

EN1740 Computer Aided Visualization and Design

Spring 2012

3/15/2012

Brian C. P. Burke

Brown University

Last Time:

- Assembly drawings
 - X-sec
 - Exploded
 - Tables
 - BOM
 - Inclusions
- Simplified Reps
- Notes on Critical to Function Drawings
- Modeling text
- Color and Appearance Texture

Tonight:

- Shared data
 - Copied Geometry
 - Component Operations
- Family Tables



Shared Data - Copied Geometry

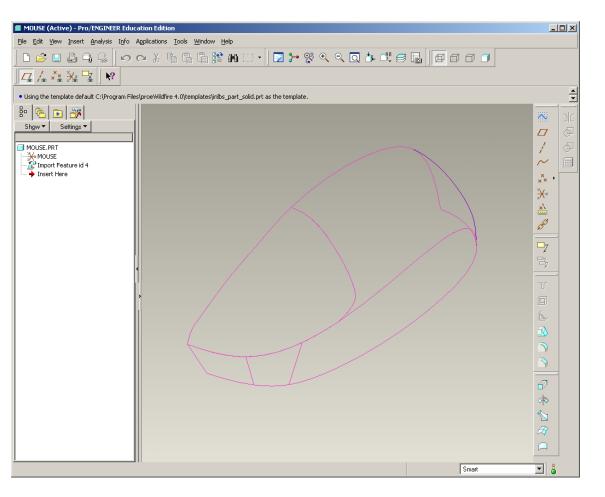
Component and assembly data can be shared among various files

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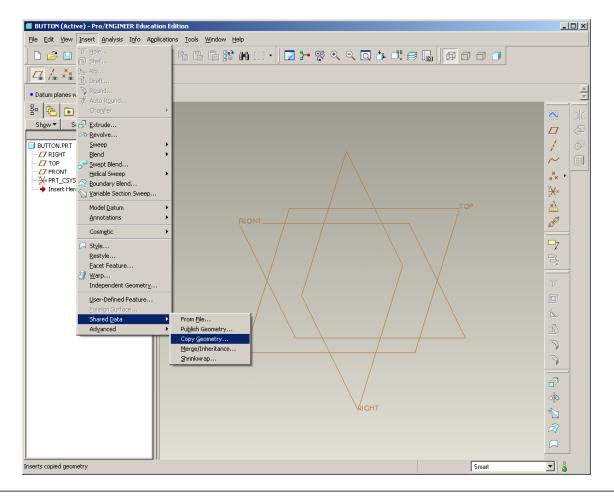


- File > Open
- Select .stp file type
- Select mouse.stp
- File > New > Part > button





- In button.prt
 - Insert > Shared Data
 - > Copy Geometry

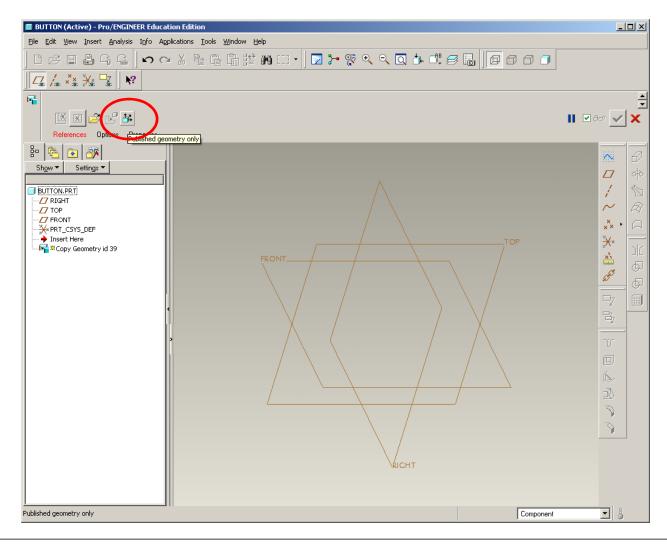


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• Uncheck Published

Geometry only



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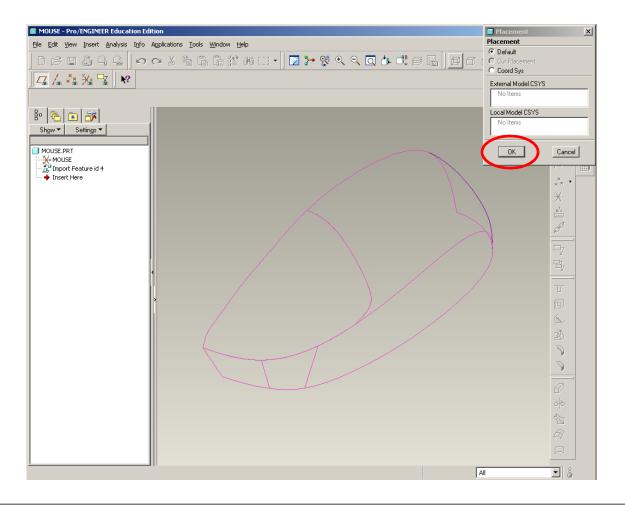


- Select Reference
- From the taskbar, select the Pro/E window with the mouse surface.....

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- ...Click on the outer surface
- Click OK for Default CSYS

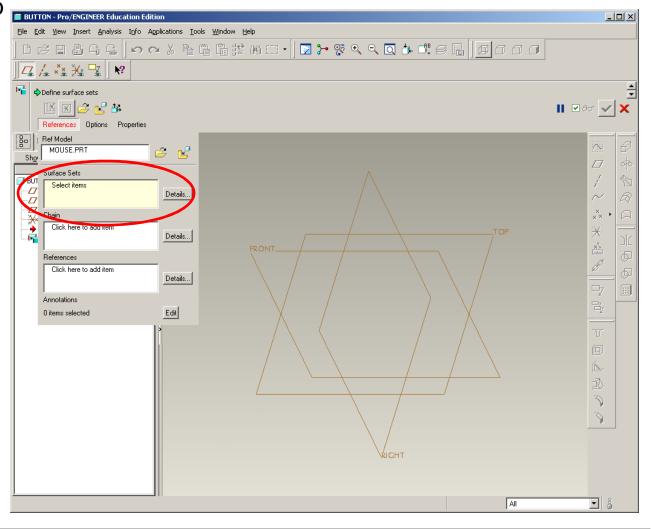




• You'll be directed back to

button.prt

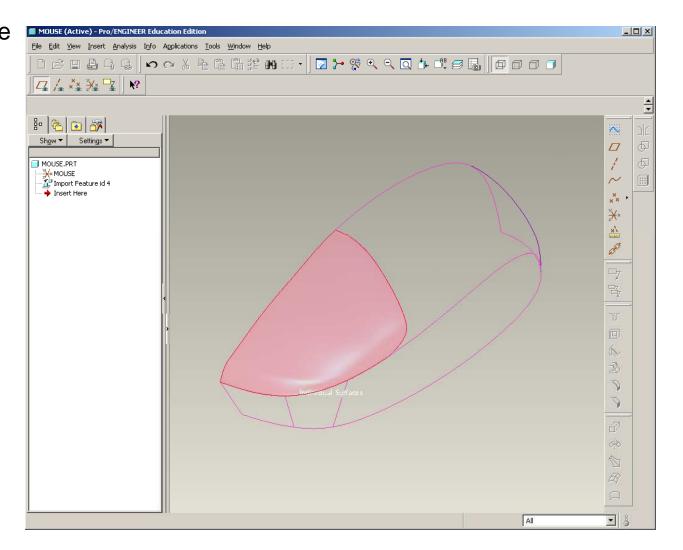
• Select Surface Sets



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- In mouse.prt, select the surface defining the button
- MMB when done



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- This file now is linked to previous file
- Try creating part files
 for the top and bottom of
 the body as well

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Family Tables

- In many cases mechanical components have very similar constructions
- Family Tables can create multiple "instances" of components sharing common features



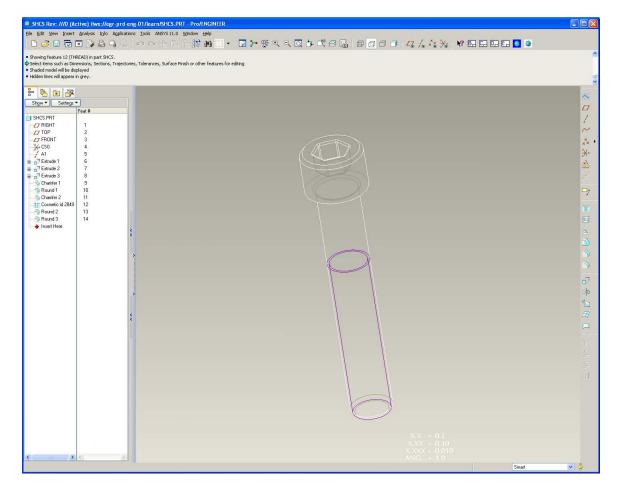
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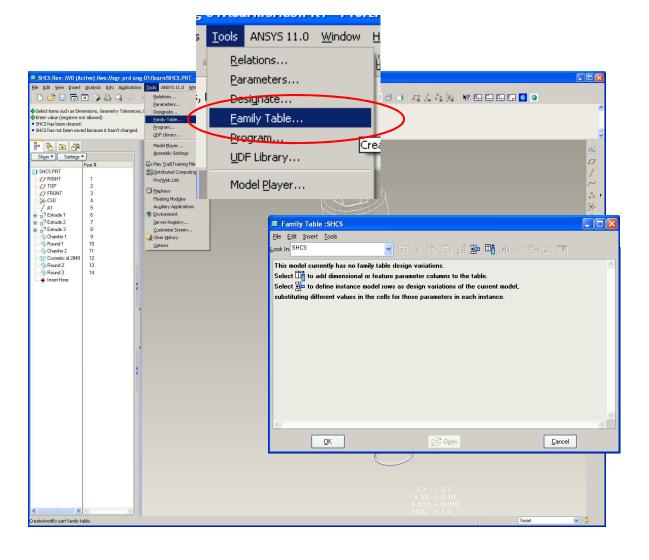


- From the Supporting Materials page download stuff for tonight
- File > Open > shcs.prt





- Tools > Family Table...
- This will launch the Family Table definition dialog





- We will build a table in this dialog that defines the family of components
 - The columns of the table are comprised of the parameters that define the components
 - Each row will be a separate instance of the family, defining a specific set of parameter values

Family Table :SHCS		
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EXERCISE - Family Tables

- Select the "Add/Delete the Table Columns" button on the Family Table dialog box
- Another dialog will launch to select the dimensions we are concerned with

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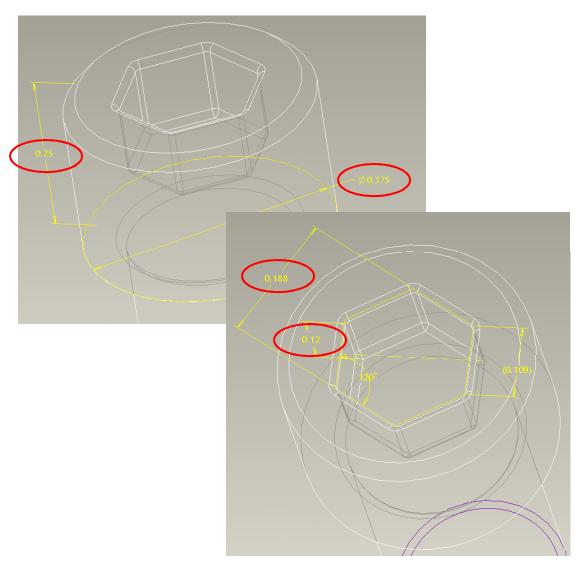
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EXERCISE - Family Tables

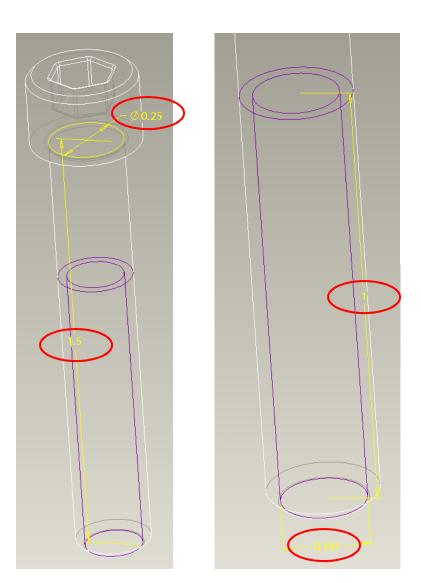
• Select the following dimensions:

- Head height (.250)
- Head diameter (.375)
- Hex width (.188)
- Hex depth (.120)



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- Select the following dimensions:
 - Thread major dia. (.250)
 - Shaft length (1.500)
 - Thread length (1.000)
 - Thread minor dia. (.191)







- Click on OK on the selection dialog
- Take a look at the Family Table dialog to see the dimensions that available

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- Click on the "Insert a new instant at the selected row" button
- Note that a new row is created with blank values
- Name the new instance "P250-20_X_1P500"
 - Be careful that the name is accepted
 - The instance naming standard is very restrictive

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	SHCS	0.250	0.375	0.188	0.120	0.250	1.50	1.00	0.191	
	P250-20_X_1P500	0.250	0.375	0.188	0.120	0.250	1.00	0.50	0.191	

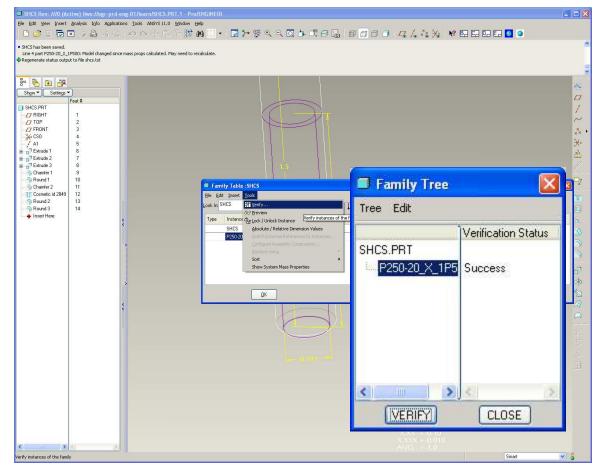


- Click on the "Insert a new instant at the selected row" button
- Note that a new row is created with blank values
- Name the new instance "P250-20_X_1P500"
 - Be careful that the name is accepted
 - The instance naming standard is very restrictive
- Copy all the values from the previous row into the new row

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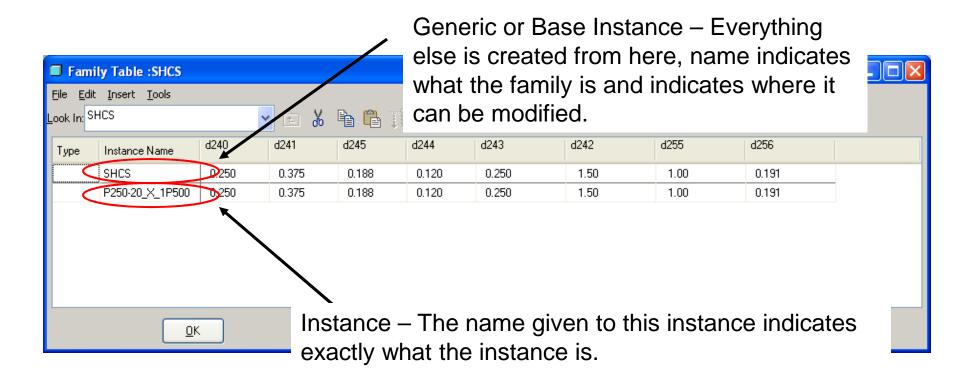


- In Family Table dialog, Tools > Verify
- In Family Tree dialog, Click VERIFY button
 - This step verifies that the model we've just created will regenerate correctly
- Verification Status should appear as "Success"





Why did we just create the same thing again?



NOTE: This isn't necessary, but is a good practice the adds to the clarity of the family



These column headings are not particularly helpful...

- Already there are too many columns to keep track of
- Let's add some clarity to make this more efficient going forward.....

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	P250-20_X_1P500	0.250	0.375	0.188	0.120	0.250	1.50	1.00	0.191	
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Change the name of the key feature dimensions

- Edit the first solid feature (Extrude1)
- Info > Switch Dimensions

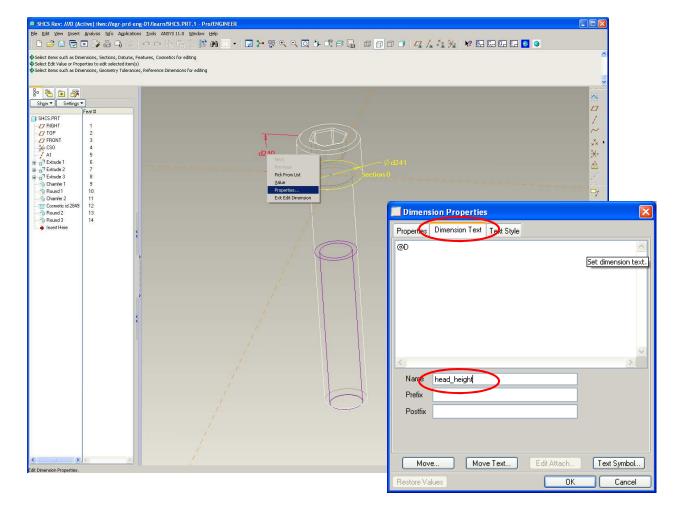
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Select items such as Dimensions, Se	Barent/Child	urface Finish or other features for editing	
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Change the name of the key feature dimensions

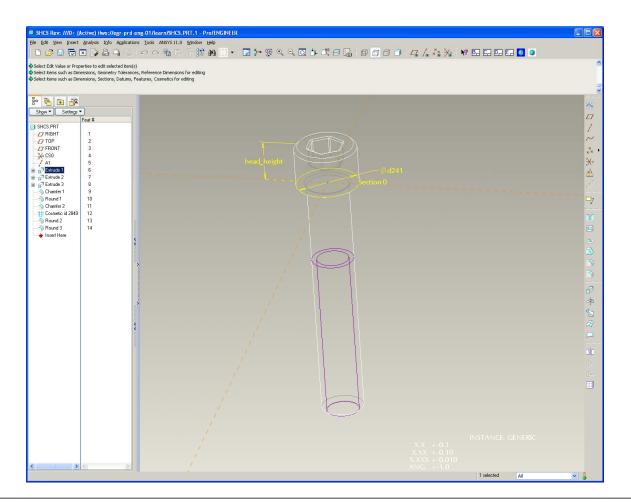
- RMB on head height
- Properties...
- Click Dimension Text tab
- Enter "head_height" in the Name box
- Click OK







- Notice the name of the dimension
- Repeat this process for
 - head_diameter
 - hex_width
 - hex_depth
 - thread_major_dia
 - shaft_length
 - thread_length
 - thread_minor_dia







• Go back and examine the Family Table column headers (much better)

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	SHCS	0.250	0.375	0.188	0.120	0.250	1.50	1.00	0.191	
	P250-20_X_1P500	0.250	0.375	0.188	0.120	0.250	1.50	1.00	0.191	
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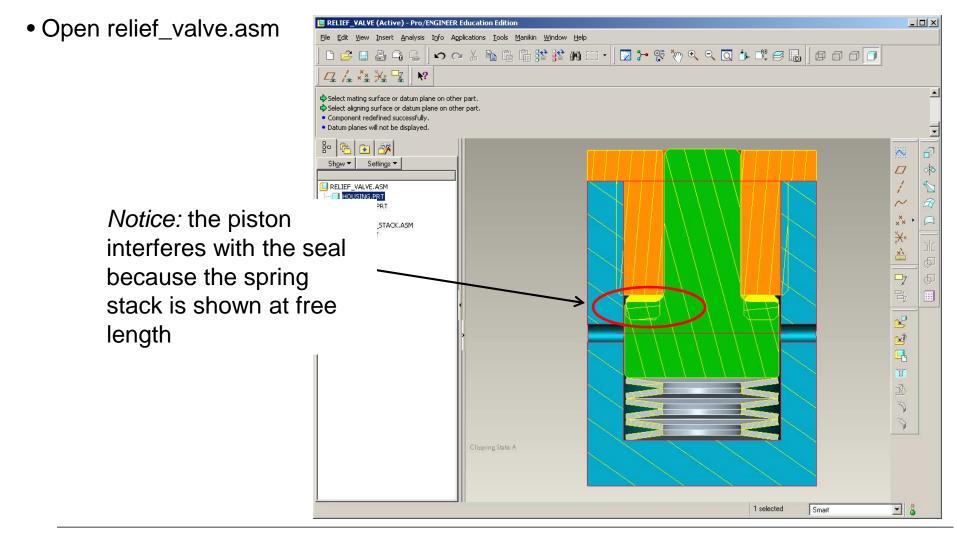


- Create a new instance that has a 1.000 shaft_length and .750 thread_length
- Verify the instance
- Save the model
- Open the new instance

ok In: S	1	d240	d241			M) ඌ ඕ _හ 🗹 d243	d242	d255	d256	
Туре	Instance Name	HEAD_HEI				THREAD_MAJO		THREAD_LENG		
	SHCS	0.250	0.375	0.188	0.120	0.250	1.50	1.00	0.191	
	P250-20_X_1P500	0.250	0.375	0.188	0.120	0.250	1.50	1.00	0.191	
	P250-20_X_1P	0.250	0.375	0.188	0.120	0.250	1.00	0.75	0.191	



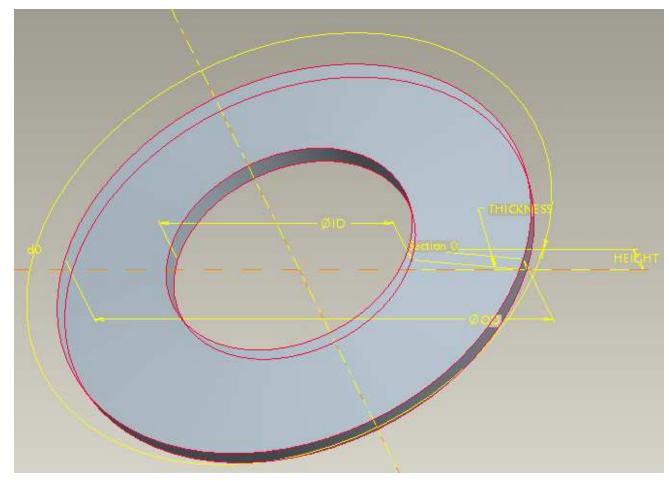
Create a Family Table to show a spring in free, installed and compressed lengths



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- Open belleville.prt
- Rename the following dimensions as we did previously
 - ID
 - OD
 - THICKNESS
 - HEIGHT







- Create a family table
- Selec

Look In:

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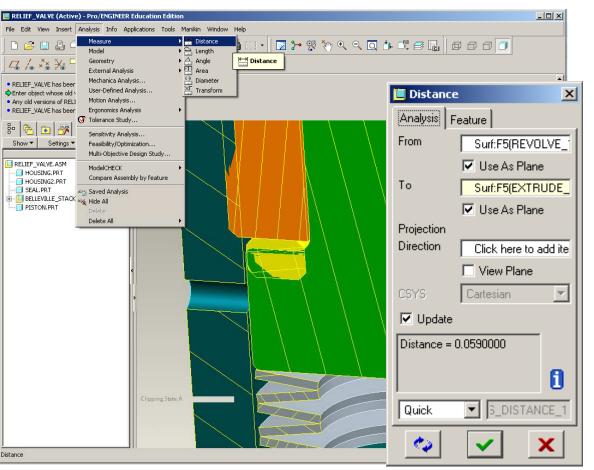
- Go back to the relief_valve.asm
 assembly
- Measure the interference

between the piston and the seal

Analysis > Measure >

Distance

- Select plane on piston
- Select plane on seal
- Note the total interference is .059in



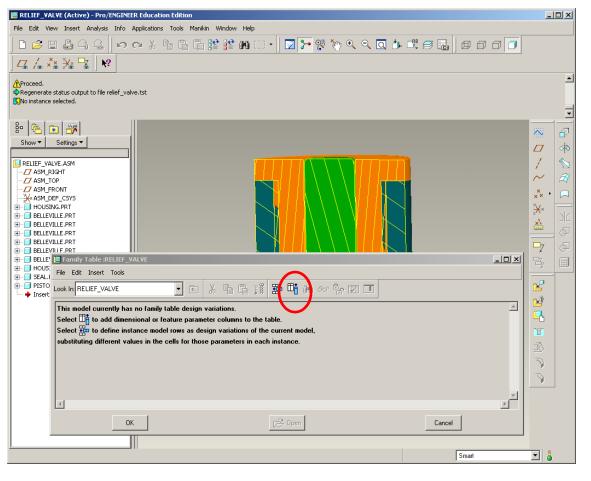


- From the measurement, we need to lower the height of the Bellevilles from .034 to .0242
 - Create a new instance "BLLV_INSTLL"
 - Copy all dimensions, except for the height
 - Change height to .0242
- Verify instance and save part

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Type Instance Name	Common Name	d1 ID	d2 THICKNESS	d3 HEIGHT	d4 OD	
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BLLV_INSTLL	belleville.prt_INST	.255	.018	.0242	.5	
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- Return to the assembly
- Create a Family Table (Tools > Family Table...)
- Begin by adding columns



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- This time in the selection dialog box, check the Component radio button
- Select each Belleville washer
 - When prompted select Single
- Continue until all 6
 Bellevilles are selected

h	Items M439, BELLEVILLE M420, BELLEVILLE M401, BELLEVILLE	Filter Dimension Parameter Feature
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t replacement option.		<u>¥</u> _ =_
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	Cmat V	<u> </u>

Family Items, Generic : RELIEF_VALVE

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• Create a new instance with the add row button

E Family Table :RELIEF_VALVE									
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- Select cell for the first Belleville instance
- Tools > Replace Using > Related model...
- Select the Belleville instance with the reduced height
- Repeat these steps for all 6 Bellevilles

Family Table :RELIEF_VALVE		
Eile Edit Insert Iools Look In: RELIEF_VA Yerify Type Instance Lock / Unlock Instance Absolute / Relative Dimension Values Switch External References to Instances	M439 BELLEVILLE BELLEVILLE Common Folders be	ocuments ▶ proe ▶ inclass ▶ family_table
RELIEF Configure Assembly Components Replace Using Sort Sort Sort Show System Mass Properties	Image: Second product of the second product of th	elevile_s ousing2_s ison.prt elef_valv elef_valv eat.pt fss.pt ison.prt ison.prt ison.prt ison.prt ison.prt ison.prt ison.prt
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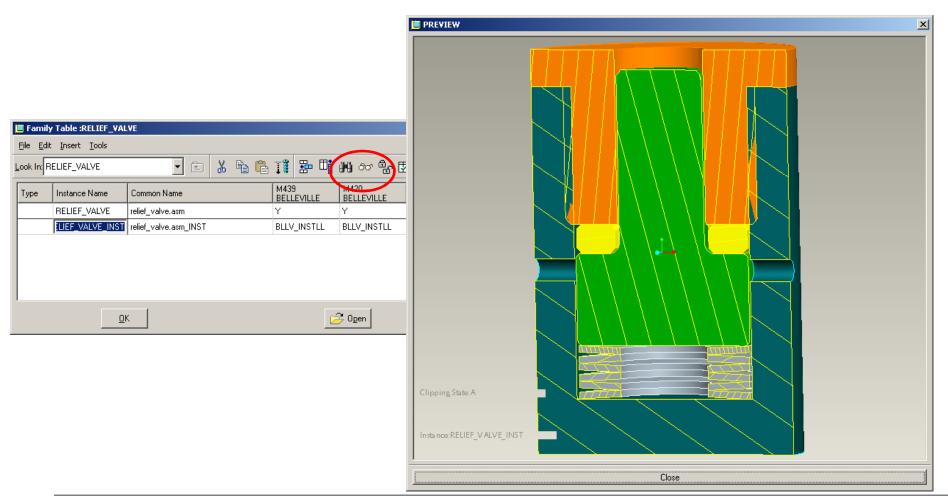


• Once all the Bellevilles are swapped out, Verify the model

E Family Table :RELIEF_VALVE							
<u>File E</u> dit Insert Tools		📒 Family Tree		×			
Look In: RELIEF_VA		Tree Edit					
A	M439 BELLEVII Y BLLV_IN	RELIEF_VALVE.ASN			M382 BELLEVILLE Y BLLV_INSTLL	M381 BELLEVILLE Y BLLV_INSTLL	M362 BELLEVILLE Y BLLV_INSTLL
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• After verifying the model, select Preview and make sure the interference is gone



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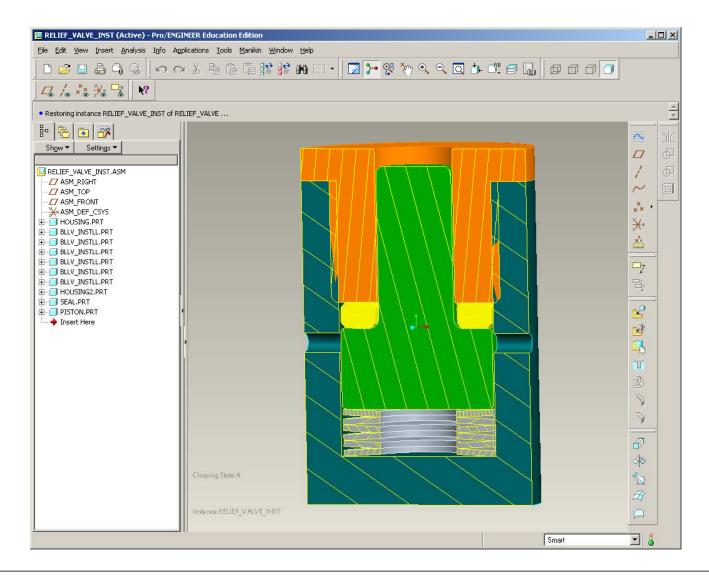
• Save the generic and then open the instance

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📥 🖄 My Documents	housing.prt					
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💼 Manikin Library	🛄 relief_valve_inst <relief_valve>.asm</relief_valve>					
🛃 Favorites	🗐 seal.prt					
	🗐 shos.prt					

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• Done



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