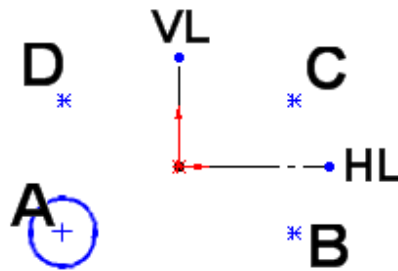
13. From the main assembly, **expand** the feature manager tree for the **U** assembly by selecting the “plus” symbol.
14. In the U assembly, **expand** the feature manager tree for the **diesetstructure** part by selecting the “plus” symbol.
15. From the main assembly, **expand** the feature manager tree for the **sketches** part by selecting the “plus” symbol.
16. Edit the “**sketches**” part.
17. Ctrl-Select the “**Front Plane**” in the **sketches** part and “**Die set size**” of the **diesetstructure** part .  
Release the CTRL key and select menu items :**Insert / Derived sketch**. Close the sketch mode.



18. Click **Edit assembly** and save.
19. Open **sketches** part in its own window.
20. **Rename** the new sketch to “**die set size**”. This sketch will update anytime the parent sketch is modified in the diesetstructure part.

21. **Select Front Plane**, click **Insert, Sketch**

22. Click **Centerlines** to create a vertical and a horizontal centre line at Origin –see VL and HL

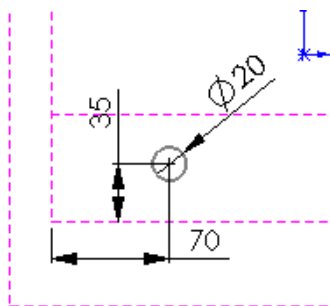


23. Click **Circle** to create a circle at **A**
24. Click **Point** to create a point at **B**
25. Click **Add Relation**, select **VL, Circle**

**Center point** (not circumference) & **Point B** and add a symmetric relation

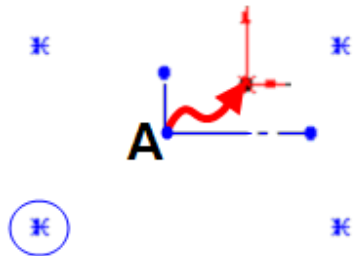
26. Mirror Point **B** about **HL** to create **C**
27. Mirror Point **C** about **VL** to create **D**

28. Show sketch **Die Set Size** sketch with RMB and dimension the hole center as shown below.

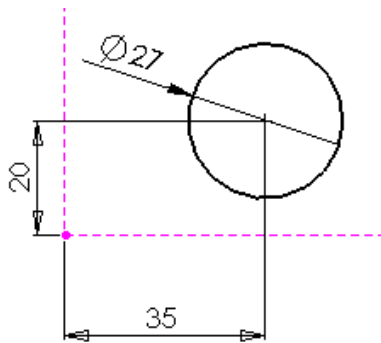


29. Exit sketch and rename the sketch to **Guide Pins** in **Feature Manager**
30. Select sketch **Guide Pin**, click **Ctrl-C (copy)**, select **Front Plane** and click **Ctrl-V (paste)**.
31. Rename the new sketch to **Stripper bolt**

32. Edit **Stripper bolt** sketch and constraint Point **A** to Part Origin by dragging away and then back until it auto constraint for coincident show up.



33. Dimension the circle in this sketch to the same left corner of the “die set size” sketch.

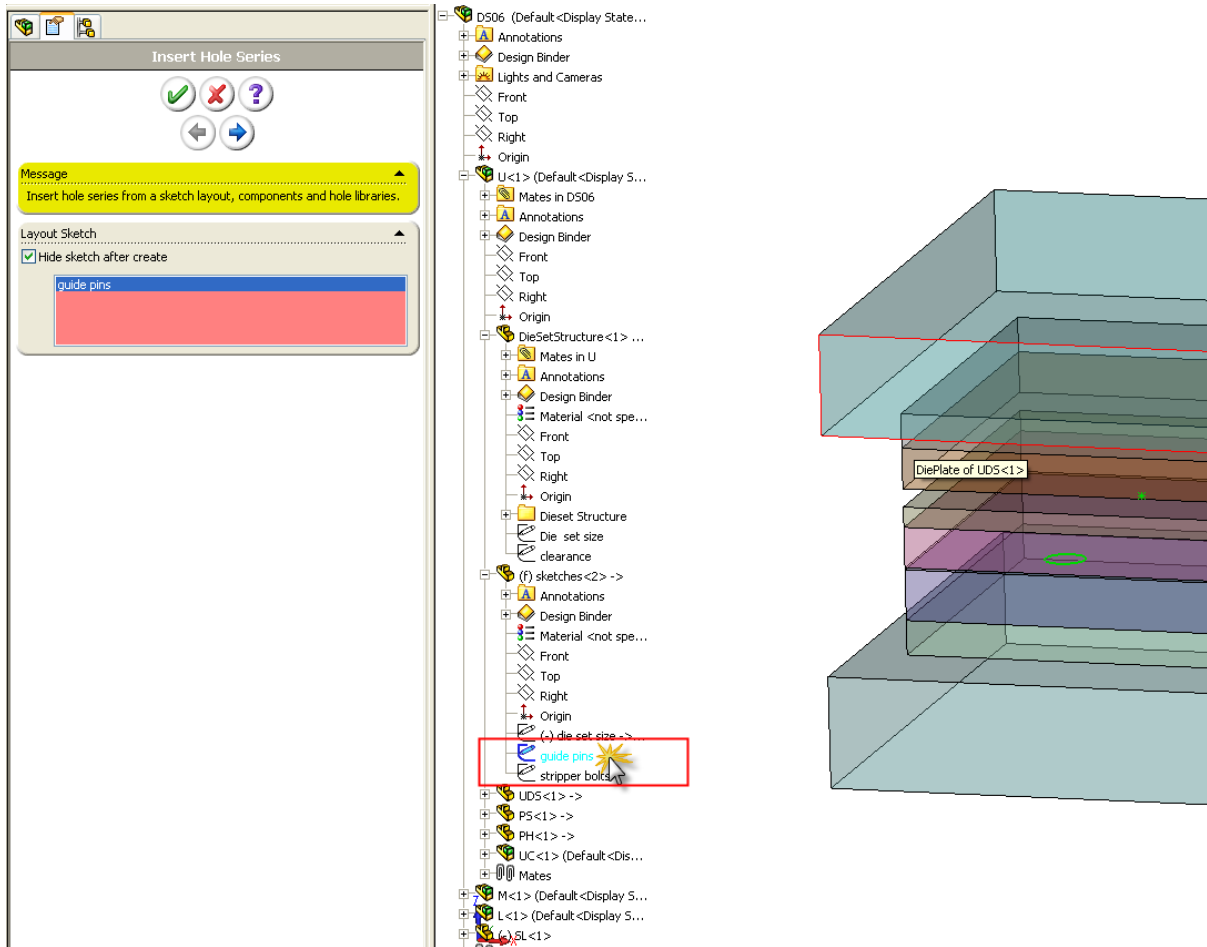


34. Exit sketch mode.
35. Hide all sketches by selecting in the feature manager and using Hide Sketch.
36. Save part and close sketches window.

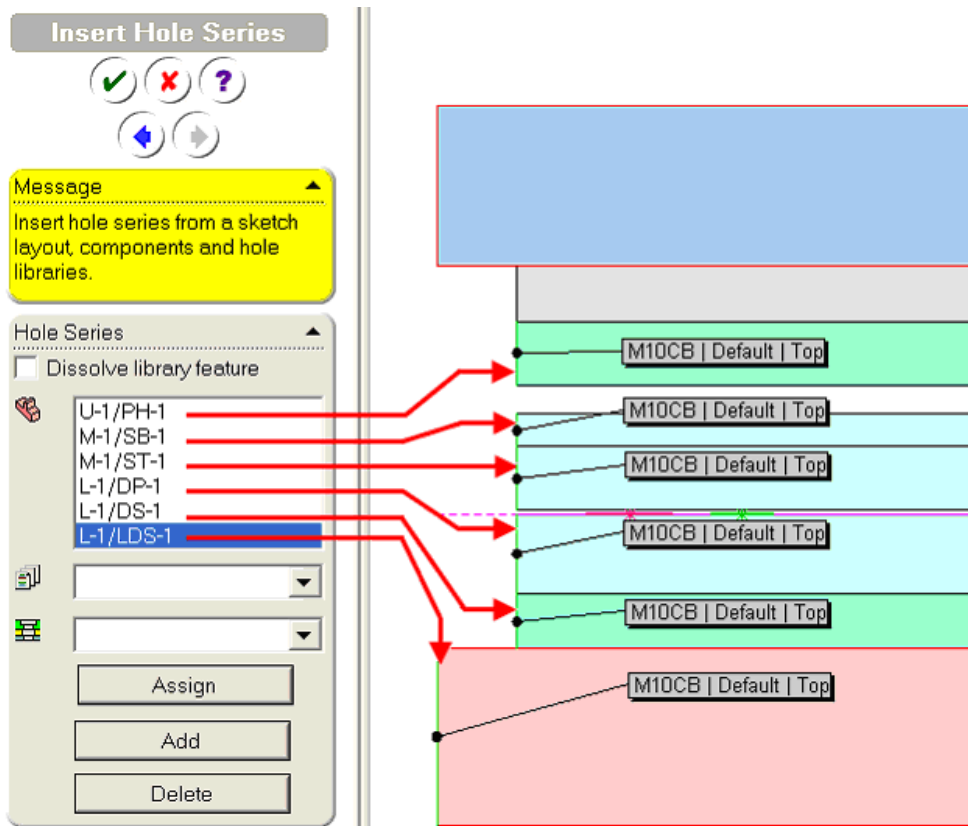
## Create Guide Pin Holes

37. Open **DS06.SLDASM** using **Window** menu selection.

38. Click **Hole Series** , select sketch **Guide Pin** from Feature Manager



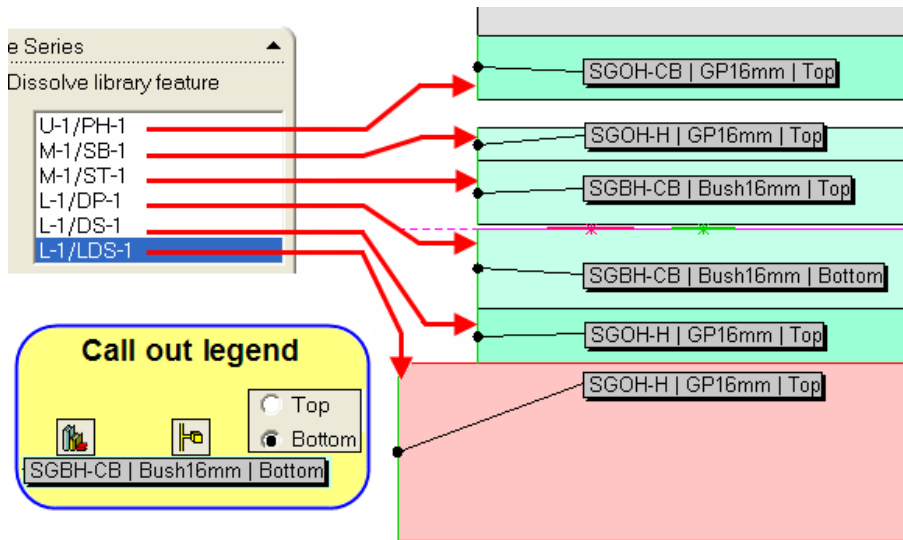
39. Click next page button  and select die plates



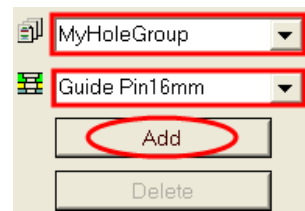
40. Highlight **U-1/PH-1** , select Library feature file **SGOH-CB** and



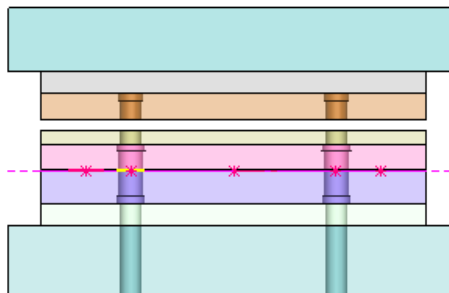
41. Use the same technique to assign Feature Library to the plates.



The settings can be saved for future use. The file is located in <PRL>/Library features/HoleSeries/\*.dat, multiple group file are supported. To save the group data do the



42. Input **MyHoleGroup** and **Guide Pin** 16mm and click Add



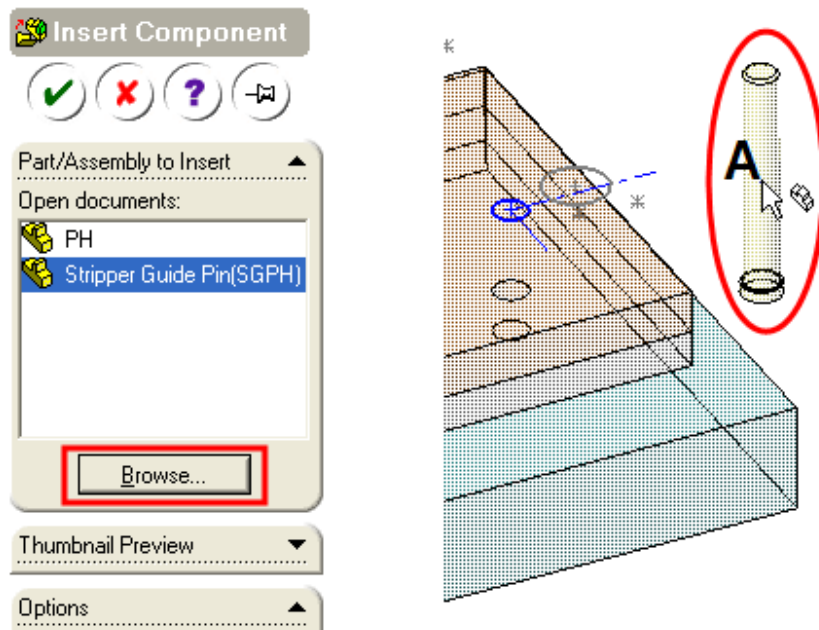
43. Click **OK** to create the holes.

44. Launch Excel and open **My PRL/Library Features/HoleSeries/MyHoleGroup.dat** to illustrate the data files for future use. This file can be edited manually to make other variations.

	A	B	C	D	E
1	Group Name	Library Feature File	Configuration	Top/Bottom	Sequence
2	Guide Pin16mm	SGOH-CB	GP16mm	1	
3	Guide Pin16mm	SGOH-H	GP16mm	1	
4	Guide Pin16mm	SGBH-CB	Bush16mm	1	
5	Guide Pin16mm	SGBH-CB	Bush16mm	0	
6	Guide Pin16mm	SGOH-H	GP16mm	1	
7	Guide Pin16mm	SGOH-H	GP16mm	1	
8					

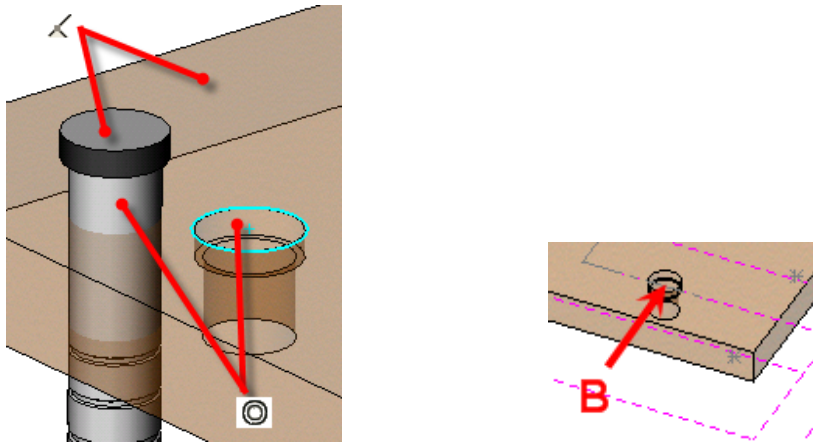
Use the pattern feature to locate initial guide pin

1. Select **U.sldasm** and RMB select **Open Assembly**.
2. Show the **Guide Pins sketch** in the “sketches” part.
3. Click **Insert, Component, Insert Existing Part/Assembly**.

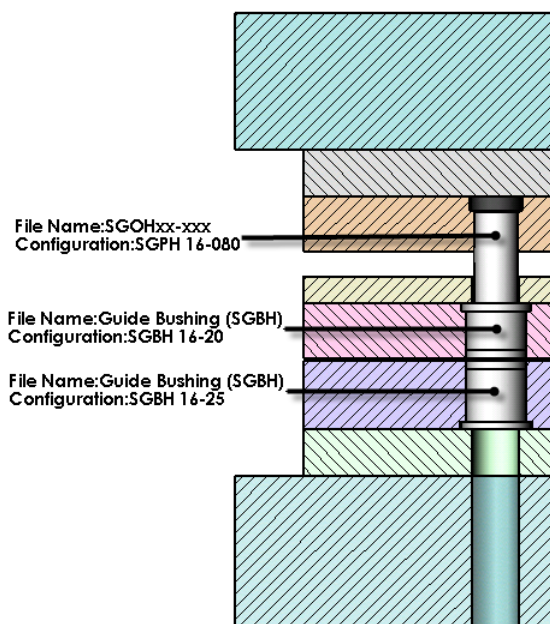


4. **Browse** for the part in C:\Program Files\3DquickPressV3\Standard Components\Misumi\Guide Pin\SGOHxx-xxx.SLDPRT configuration **SGPN 16-080**.
5. Drag the **Guide Pin** at “A” close to the 1<sup>st</sup> hole (It is indicated by the Circle in Guide Pin sketch)
6. Hide **UDS** and **PS** parts.

- Click **Insert, Mate** to add **Centric** and **Coincident** mate to position the Guide Pin



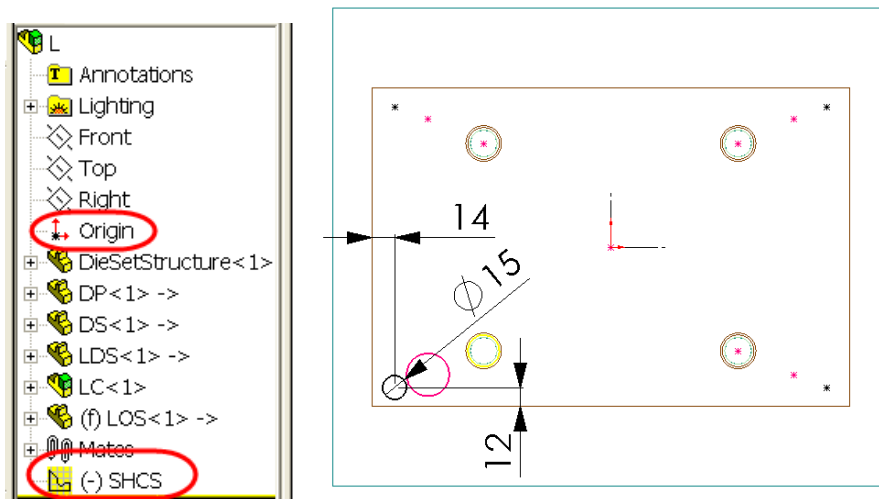
- Click **Insert, Component Pattern, Feature Driven**, select **SGOHxx-xxx** and click on **B** for the **Driving Feature**, click **OK** to finish
- Use similar techniques to insert Guide Bushes to Stripper and Dieplates in the corresponding subassemblies L.SLDASM and M.SLDASM respectively.



## Create fasteners for bottom die set

If the components only have common holes in the subassembly, we can create the layout sketch in the assembly instead.

1. Open **L.SLDASM**
2. Select **Guide Pin** sketch from **sketches** part and press **ctrl-c (Copy)** .
3. Select **Front plane** of the **L** assembly and press **CTRL-V (Paste)**.
4. Rename the sketch to **SHCS** and edit the sketch.
5. Add a coincident relation between Origin and the Center by dragging and dropping on to the origin.
6. Dimension the sketch as shown below and exit sketch when finished



7. Click  Hole Series, select sketch **SHCS** from Feature Manager and click next page button



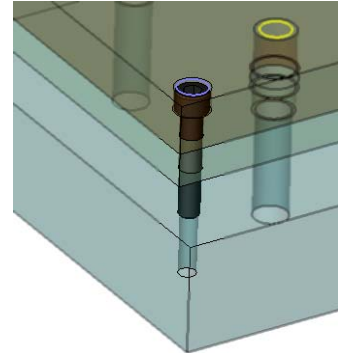
8. Select plates

9. Select Group File **3P-Metric-CB-H-THD**  **3P-Metric-CB-H-THD** , Hole Series **<M10 Z->**

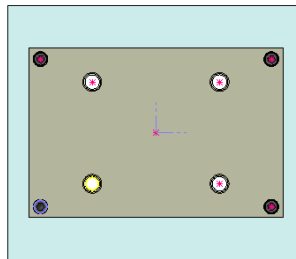


10. Click OK and the holes are created.

11. Insert Socket Head screw in hole with circle. Insert **3DQuickPressV3\Standard Components\Misumi\Socket head Screw\CBxx-xxx.SLDPRT** to Lower die set and set configuration to **CB 10-55** and mate it to 1<sup>st</sup> hole of the die plate. For step by step approach review how guide pin was inserted and mated.

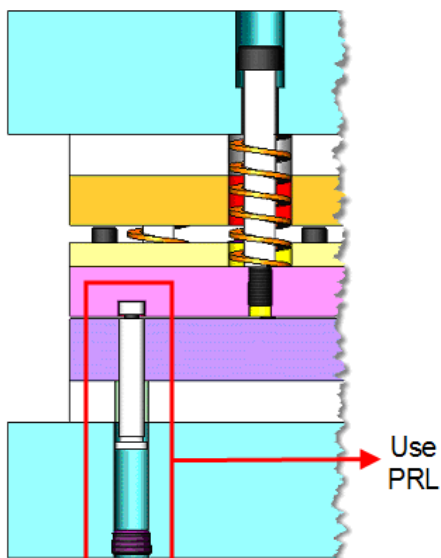


12. Pattern the cap bolt by Feature Driven component pattern



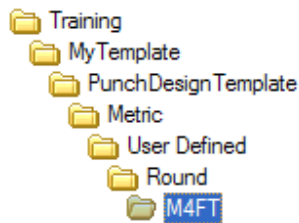
## Conclusion

This is a generic way to insert standard components to a PRL Die set assembly that are driven by a common sketch part.. For other type of tool components which are related to the strip layout--We suggest users to use UDCs (Users defined components) and insert these UDCs (PRLS) to the punch design assembly. For example: ejectors, stock guide lifters, pilots, inserts, die blocks, etc.

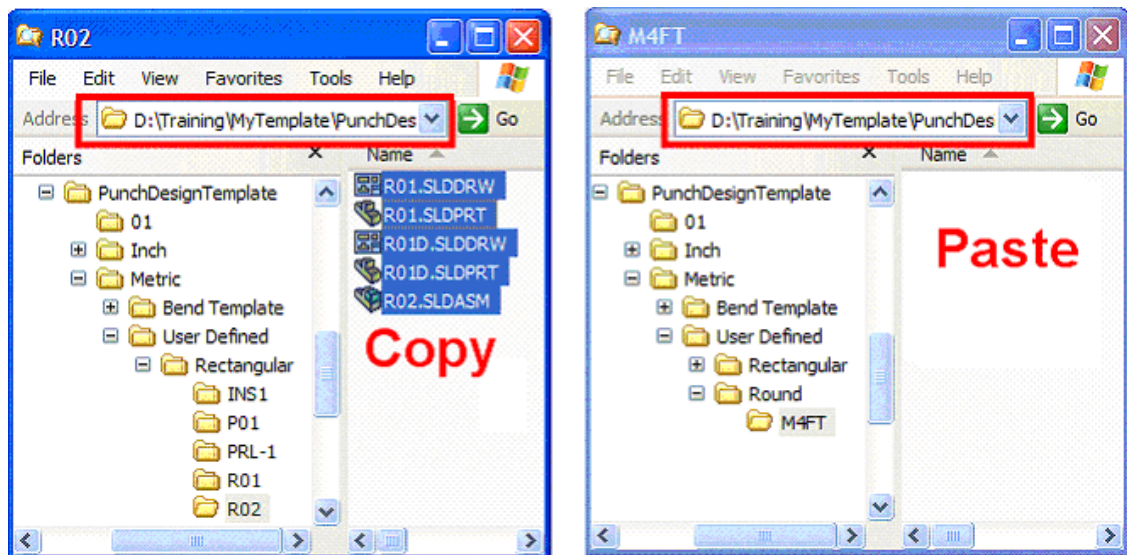


## Tutorial 5. Self Study: Create PRL M4 punch & die

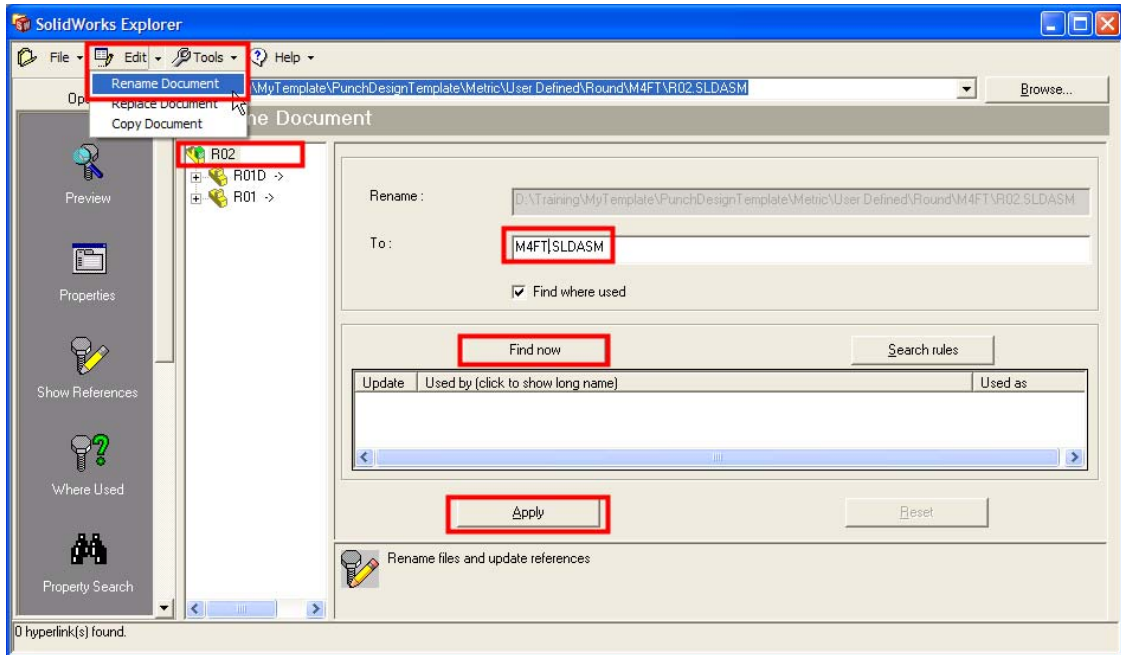
1. Create a new folder \training\My PRL\PunchDesignTemplate\Metric\User Defined\Round\M4FT





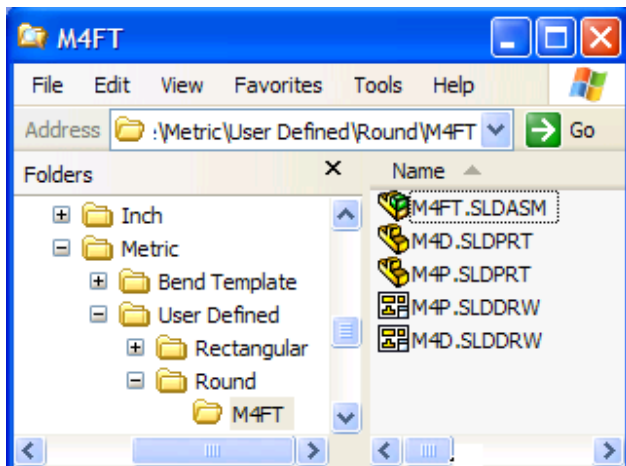
2. Use window explorer to copy files under **R02** folder to folder **M4FT**



3. Launch SolidWorks Explorer.
4. Click **File, Open** in SolidWorks Explorer and select **M4FT/R02.SLDASM**
5. Click **Edit, Rename Document** and click **R02**, input **M4FT.SLDASM** and click **Find now** followed by **Apply**.

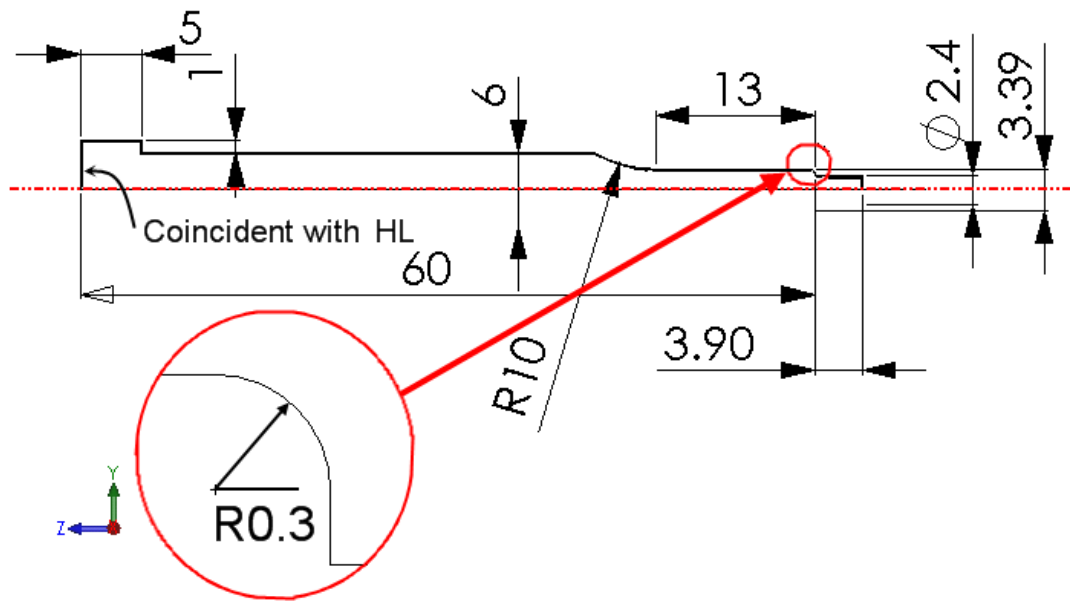


6. Use same technique to rename R01D.SLDPRT to M4D.SLDPRT and R01.SLDPRT to M4P.SLDPRT
7. Click M4FT  and click **Propertes** , inside the **Comment** edit box, input **M4 Forming Tap for 1.2 stock thk**, click **Apply** button to finish
8. Click **File, Open** in SolidWorks Explorer and select drawing **R01D.SLDDRW** to open, rename it to **M4D.SLDDRW**.
9. Repeat last step to rename **R01.SLDDRW** to **M4P.SLDDRW**
10. Now you have all files ready for the M4 Round Extrude for M4 mm thread



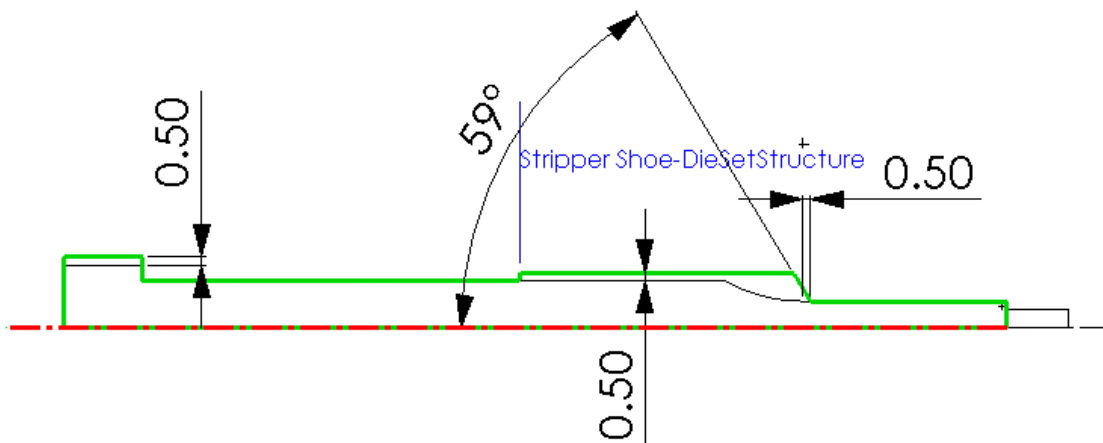
## Create Punch

11. Open M4P.SLDPRT in SolidWorks.
12. Delete all features after HL
13. Create the following sketch in Right Plane the create a Revolve Boss.



## Create Hole body

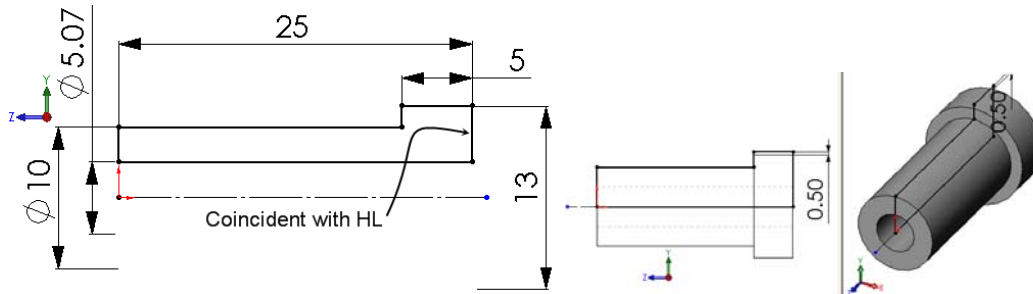
14. Create the following sketch (constraint most entities to the previous sketch) and **Boss, Revolve**, uncheck **Merge**



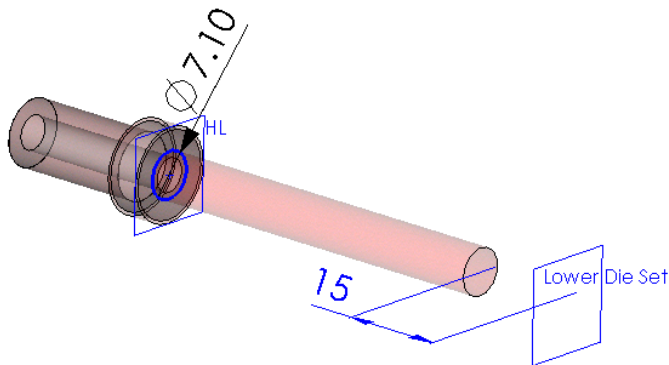
15. Switch to drawing configuration and delete the hole body and then switch back to default configuration.

16. Open M4P.SLDDRW and detail it.

17. Open M4D.SLDPRT and create die button and hole body as below



18. Create another hole body for ejector and spring as below by creating a 7.1 dia. circle on HL and Boss, Extrude it to a distance of 15mm from Lower Die set



19. Switch to Drawing configuration and delete the hole bodies, switch back to Default Configuration and save the file.

20. Open M4D.SLDDRW and detail it.

21. Close all files and open M4FT.SLDASM. Set Lightweight to resolved if necessary to update the graphic to the new design.

**Tutorial End**