



# QUICK AND DIRTY TRICKS FOR LARGE ASSEMBLY MANAGEMENT

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# “WHO’S PETE HOLLMER?”



# Raytheon

(2005-2016)



(1995-2004)

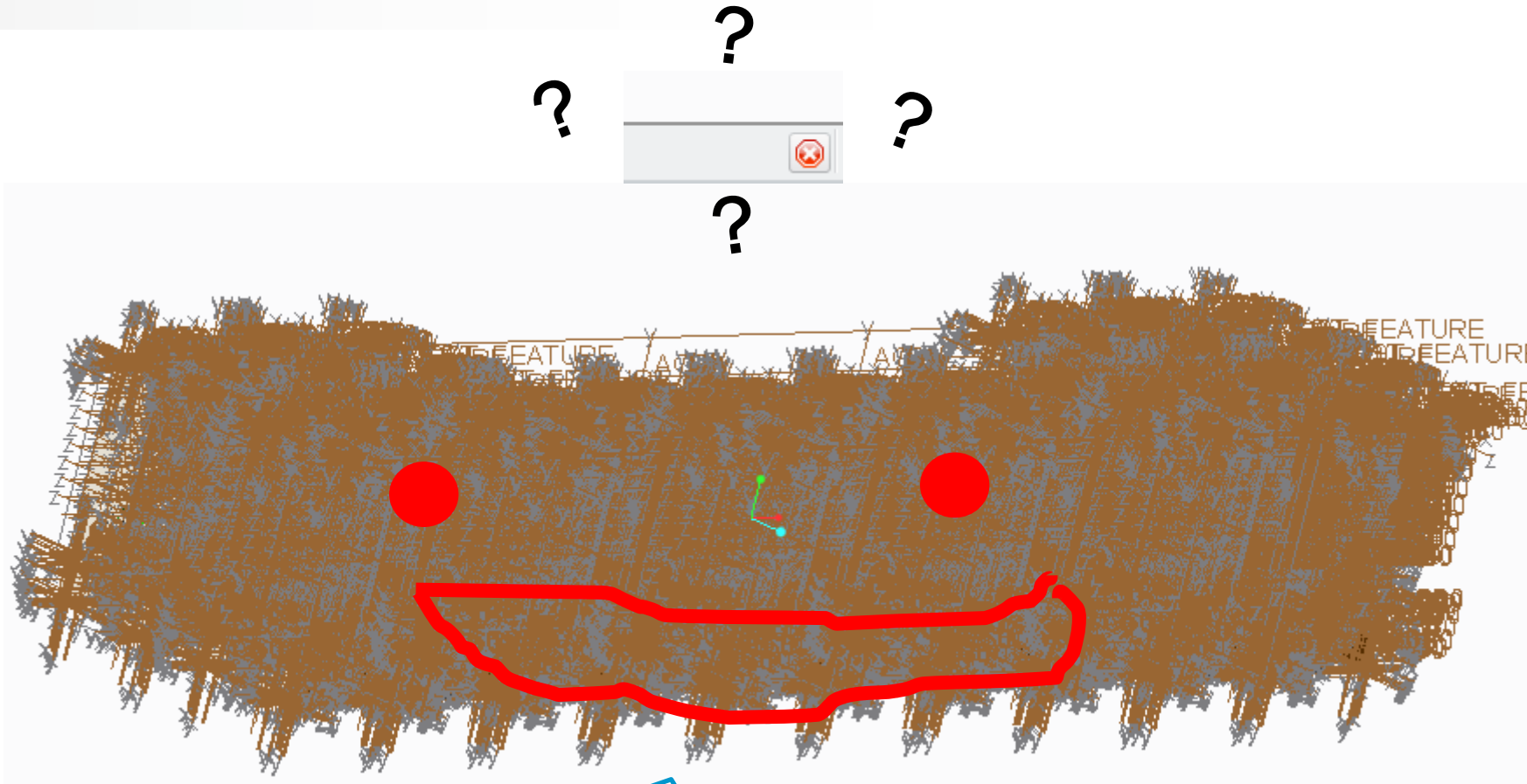


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# THE SITUATION



# “THE BEAST”



HA-Ha! Go get some coffee.

# WHAT'S THE ROOT CAUSE?



- PTC Creo is doing too much math.
- The solution?
  - Make it do less math
    - ..... But how?

# THE FIRST TRICK

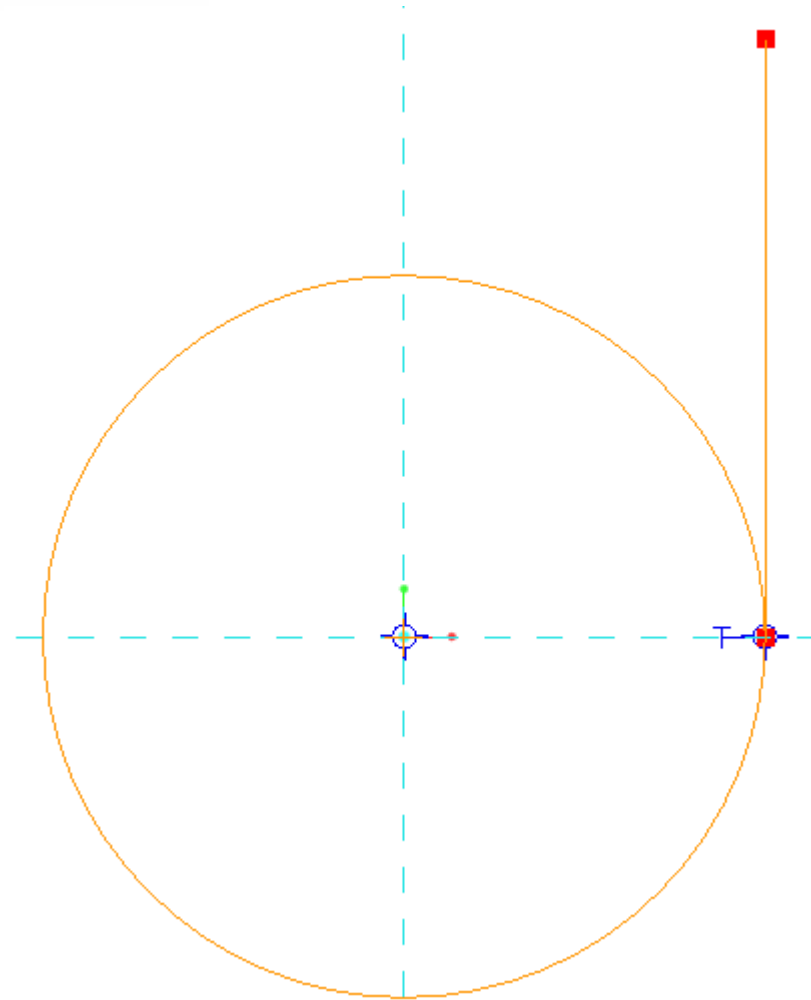


# FOR OUR READING LEISURE ...



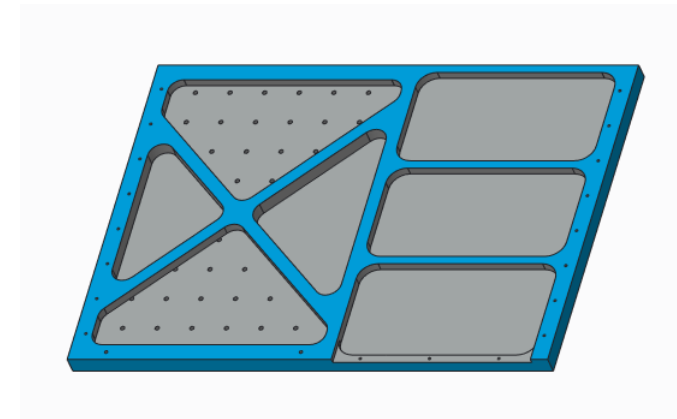
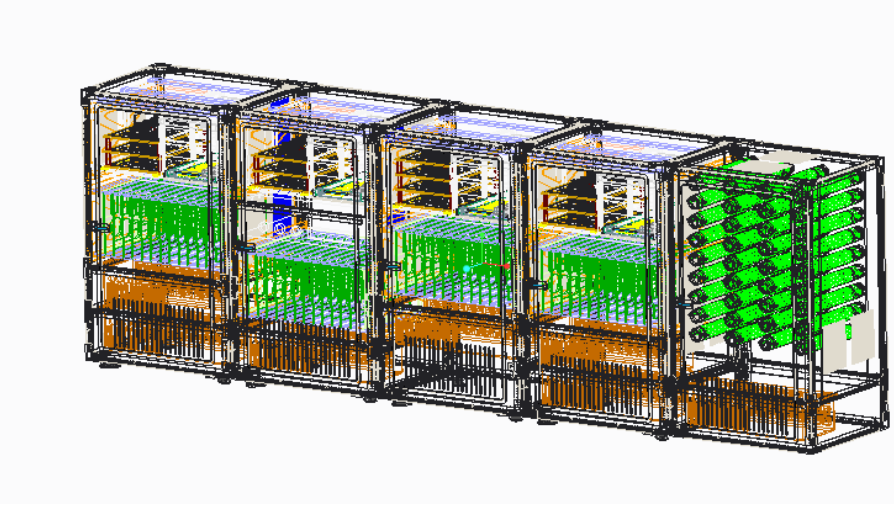
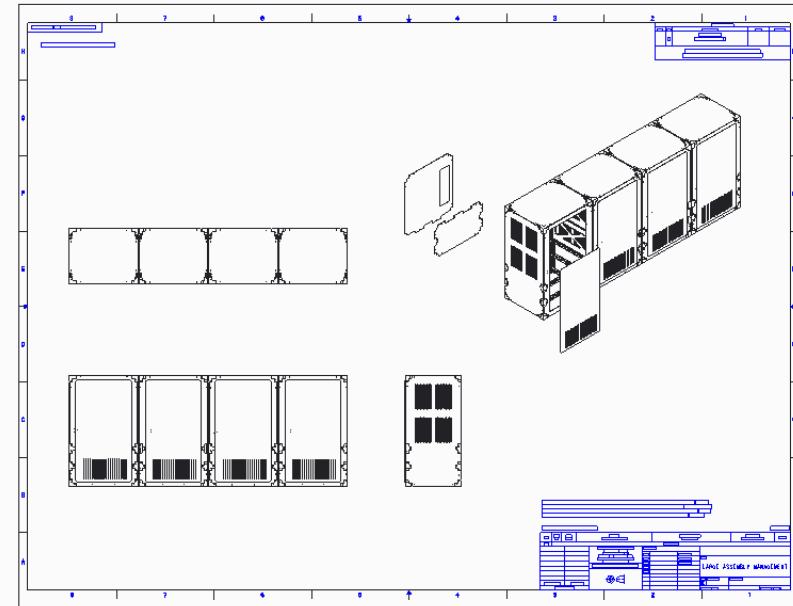
- **CS52452** (How to improve performance for large assembly ...)
- **CS124155** (How to prevent regeneration of models and features upon opening models with PTC Creo Parametric 2.0)
- “Suggested Techniques for Increasing Performance when Working with **Large Assembly Drawings**”
- “Frequently Asked Questions **Large Assembly Management**”
- (find all of these at [www.ptc.com/support...](http://www.ptc.com/support...))

- auto\_regen\_view no
- regen\_simp\_retrieve no
- regen\_int\_mdls\_on\_retr no





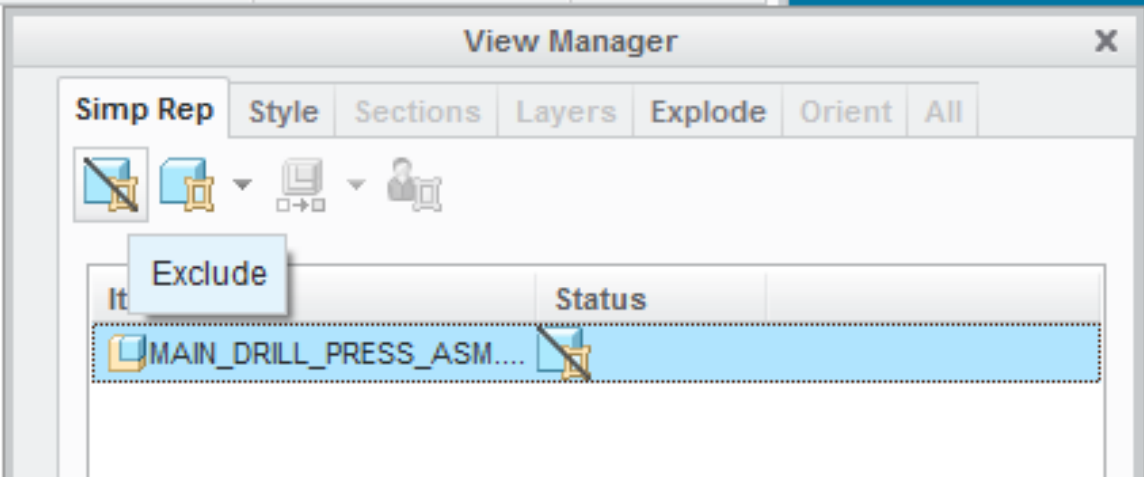
# YOU HAVE TO START SOMEWHERE...



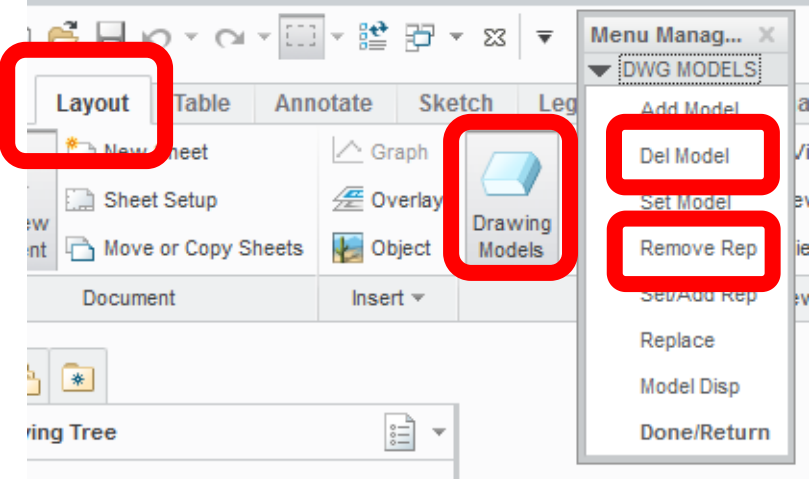
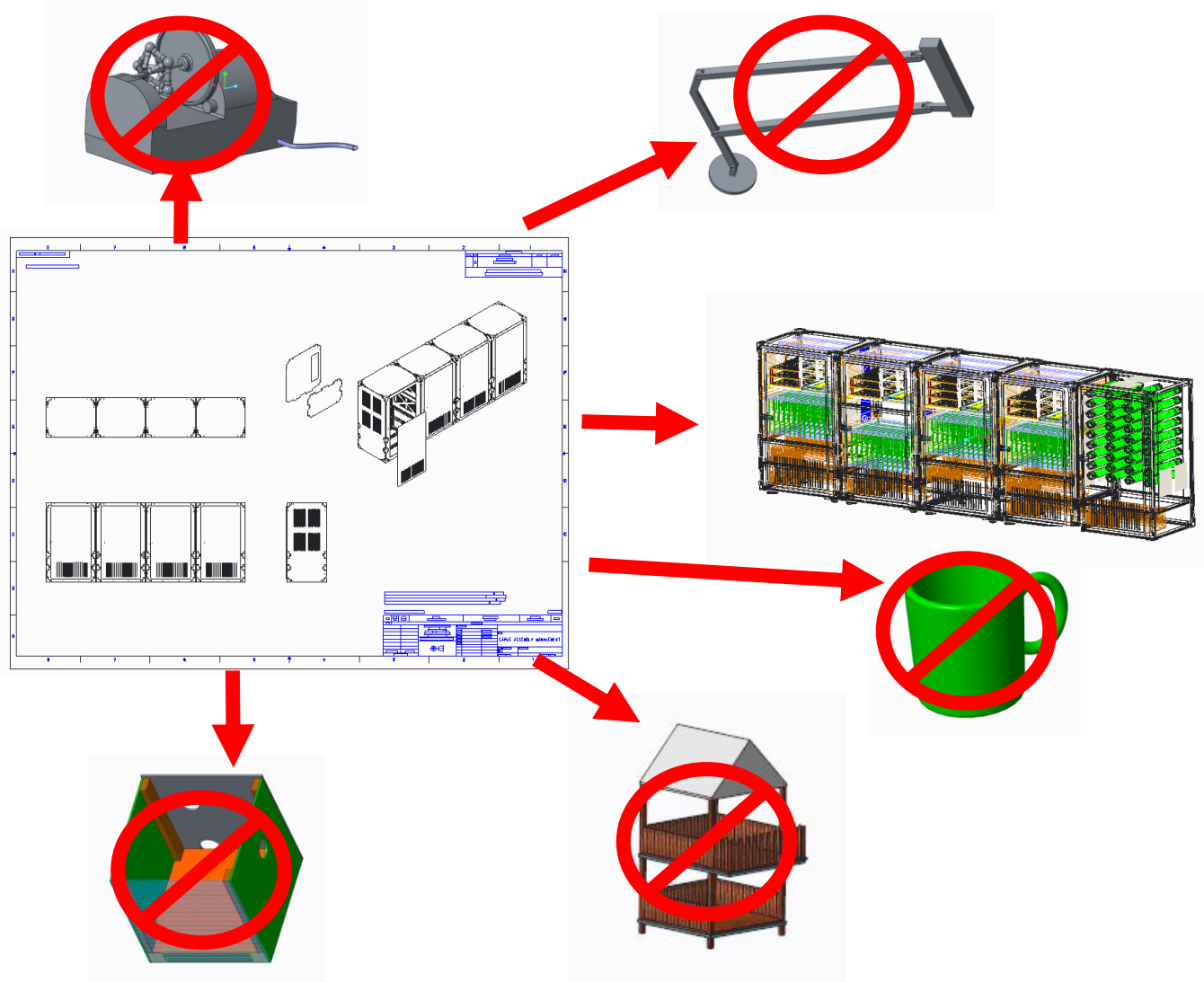
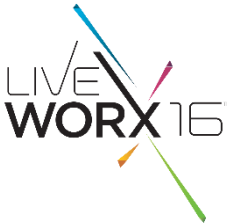
# OVERALL TRICK: THE “EMPTY” REP



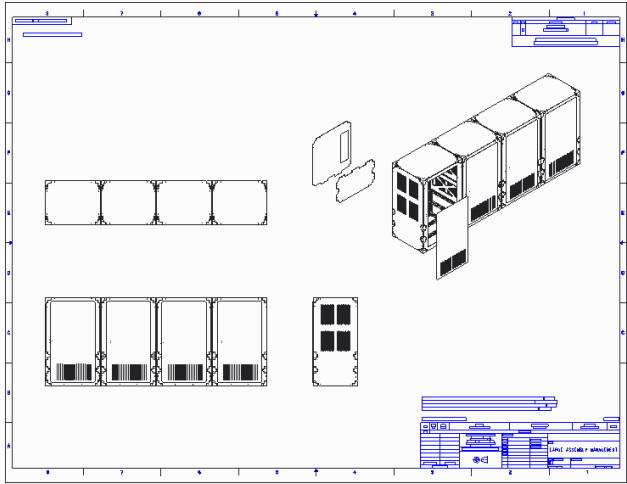
		EMPTY
<input checked="" type="checkbox"/>	MAIN_DRILL_PRESS_ASM.ASM	Exclude
<input type="checkbox"/>	TOP.ASM	Exclude (Derived)
<input type="checkbox"/>	RIGHT_SIDE.ASM	Exclude (Derived)
<input type="checkbox"/>	LEFT_SIDE.ASM	Exclude (Derived)
<input type="checkbox"/>	BACK_PANEL.ASM	Exclude (Derived)
<input type="checkbox"/>	2X4X22.PRT	Exclude (Derived)
<input type="checkbox"/>	2X4X22.PRT	Exclude (Derived)
<input type="checkbox"/>	SHELF.PRT	Exclude (Derived)
<input type="checkbox"/>	SCREEN.PRT	Exclude (Derived)



# DRW TRICK: UNLOAD UNUSED MODELS



# DRW TRICK: DRAFT IT!



work

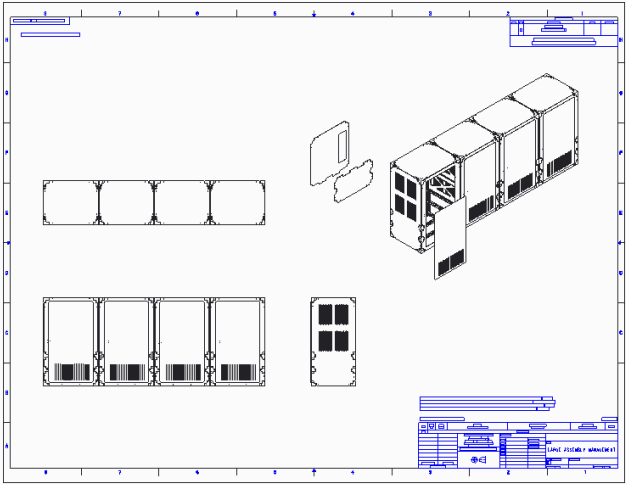
lay

- Convert to Draft Group**
- Erase view
- Resume View
- Move to Sheet
- Show Modified

Edit

Display

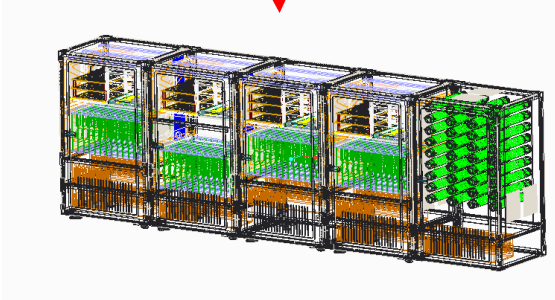
**Convert to Draft Group**  
Convert the selected view into a draft group.



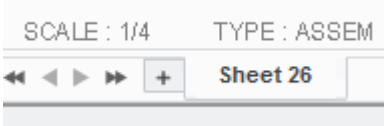
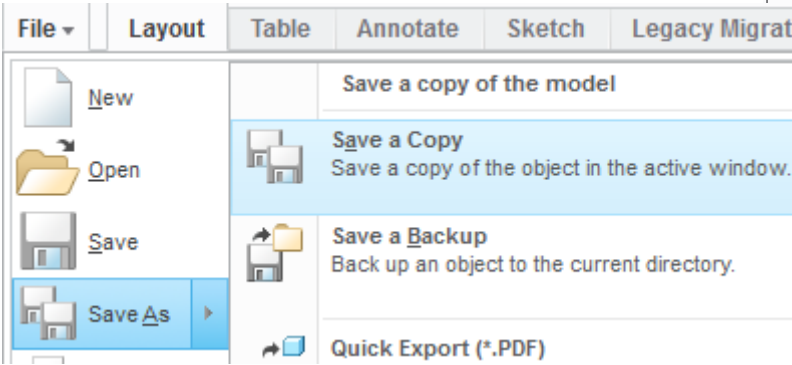
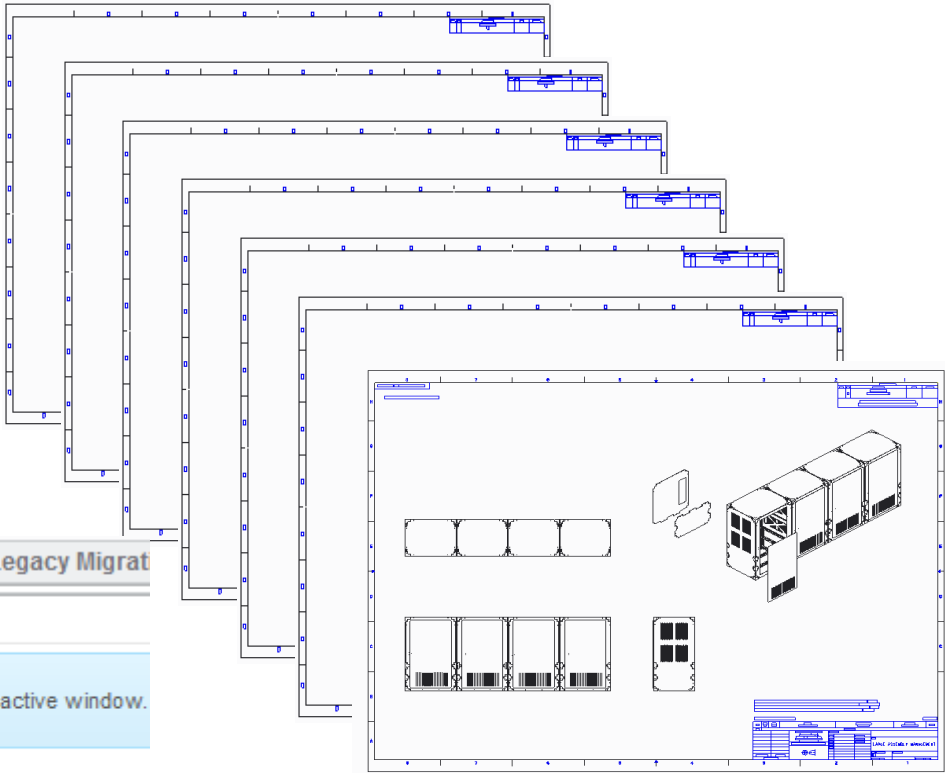
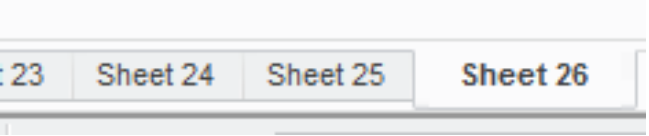
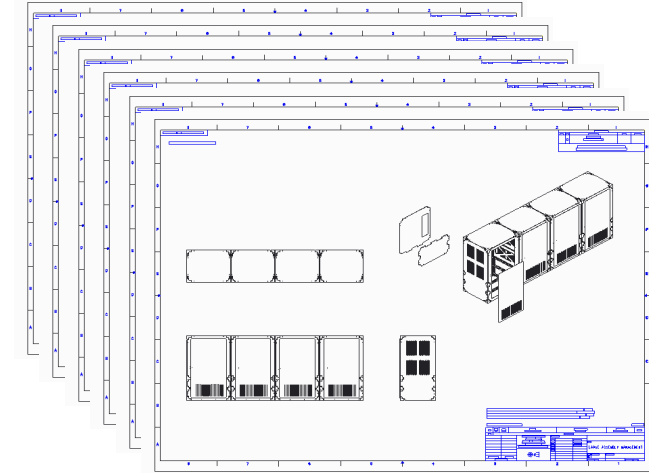
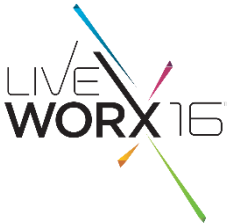
Confirm

? The selected view(s) will be broken up into drafting entities. Do you want to continue?

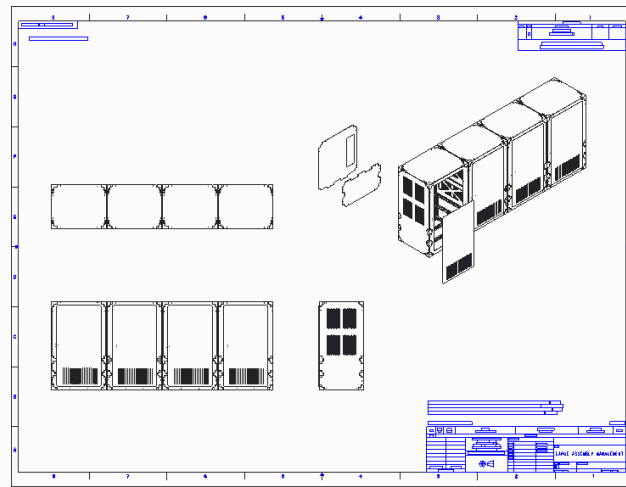
Yes No



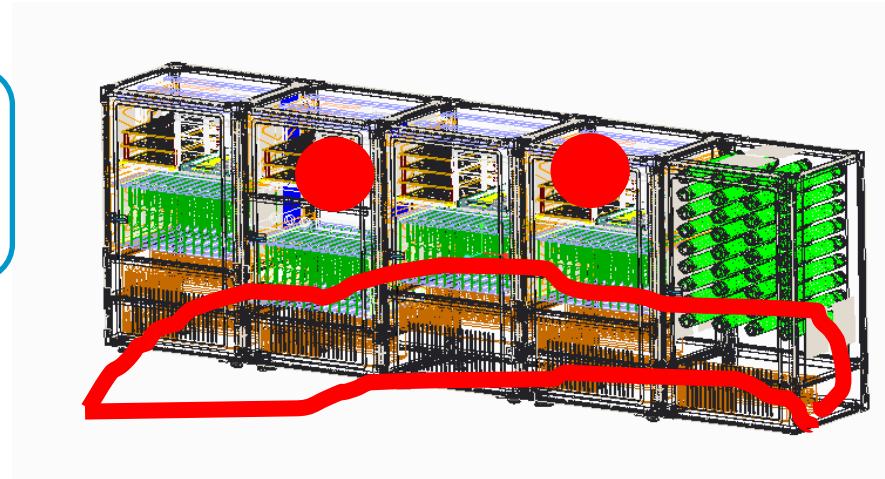
# DRW TRICK: SEPARATE THE SHEETS



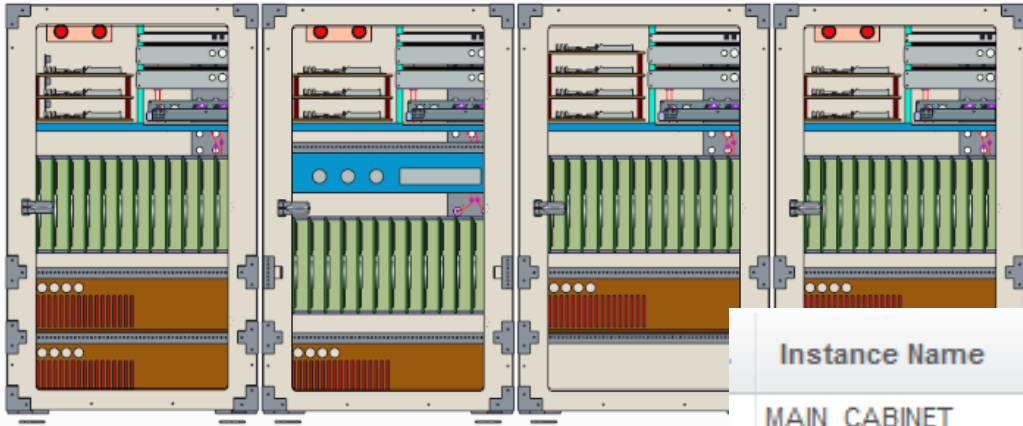
# IT'S NOT THE DRAWING...



It's not me.  
It's you.



# ASM TRICK: INSTANCE? SEVER IT!

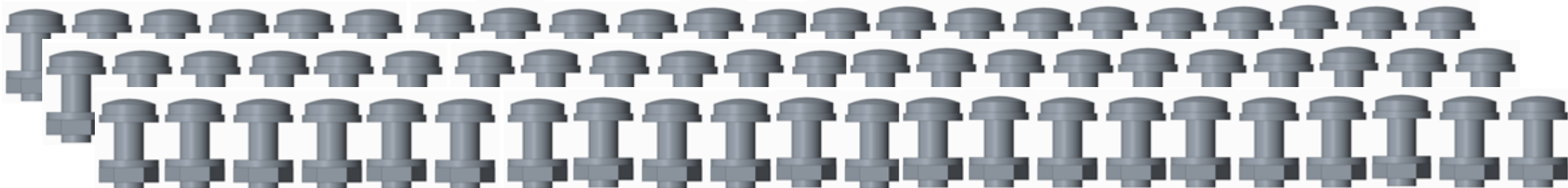
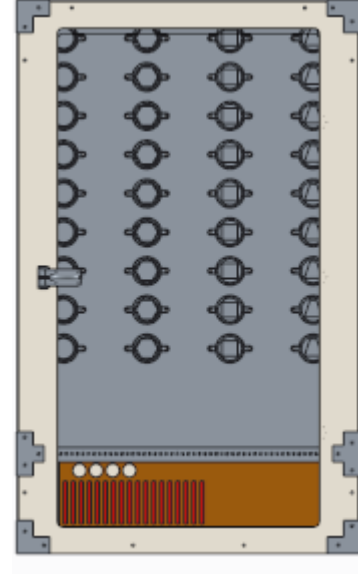
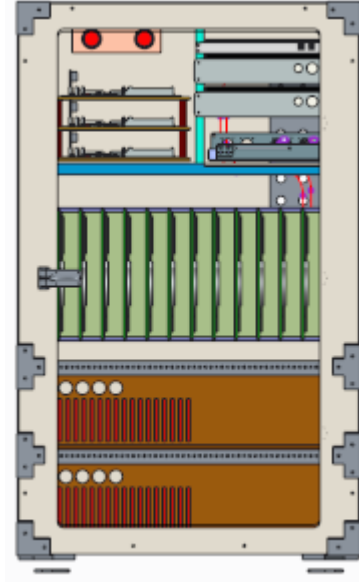
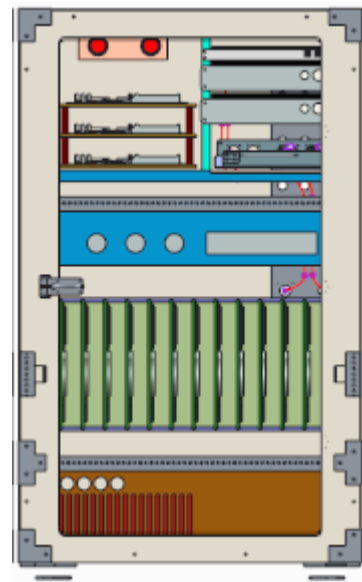
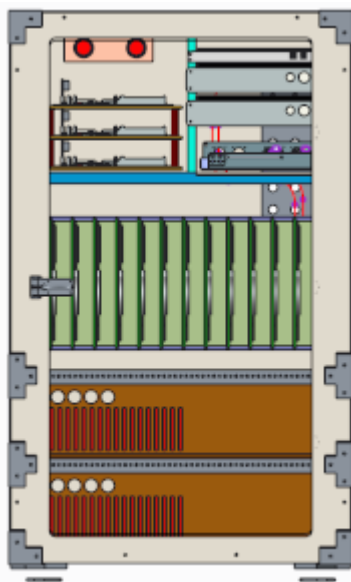
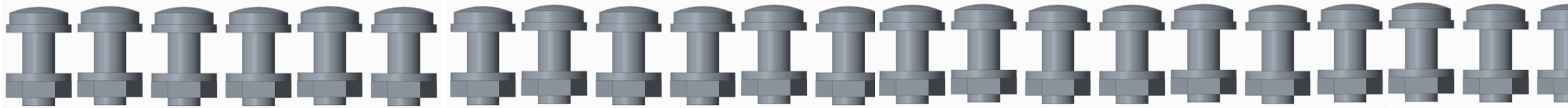
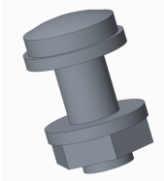


Instance Name	Common Na...	M156 CABINE...	M180 CONNE...	M184 BATTE...	M3874 PDU_2_TEST
MAIN_CABINET		Y	Y	Y	Y
VARIANT_A	Alpha Cabinet	Y	Y	Y	N
VARIANT_B	Beta Cabinet	Y	N	N	N
VARIANT_C	Charlie Cabinet	N	N	N	N

# CS50038

# CS220794

# TRUE STORY: “HOW MANY COLUMNS?”





# ASM TRICK: TOO MANY LAYERS?

- Layers
- COLOR11
- COLOR12
- DAR001
- DAR002
- INTF\_545448
- QUILT
- QUILT01
- QUILT02
- QUILT03
- QUILTS
- QUILT7

Layers

- INTFCLR\_36986
- INTFCLR\_36987
- INTFCLR\_37308
- INTFCLR\_37496
- INTFCLR\_37892
- INTFCLR\_38081
- INTFCLR\_38262
- INTFCLR\_38543
- INTFCLR\_38681
- INTFCLR\_38783
- INTFCLR\_38948
- INTFCLR\_38985
- INTFCLR\_39137
- INTFCLR\_39711
- INTFCLR\_39973
- INTFCLR\_39987
- INTFCLR\_40001
- INTFCLR\_40002
- INTFCLR\_40016
- INTFCLR\_40223
- INTFCLR\_40312
- INTFCLR\_40326
- INTFCLR\_40453
- INTFCLR\_40569
- INTFCLR\_40570
- INTFCLR\_40636
- INTFCLR\_40800
- INTFCLR\_40814
- INTFCLR\_40935
- INTFCLR\_40936
- INTFCLR\_40937
- INTFCLR\_41309
- INTFCLR\_41711
- INTFCLR\_42159
- INTFCLR\_42531
- INTFCLR\_43546
- INTFCLR\_43734
- INTFCLR\_44099
- INTFCLR\_44159
- INTFCLR\_44563
- INTFCLR\_45072
- INTFCLR\_45100

- 
- Layers
- INTFCLR\_39711
  - INTFCLR\_39973
  - INTFCLR\_39987
  - INTFCLR\_40002
  - INTFCLR\_40016
  - INTFCLR\_40223
  - INTFCLR\_40312
  - INTFCLR\_40326
  - INTFCLR\_40453
  - INTFCLR\_40569
  - INTFCLR\_40570
  - INTFCLR\_40636
  - INTFCLR\_40800
  - INTFCLR\_40814
  - INTFCLR\_40935
  - INTFCLR\_40936
  - INTFCLR\_40937
  - INTFCLR\_41309
  - INTFCLR\_41711
  - INTFCLR\_42159
  - INTFCLR\_42531
  - INTFCLR\_43546
  - INTFCLR\_43734
  - INTFCLR\_44099
  - INTFCLR\_44159
  - INTFCLR\_44563
  - INTFCLR\_45072
  - INTFCLR\_45100

Layers

- INTFCLR\_39711
- INTFCLR\_39973
- INTFCLR\_39987
- INTFCLR\_40002
- INTFCLR\_40016
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- INTFCLR\_43734
- INTFCLR\_44099
- INTFCLR\_44159
- INTFCLR\_44563
- INTFCLR\_45072
- INTFCLR\_45100

- Unhide
- Hide
- Activate
- Deactivate
- New Layer...
- Copy Layer
- Paste Layer
- Delete Layer
- Rename
- Layer Properties...
- Cut Item

# ASM TRICK: FOLLOW THE TRAIL (FILE)

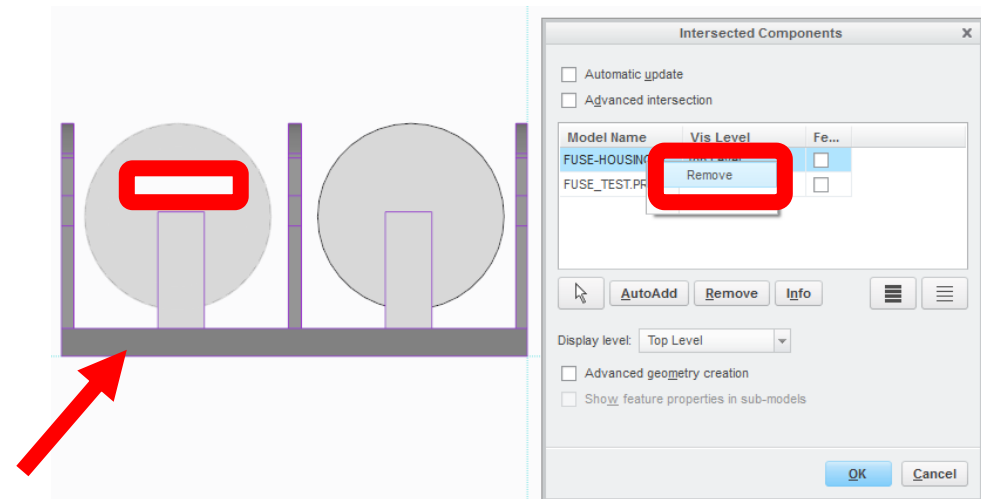
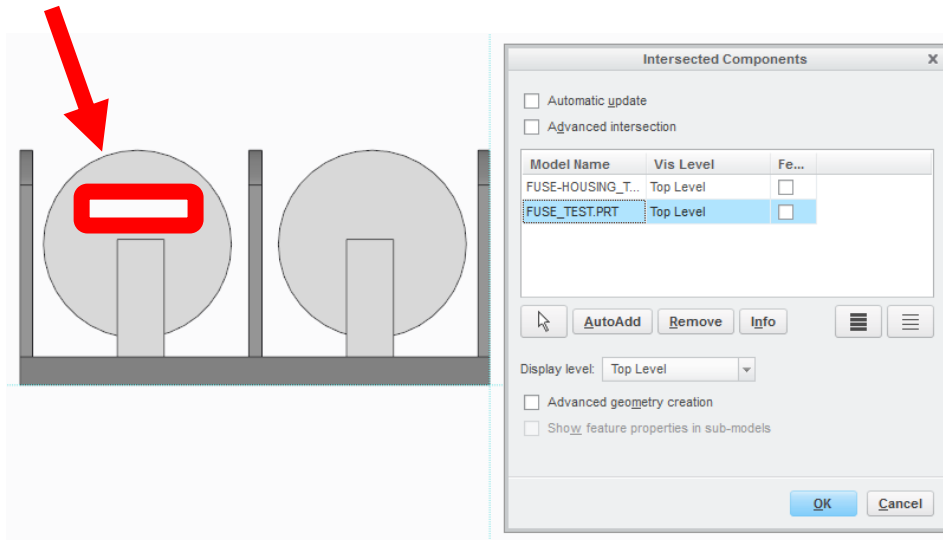
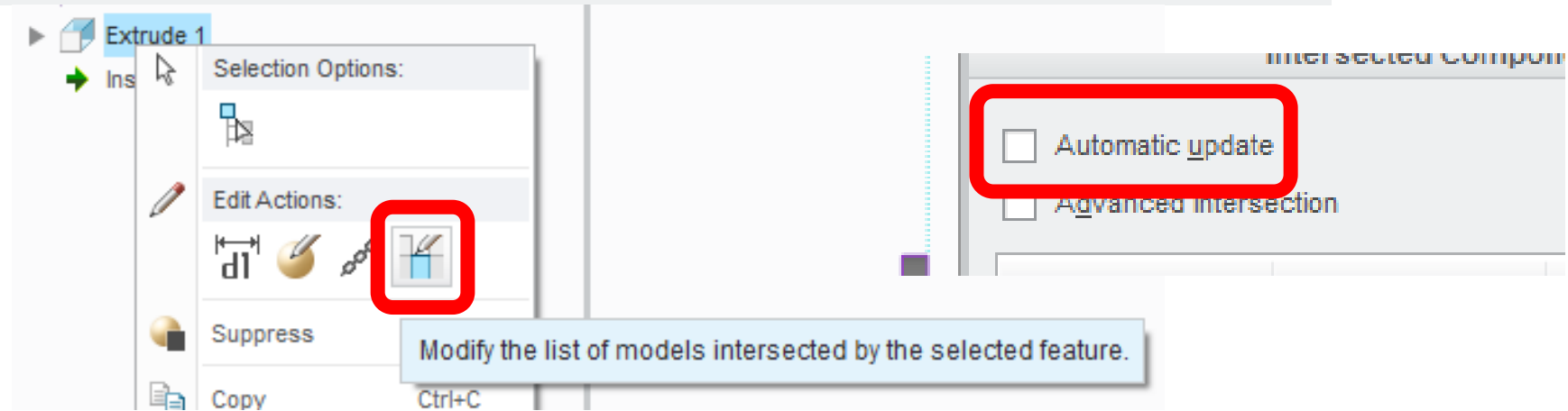


```
!%CPselect start point.  
!%CIwhen a constraint is active, right click to cycle through lock/disable/enable the constraint.  
Use Tab key to toggle active constraint. Press and hold shift to disable snapping to new  
constraints.  
~ Enter `main_dlg_cur` `proe_win` 9 355 96 0 1536 1323 804 1680 1050 69513  
~ Move `main_dlg_cur` `proe_win` 9 355 96 0 0 1323 804 1680 1050 69513  
0.178347 0.741954 N 0 0.952888889 0  
~ LButtonArm `main_dlg_cur` `proe_win` 9 781 397 0 1 1323 804 1680 1050 71167  
** 0.625408 0.504975 0 1 1  
0.625408 0.426073 L 0 0.952888889 0  
@ sel view 0  
1.327015 0.000000 0.000000 -0.000000 1.327015 0.000000  
0.000000 0.000000 1.327015 500.000000 421.875000 -2338.268590 1.000000 0.000000 0  
!%CPselect end point.  
!%CIwhen a constraint is active, right click to cycle through lock/disable/enable the constraint.  
Use Tab key to toggle active constraint. Press and hold shift to disable snapping to new  
constraints.  
~ LButtonDisarm `main_dlg_cur` `proe_win` 9 781 397 0 0 1323 804 1680 1050 71276  
0.625408 0.426073 N 0 0.952888889 0  
~ LButtonArm `main_dlg_cur` `proe_win` 9 768 210 0 1 1323 804 1680 1050 75638  
** 0.611765 0.737562 0 1 1  
0.611765 0.622318 L 0 0.952888889 0  
@ sel view 0  
.....
```

- COUNTIF(range, “\*Error\*”)
- COUNTIF(range, “\*Warning\*”)
- COUNTIF(range, “\*Varied Item\*”)
- COUNTIF(range, “\*Multiple Harness\*”)

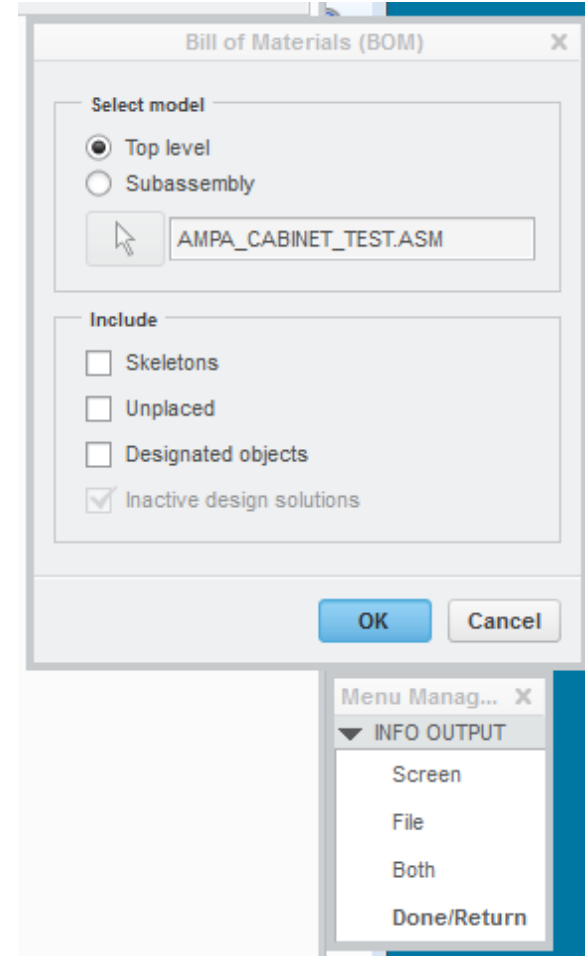
# ASM TRICK: REMOVE UNUSED INTERSECTIONS

WARNING: ASSEMBLY CUT is entirely outside the model; model unchanged.



# ASM TRICK: USE BOM TO FIND THE MOST PARTS

- BOM will show only models in rep, in session
- Found on both the Model and Tools Tab
- (set config.pro “info\_output\_mode choose”)



```

Assembly MAIN_CABINET contains:
  1 Sub-Assembly CABINET_FRAME_TEST
  1 Sub-Assembly PDU_TEST
  1 Sub-Assembly CARD_CAGE_2_TEST
  1 Sub-Assembly CONNECTOR_PANEL_TEST
  2 Sub-Assembly BATTERY_TEST
  1 Sub-Assembly CABINET_CABLES_TEST

Sub-Assembly CABINET_FRAME_TEST contains:
  1 Sub-Assembly FRAME_DLP_TEST
  4 Part CC_ADAPTER_TEST
  1 Part PANEL_TOP_BOTTOM_A_TEST
  2 Part SIDE_PANEL_A_TEST
  1 Part REAR_UPPER_PANEL_TEST
  1 Part REAR_LOWER_PANEL_TEST
  1 Sub-Assembly FRONT_PANEL_DOOR_TEST
  
```

# SIDE TRICK: MAKE A CSV



Assembly MAIN\_CABINET contains:

- 1 Sub-Assembly CABINET\_FRAME\_TEST
- 1 Sub-Assembly PDU\_TEST
- 1 Sub-Assembly CARD\_CAGE\_2\_TEST
- 1 Sub-Assembly CONNECTOR\_PANEL\_TEST
- 2 Sub-Assembly BATTERY\_TEST
- 1 Sub-Assembly CABINET\_CABLES\_TEST

Assembly,MAIN\_CABINET,contains:

- ,,,,1,Sub-Assembly,,CABINET\_FRAME\_TEST
- ,,,,1,Sub-Assembly,,PDU\_TEST
- ,,,,1,Sub-Assembly,,CARD\_CAGE\_2\_TEST
- ,,,,1,Sub-Assembly,,CONNECTOR\_PANEL\_TEST
- ,,,,2,Sub-Assembly,,BATTERY\_TEST
- ,,,,1,Sub-Assembly,,CABINET\_CABLES\_TEST

Assembly,MAIN\_CABINET,contains:

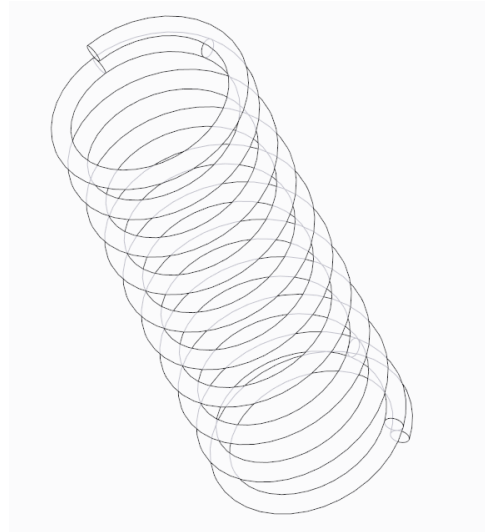
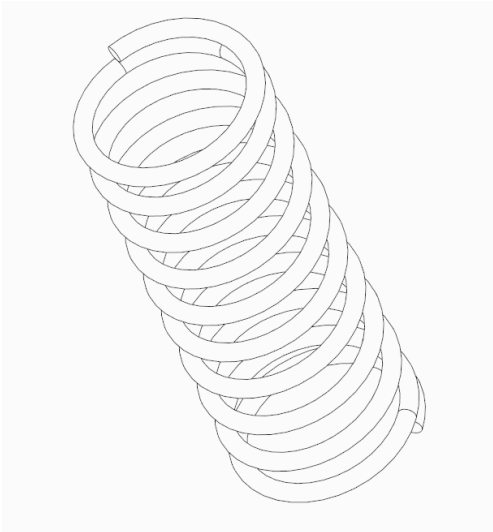
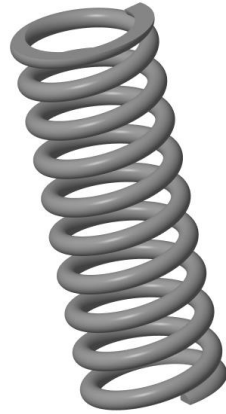
- ,1,Sub-Assembly,CABINET\_FRAME\_TEST
- ,1,Sub-Assembly,PDU\_TEST
- ,1,Sub-Assembly,CARD\_CAGE\_2\_TEST
- ,1,Sub-Assembly,CONNECTOR\_PANEL\_TEST
- ,2,Sub-Assembly,BATTERY\_TEST
- ,1,Sub-Assembly,CABINET\_CABLES\_TEST

	parts	for	assembly	MAIN_CABINET
	8 Part	CORNER_BRACKET_B_TEST		
	8 Part	EDGE_RUNNER_56_B_TEST		
	4 Part	EDGE_RUNNER_94_B_TEST		
	8 Part	EDGE_RUNNER_44_B_TEST		
	8 Part	TEE_BRACKET_B_TEST		
	208 Part	MS_ENG_WASH_05_DIA_A_TEST		
	104 Part	MS_ENG_NUT_05_DIA_A_TEST		
	96 Part	MS_EN_SCREW_05_1250_A_TEST		

	parts	for	
	208 Part	MS_ENG_WASH_05_DIA_A_TEST	
	104 Part	MS_ENG_NUT_05_DIA_A_TEST	
	96 Part	MS_EN_SCREW_05_1250_A_TEST	
	72 Part	MS15795-817B	
	36 Part	NUT_LAMTEST	
	36 Part	BOLT_LAMTEST	
	26 Part	MS DOORHINGESCREW TEST	

# TRUE STORY: "IT'S NOT A COMPLICATED PART..."

1200 x



Rule Actions

Rep Action	Condition
Exclude	COND01

Rule Editor:1

Look for: Solid Model    Look in: AMPA\_CABINET\_TEST.ASM

Look by: Solid Model     Include submodels

Attributes    History    Status    Geometry

Rule

- Name
- Type
- Expression
- Size
- Description
- Property

Criteria

Comparison: is equal to

Value: spring\_part\_name\*

Query Builder

Rule Description

```
( Name == Spring_Part_Name* )
```

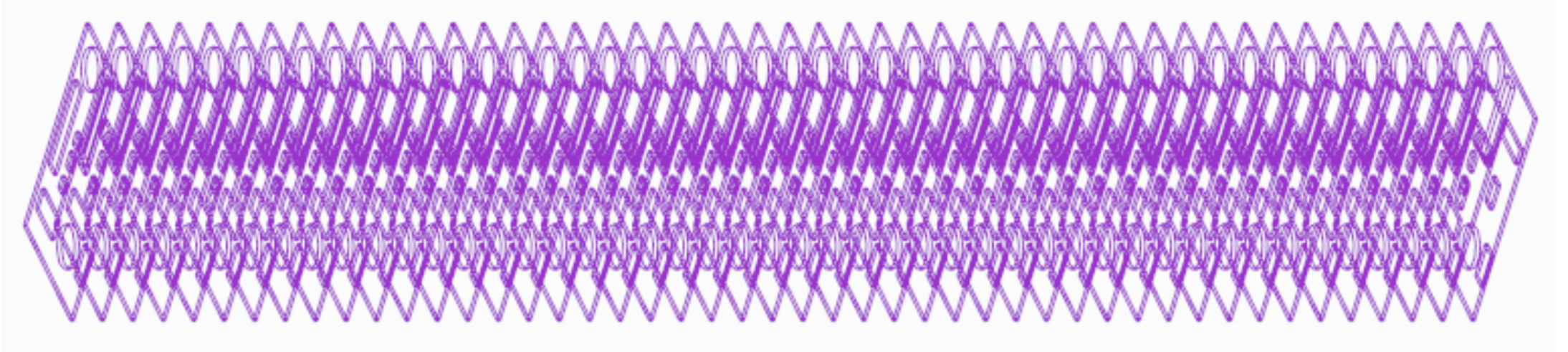
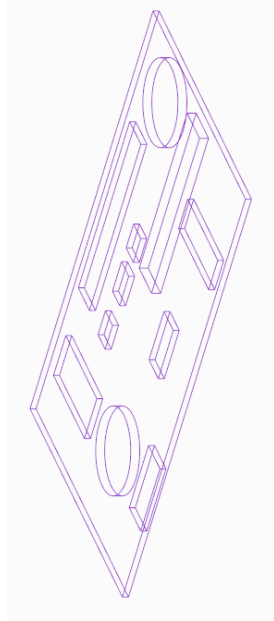
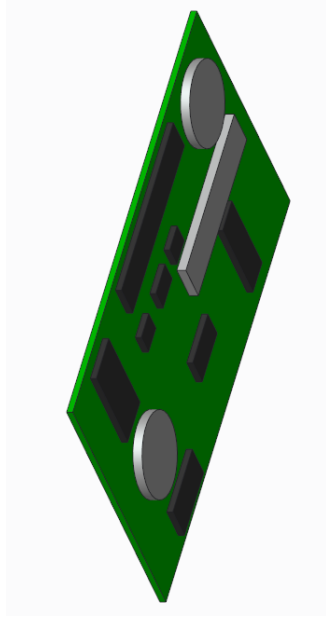
Add New    Remove    Update    ↑    ↓

Preview Results    New Rule    Options

OK    Cancel



# TRUE STORY: “SHRINKWRAPS ARE FASTER, RIGHT?”



# BACK TO THE TRAIL FILE...

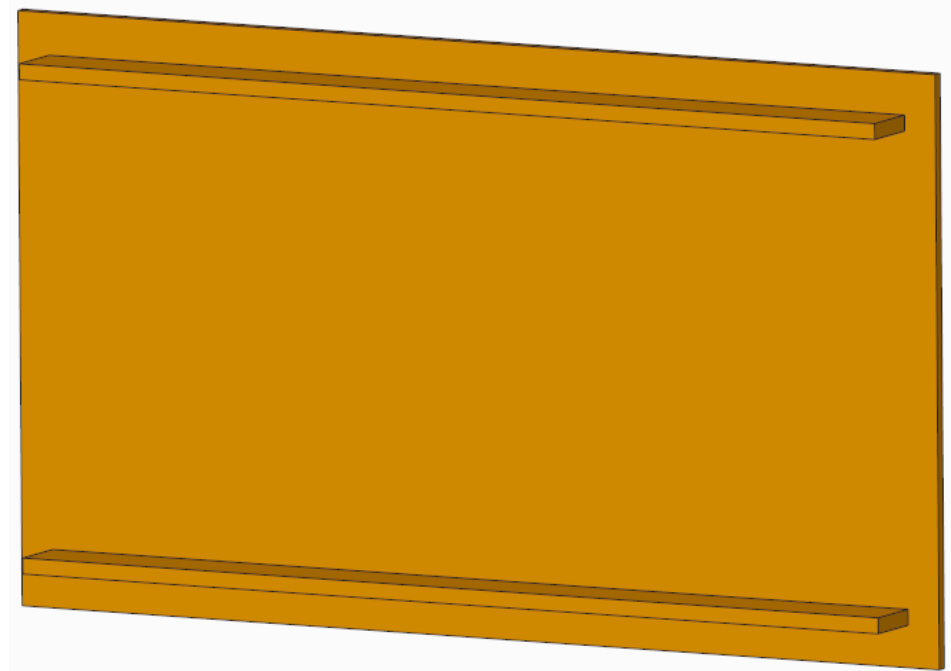
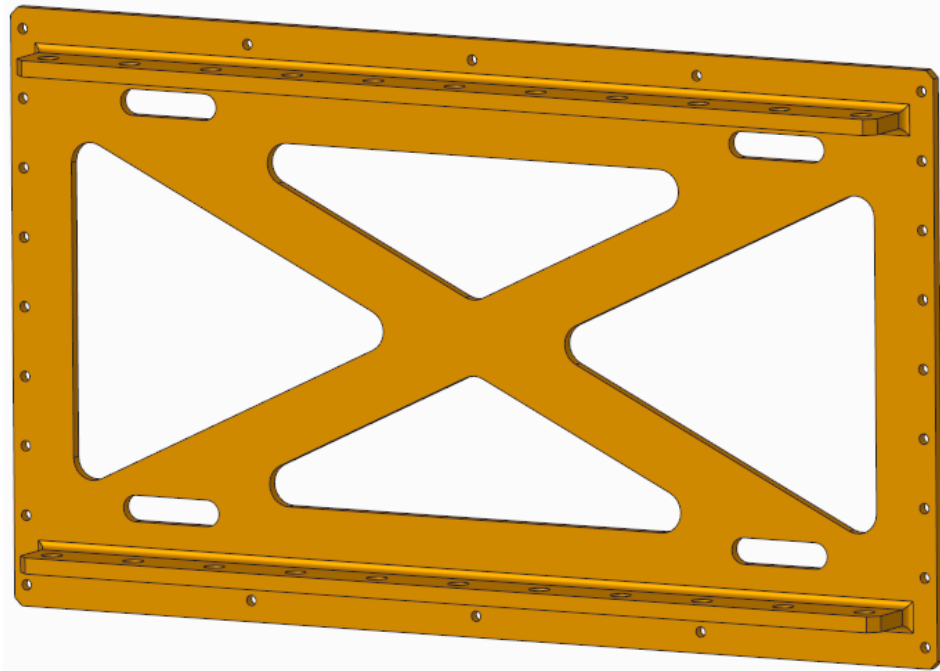


```
!03-May-16 12:22:30 End (
!03-May-16 12:22:31 Start (
!03-May-16 12:22:31 End (
!03-May-16 12:22:31 Start (
!03-May-16 12:22:31 Start (
!03-May-16 12:22:31 End (
!03-May-16 12:22:31 Start (
!03-May-16 12:22:31 End (
!03-May-16 12:22:31 Start (
!03-May-16 12:22:31 End (
!03-May-16 12:22:31 End (
!03-May-16 12:22:31 End (
!03-May-16 12:22:31 Start (
```

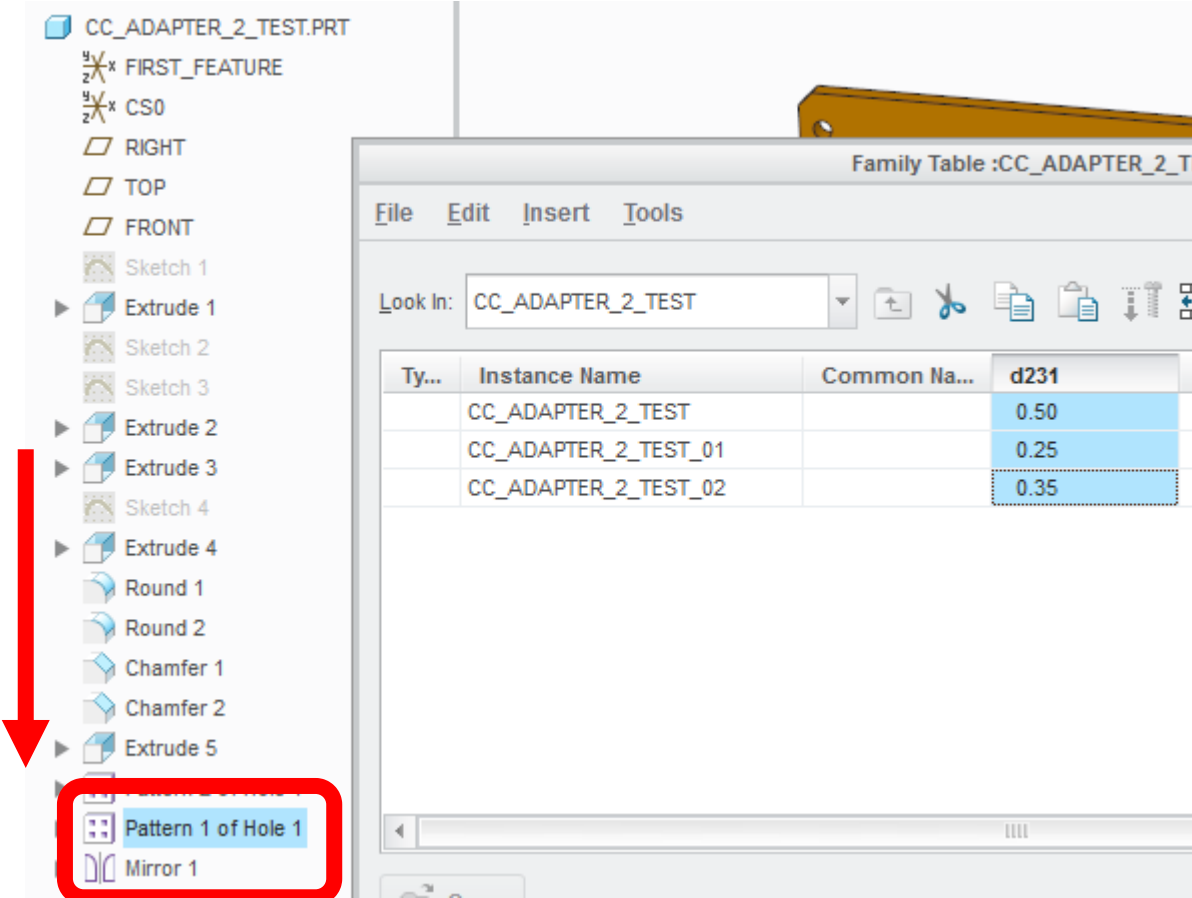
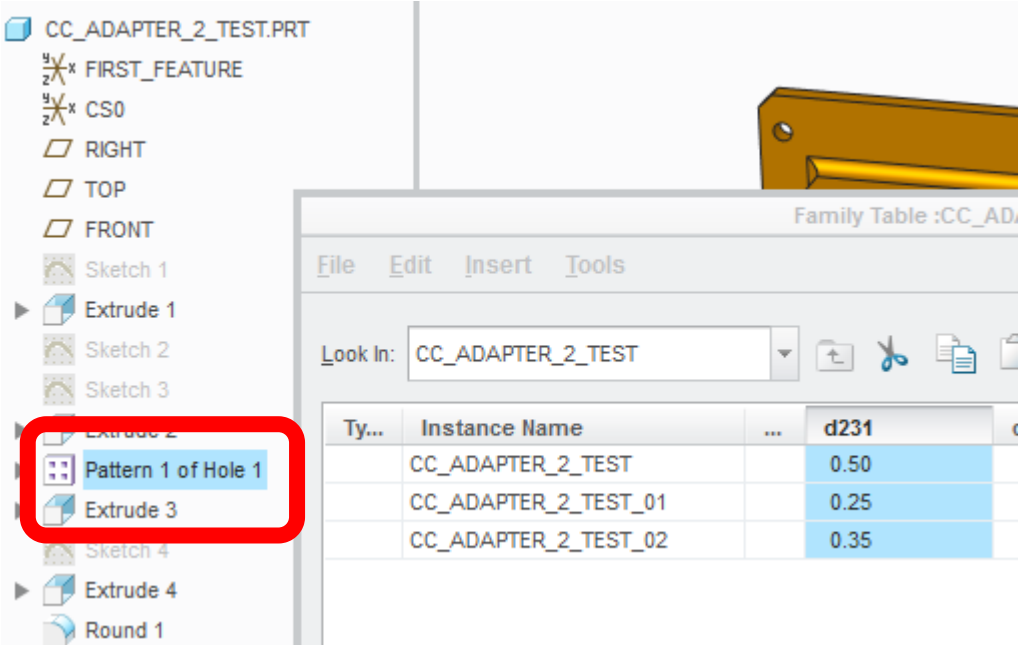
```
!03-May-16 12:22:35 Start (
!03-May-16 12:25:17 End (
!03-May-16 12:25:17 End (
!03-May-16 12:25:17 End (
!03-May-16 12:25:17 End (
```



# THE ENVELOPE PLEASE...?

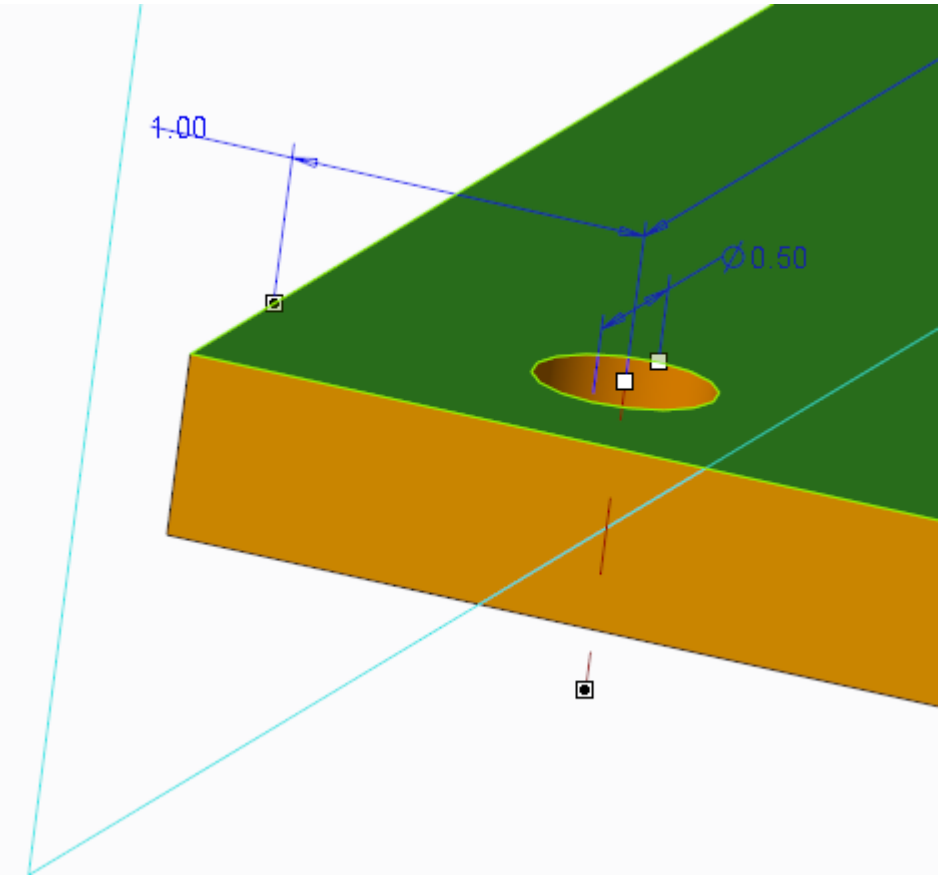
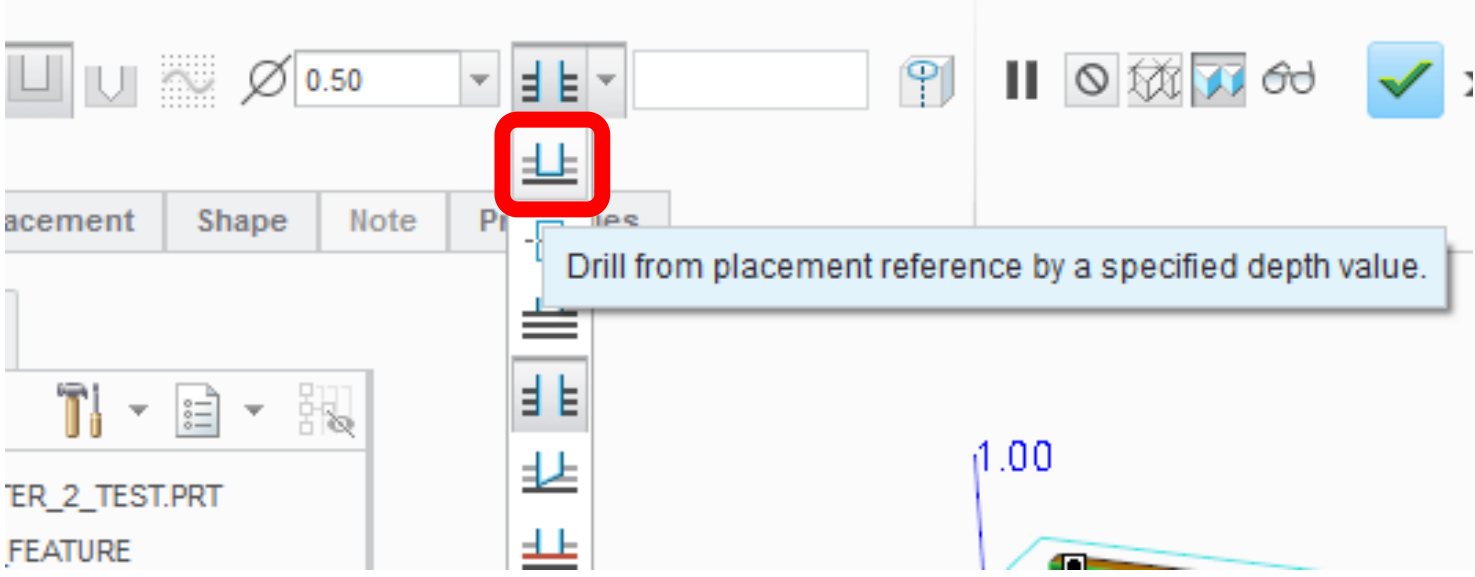


# ORDER MATTERS



# REDUCE HOLE AND CUT CALCULATIONS

- “Blind” is faster than “Thru-All”



# MAKE PATTERNS IDENTICAL OR VARYING



The screenshot shows a CAD software interface with a dimension tool active. At the top, there are two dimension input fields: "1 9" and "2 5", each followed by "1 item(s)". Below these is a tabbed menu with "Options" selected and highlighted with a red box. A dropdown menu for "Regeneration option" is open, with "Identical" selected and highlighted with a red box. A tooltip points to the "Identical" option, containing the text: "Calculate member geometry by assuming that all members are identical, do not intersect, and do not break part edges." The Model Tree on the left shows a part named "CC\_ADAPTER\_2\_TEST.PRT" with features "FIRST\_FEATURE" and "CS0".

# SUMMARY



- Build a large assembly config.pro and a mapkey to load it
- Make/Use the Empty Rep
- Remove Unused Models from Drawings
- Consider draft entities or separate sheet drawings
- Break up table-driven assemblies
- Use BOM to find most parts in an assembly rep and remove/simplify them
- Find most complex parts and simplify them
  - Reorder for faster family tables
  - Blind depth on Holes and Cuts
  - Identical Patterns

# QUESTIONS?



# THANKS FOR ATTENDING!



- Pete Hollmer
- Senior MCAD Applications Engineer
- Raytheon Company
- [Peter\\_Hollmer@Raytheon.com](mailto:Peter_Hollmer@Raytheon.com)

The image features several colorful geometric shapes, including triangles and lines in shades of blue, green, yellow, orange, pink, and purple, scattered across the background. A large, multi-colored triangular shape is prominent on the right side. The text 'LIVE WORX 16' is centered, with 'LIVE' in a thin, outlined font and 'WORX 16' in a bold, solid black font. A small 'TM' trademark symbol is positioned to the upper right of the '6'.

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