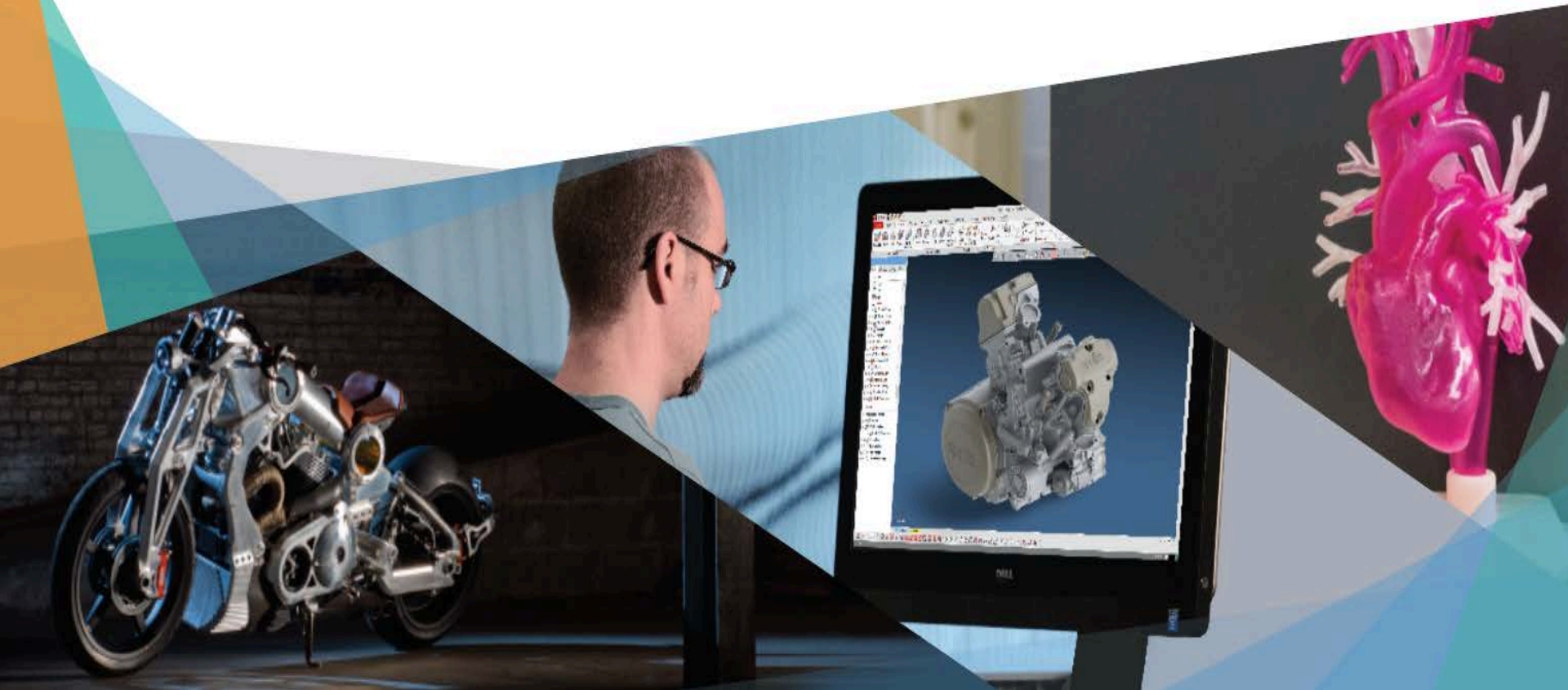





# Die Design and Build Standards

Die Design Tools to Help Ensure Correct Die Build



# Agenda

We will look at...

- Avoidable pain
  - Capturing the way you build dies
  - Software that ensures holding your standards
  - Eliminating NC errors
- 

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Scan

Production  
Machining

Part Design

Tool Design & Machining

3D Printing

SCANNING

**END-TO-END SOLUTIONS  
FROM DESIGN TO MANUFACTURING**

# Pain



Screw – not enough **thread depth**

# Pain



Dowel Pin – hole cut as **slip fit** instead of **press fit**



# Using Standards

The screenshot displays a CAD application window with a 3D model of a die assembly. A 'Setup' dialog box is open, showing a list of dimensions and their values. The 'Strip Length' is defined by a formula:  $Strip\ Length = H + H$ . The dialog also includes a 'Rounding' dropdown set to 'No Rounding' and a 'Unit' dropdown set to 'inch'. A 3D model of the die assembly is visible in the background, showing various components like the die steel, punch retainers, and stripper assembly.

Dimension	Value	Unit
Overall Length	171.311...	inch
Overall Width	25.500000	inch
Punch Shoe Thickness	2.000000	inch
Die Shoe Thickness	2.000000	inch
Stripper Plate Stroke	3.000000	inch
Die Closed Position	1.500000	inch
Strip Lead	6.000000	inch
Die Steel Thickness	1.500000	inch
Die Steel A Width	19.53526	inch
Die Steel A Length	40.000000	inch
Die Steel Shift	2.000000	inch
Stock Guide Thickness	0.500000	inch
Stock Guide A Width	2.000000	inch
Stock Guide A Length	40.000000	inch
Stock Guide Shift	7.797763	inch
Punch Retainer A Thickness	1.375000	inch
Punch Retainer A Width	19.53526	inch
Punch Retainer A Length	40.000000	inch
Punch Retainer A Shift	2.000000	inch
Backing Plate A Thickness	0.250000	inch
Backing Plate A Width	19.53526	inch
Backing Plate A Length	40.000000	inch
Stripper Set Height	0.074000	inch
Stripper Plate A Width	15.410526	inch
Stripper Plate A Length	40.000000	inch
Stripper Plate A Thickness	0.750000	inch

Strip Length =  $H + H$

Unit: inch

Used by Dimension  Invalid Formula   
Used by Formula  Not Updated Value   
Used by Both

Automatic size - position of guide pins and screws

# Using Standards

The screenshot displays a CAD software interface with a 3D model of a die assembly. The 'Setup' dialog box is open, showing a list of parameters and their values. A red circle highlights the 'Guides' section, and the 'Guide Pin Dia' parameter is selected. The 3D model shows a die with various components like guide pins and punches.

Parameter	Value	Unit
Die Closed Position	1.50000	inch
Strip Lead	6.00000	inch
<New Item>		
Die Steels		
Die Steel Thickness	1.50000	inch
Die Steel A Width	19.53526	inch
Die Steel A Length	40.00000	inch
Die Steel Shift	2.00000	inch
Stock Guide Thickness	0.50000	inch
Stock Guide A Width	2.00000	inch
Stock Guide A Length	40.00000	inch
Stock Guide Shift	7.797763	inch
<New Item>		
Punch Steels		
Punch Retainer A Thick...	1.37500	inch
Punch Retainer A Width	19.53526	inch
Punch Retainer A Len...	40.00000	inch
Punch Retainer A Shift	2.00000	inch
Backing Plate A Thick...	0.25000	inch
Backing Plate A Width	19.53526	inch
Backing Plate A Length	40.00000	inch
<New Item>		
Stripper Assembly		
Stripper Set Height	0.07400	inch
Stripper Plate A Width	15.410526	inch
Stripper Plate A Length	40.00000	inch
Stripper Plate A Thick...	0.75000	inch
<New Item>		
Guides		
Guide Pin Length	5.50000	inch
Guide Pin Dia	1.00000	inch
Guide Pin Locator	2.12500	inch
Bearing Case O Dim	1.00000	inch

Standard Components

# Using Standards

The screenshot displays a CAD application window with a 3D model of a die assembly and a 'Setup' dialog box. The 'Setup' dialog box is open to the 'Die Set Dimensions' tab, showing a list of parameters and their values. A red circle highlights the 'Die Shoe Thickness' parameter, which is set to 2.000000 inch. The 3D model shows a die with various components like punches, strippers, and plates. The software interface includes a top menu bar, a toolbar, and a Windows taskbar at the bottom.

Parameter	Value	Unit
Overall Length	171.311	inch
Overall Width	25.500000	inch
Punch Shoe Thickness	2.000000	inch
Die Shoe Thickness	2.000000	inch
Stripper Plate Stroke	1.500000	inch
Die Closed Position	1.750000	inch
Strip Lead	2.000000	inch
Die Steel Thickness	1.500000	inch
Die Steel A Width	19.53526	inch
Die Steel A Length	40.000000	inch
Die Steel Shift	2.000000	inch
Stock Guide Thickness	0.500000	inch
Stock Guide A Width	2.000000	inch
Stock Guide A Length	40.000000	inch
Stock Guide Shift	7.797763	inch
Punch Retainer A Thickness	1.375000	inch
Punch Retainer A Width	19.53526	inch
Punch Retainer A Length	40.000000	inch
Punch Retainer A Shift	2.000000	inch
Backing Plate A Thickness	0.250000	inch
Backing Plate A Width	19.53526	inch
Backing Plate A Length	40.000000	inch
Stripper Set Height	0.074000	inch
Stripper Plate A Width	15.410526	inch
Stripper Plate A Length	40.000000	inch
Stripper Plate A Thickness	0.750000	inch

Standard Plate Sizes



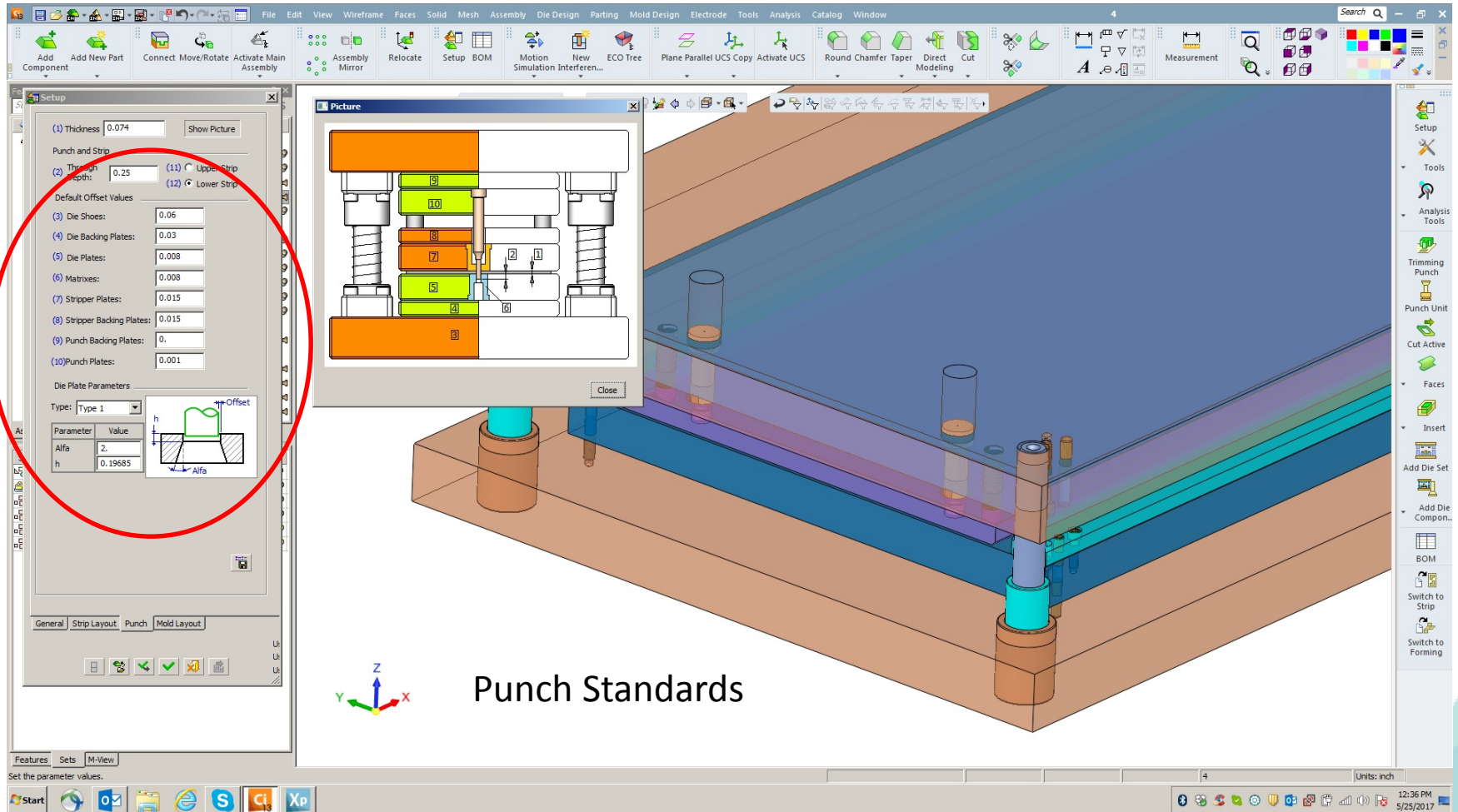
# Using Standards

The image shows a screenshot of a CAD software interface, likely SolidWorks, with a 3D model of a die casting mold. The 'Setup' dialog box is open and highlighted with a red circle. The dialog box contains the following information:

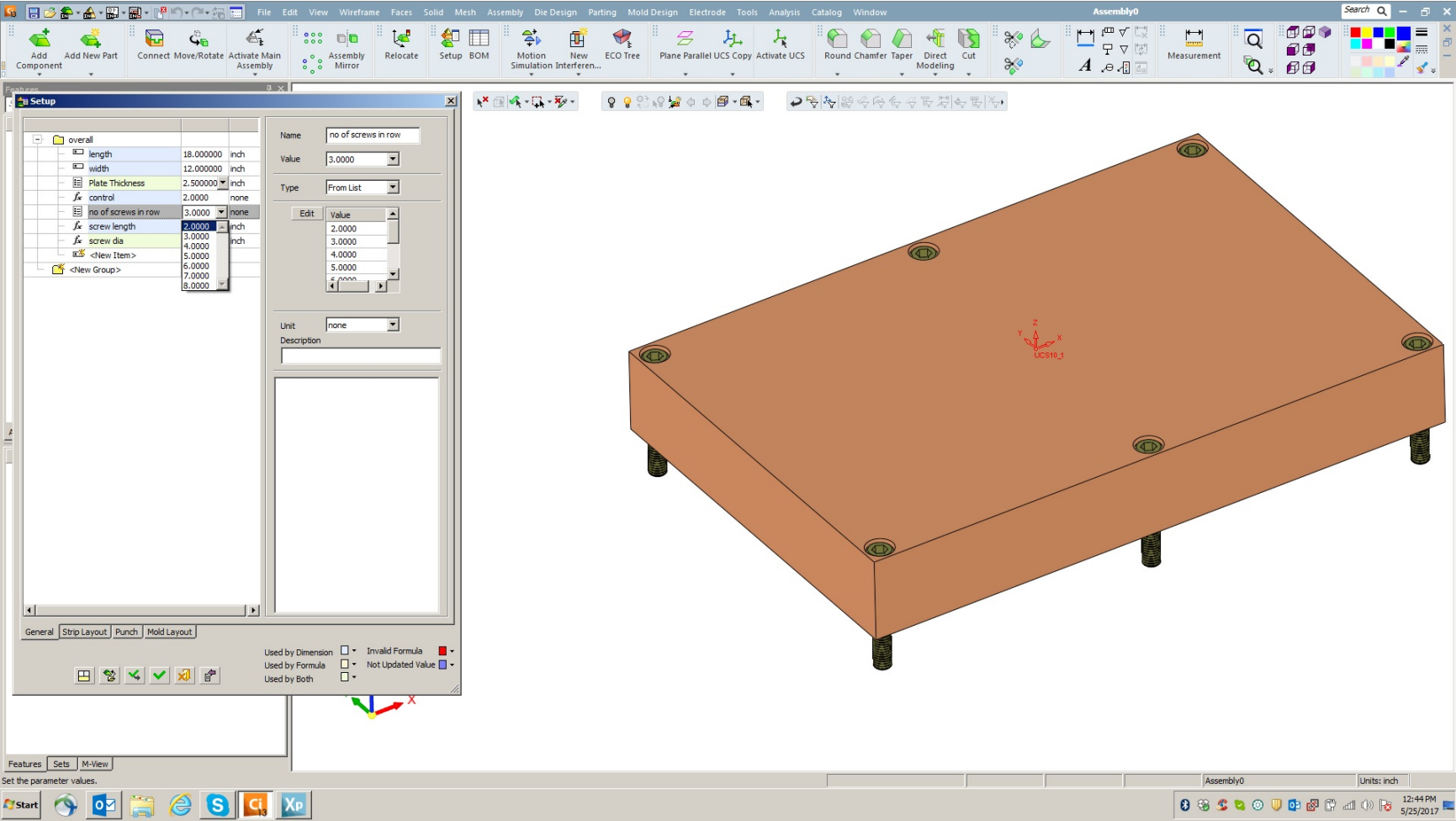
Property	Value
Thickness	0.074
Forming	
Material Standard	Generic
Material	HSLA 350
K - Factor for Bend	0.333
K - Factor for Unfold & Unbend	0.333
General	
Progression	14.41465
Progressive Die Nesting	
Minimum Distance	0.11811
Top/Bottom Margin	0.19685
Net Utilization	72.045505 %
Blank Area	161.338105 in <sup>2</sup>
Scrap Area	62.601063 in <sup>2</sup>
Single Progression Area	223.939167 in <sup>2</sup>
Bounding Data	
Width	15.535526
Length	159.311162
Height Z+	0.444316
Height Z-	1.612892
Round values	<input type="checkbox"/>
Increment	1
Include Punch Faces	<input type="checkbox"/>

The 3D model shows a die casting mold with a blue die and a brown punch. The word 'Materials' is written below the 3D model.

# Using Standards



# Components



# Rules

## Length of plate determines number of screws

The screenshot displays a CAD application window with a 3D model of a rectangular plate and a 'Setup' dialog box. The 'Setup' dialog is used to define parameters for the model, including dimensions and material properties. The parameters are listed in the following table:

Name	Value	Unit	Type
overall			
length	18.000000	inch	
width	12.000000	inch	
Plate Thickness	2.500000	inch	From List
control	1.000000	none	
no of screws in row	1.250000	none	
screw length	1.750000	inch	
screw dia	2.250000	inch	
<New Item>	2.500000		
<New Group>			

The 'Setup' dialog also includes an 'Edit' table for values:

Edit	Value
	1.000000
	1.250000
	1.500000
	1.750000
	2.000000
	2.250000
	2.500000

The 3D model shows a brown rectangular plate with four screws at the corners and four legs. A coordinate system (UCS10.1) is visible on the top surface of the plate. The software interface includes a menu bar, a toolbar, and a status bar at the bottom.

# Rules

## Plate thickness determines screw length and diameter

The screenshot displays a CAD application window with a 3D model of a rectangular plate with four screws. A 'Setup' dialog box is open, showing a table of parameters. A red circle highlights the 'screw length' and 'screw dia' rows, which are linked to the 'Plate Thickness' parameter. The 'screw length' row shows a formula:  $\text{Plate Thickness} + (1.5 * \text{screw dia})$ .

Parameter	Value	Units
length	18.000000	inch
width	12.000000	inch
Plate Thickness	1.000000	inch
control	1.0000	none
no of screws in row	2.0000	none
screw length	1.500000	inch
screw dia	0.312500	inch

The 'Setup' dialog box also shows a 'Name' field set to 'screw length', a 'Value' field set to '1.500000', and a 'Type' dropdown set to 'Formula'. The formula field contains the expression:  $\text{Plate Thickness} + (1.5 * \text{screw dia})$ . The 'Rounding' section shows 'By List' set to '0.250000', '0.375000', '0.500000', and '0.625000'. The 'Unit' is set to 'inch'.



# Standard Catalog Parts

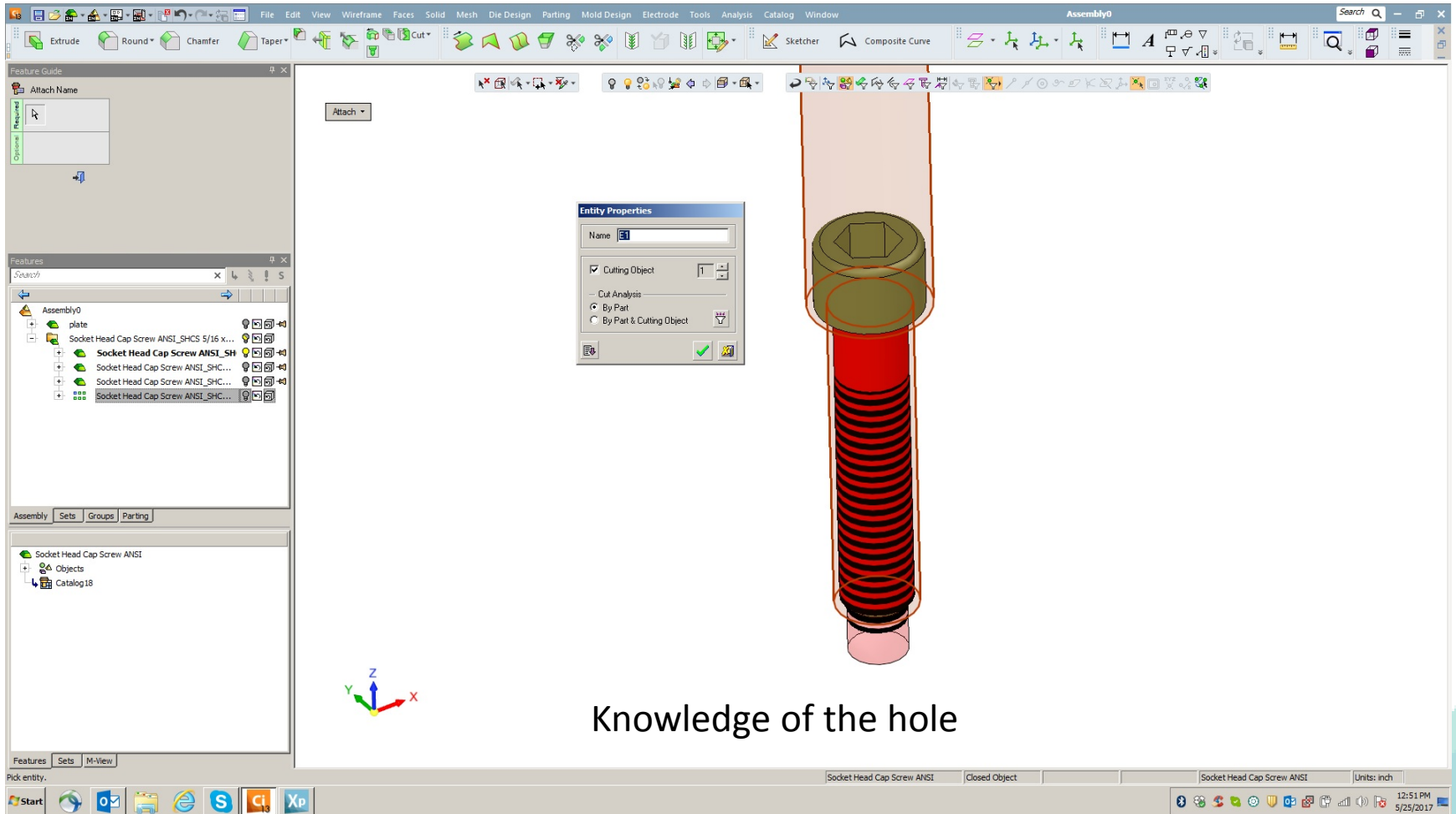
The screenshot displays a CAD software interface with the following components:

- Top Bar:** File, Edit, View, Wireframe, Faces, Solid, Mesh, Die Design, Parting, Mold Design, Electrode, Tools, Analysis, Catalog, Window.
- Search Bar:** Search
- Component Selection Panel:**
  - Category: Screws & Bolts
  - Sub-Category: Cap Screws
  - Lib: Cap Screw Z 21, Cap screw Z 22, din 912 Head Cap screw, Socket-head Cap screw...
- 3D Model:** A 3D rendering of a Socket Head Cap Screw.
- Technical Drawings:**
  - Front View:** Shows dimensions  $b$  (total length),  $ck$  (head length),  $l$  (thread length), and  $d$  (thread diameter).
  - Top View:** Shows the hexagonal head with diameter  $\phi$ .
  - Side View:** Shows the thread pitch and dimensions  $dk$  (outer diameter) and  $k$  (pitch diameter).
- Table:** A table listing various screw specifications with columns for Record Label,  $c$ ,  $l$ ,  $\phi$ , and Material.
- Bottom Bar:** Socket Head Cap Screw ANSI, Units: inch, 12:49 PM, 5/25/2017.

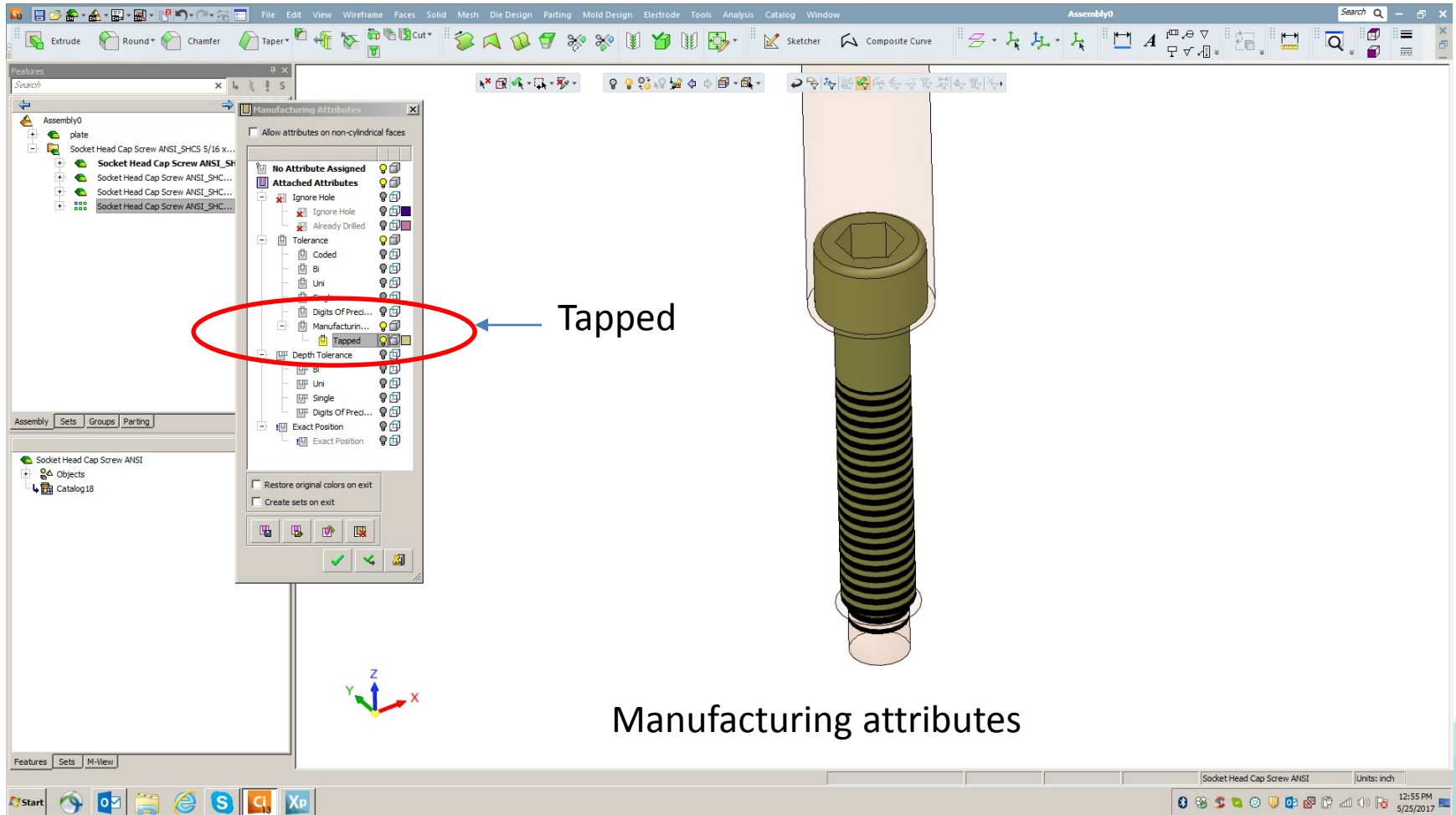
Record Label	c	l	$\phi$	Material
5_16 x 1_2	0.3125	1.125	0.3125	Steel
5_16 x 1_4	0.3125	1.125	0.3125	Steel
5_16 x 2	0.3125	2	0.3125	Steel
5_16 x 2_4	0.3125	2.25	0.3125	Steel
5_16 x 2_1_2	0.3125	2.5	0.3125	Steel
5_16 x 2_3_4	0.3125	2.75	0.3125	Steel
5_16 x 3	0.3125	3	0.3125	Steel
5_16 x 3_4	0.3125	3.25	0.3125	Steel
5_16 x 3_1_2	0.3125	3.5	0.3125	Steel
3_8 x 1_2	0.375	1.125	0.375	Steel
3_8 x 1_4	0.375	1.125	0.375	Steel
3_8 x 2	0.375	2	0.375	Steel
3_8 x 2_4	0.375	2.25	0.375	Steel
3_8 x 2_1_2	0.375	2.5	0.375	Steel
3_8 x 2_3_4	0.375	2.75	0.375	Steel
3_8 x 3	0.375	3	0.375	Steel
3_8 x 3_4	0.375	3.25	0.375	Steel
3_8 x 3_1_2	0.375	3.5	0.375	Steel
3_8 x 3_3_4	0.375	3.75	0.375	Steel
3_8 x 4	0.375	4	0.375	Steel
3_8 x 4_1_2	0.375	4.5	0.375	Steel
3_8 x 4_3_4	0.375	4.75	0.375	Steel
3_8 x 5	0.375	5	0.375	Steel
3_8 x 5_1_2	0.375	5.5	0.375	Steel
3_8 x 5_3_4	0.375	5.75	0.375	Steel
3_8 x 6	0.375	6	0.375	Steel
3_8 x 6_1_2	0.375	6.5	0.375	Steel
3_8 x 6_3_4	0.375	6.75	0.375	Steel
3_8 x 7	0.375	7	0.375	Steel
3_8 x 7_1_2	0.375	7.5	0.375	Steel
3_8 x 7_3_4	0.375	7.75	0.375	Steel
3_8 x 8	0.375	8	0.375	Steel
3_8 x 8_1_2	0.375	8.5	0.375	Steel
3_8 x 8_3_4	0.375	8.75	0.375	Steel
3_8 x 9	0.375	9	0.375	Steel
3_8 x 9_1_2	0.375	9.5	0.375	Steel
3_8 x 9_3_4	0.375	9.75	0.375	Steel
3_8 x 10	0.375	10	0.375	Steel
3_8 x 10_1_2	0.375	10.5	0.375	Steel
3_8 x 10_3_4	0.375	10.75	0.375	Steel
3_8 x 11	0.375	11	0.375	Steel
3_8 x 11_1_2	0.375	11.5	0.375	Steel
3_8 x 11_3_4	0.375	11.75	0.375	Steel
3_8 x 12	0.375	12	0.375	Steel
3_8 x 12_1_2	0.375	12.5	0.375	Steel
3_8 x 12_3_4	0.375	12.75	0.375	Steel
3_8 x 13	0.375	13	0.375	Steel
3_8 x 13_1_2	0.375	13.5	0.375	Steel
3_8 x 13_3_4	0.375	13.75	0.375	Steel
3_8 x 14	0.375	14	0.375	Steel
3_8 x 14_1_2	0.375	14.5	0.375	Steel
3_8 x 14_3_4	0.375	14.75	0.375	Steel
3_8 x 15	0.375	15	0.375	Steel
3_8 x 15_1_2	0.375	15.5	0.375	Steel
3_8 x 15_3_4	0.375	15.75	0.375	Steel
3_8 x 16	0.375	16	0.375	Steel
3_8 x 16_1_2	0.375	16.5	0.375	Steel
3_8 x 16_3_4	0.375	16.75	0.375	Steel
3_8 x 17	0.375	17	0.375	Steel
3_8 x 17_1_2	0.375	17.5	0.375	Steel
3_8 x 17_3_4	0.375	17.75	0.375	Steel
3_8 x 18	0.375	18	0.375	Steel
3_8 x 18_1_2	0.375	18.5	0.375	Steel
3_8 x 18_3_4	0.375	18.75	0.375	Steel
3_8 x 19	0.375	19	0.375	Steel
3_8 x 19_1_2	0.375	19.5	0.375	Steel
3_8 x 19_3_4	0.375	19.75	0.375	Steel
3_8 x 20	0.375	20	0.375	Steel
3_8 x 20_1_2	0.375	20.5	0.375	Steel
3_8 x 20_3_4	0.375	20.75	0.375	Steel
3_8 x 21	0.375	21	0.375	Steel
3_8 x 21_1_2	0.375	21.5	0.375	Steel
3_8 x 21_3_4	0.375	21.75	0.375	Steel
3_8 x 22	0.375	22	0.375	Steel
3_8 x 22_1_2	0.375	22.5	0.375	Steel
3_8 x 22_3_4	0.375	22.75	0.375	Steel
3_8 x 23	0.375	23	0.375	Steel
3_8 x 23_1_2	0.375	23.5	0.375	Steel
3_8 x 23_3_4	0.375	23.75	0.375	Steel
3_8 x 24	0.375	24	0.375	Steel
3_8 x 24_1_2	0.375	24.5	0.375	Steel
3_8 x 24_3_4	0.375	24.75	0.375	Steel
3_8 x 25	0.375	25	0.375	Steel
3_8 x 25_1_2	0.375	25.5	0.375	Steel
3_8 x 25_3_4	0.375	25.75	0.375	Steel
3_8 x 26	0.375	26	0.375	Steel
3_8 x 26_1_2	0.375	26.5	0.375	Steel
3_8 x 26_3_4	0.375	26.75	0.375	Steel
3_8 x 27	0.375	27	0.375	Steel
3_8 x 27_1_2	0.375	27.5	0.375	Steel
3_8 x 27_3_4	0.375	27.75	0.375	Steel
3_8 x 28	0.375	28	0.375	Steel
3_8 x 28_1_2	0.375	28.5	0.375	Steel
3_8 x 28_3_4	0.375	28.75	0.375	Steel
3_8 x 29	0.375	29	0.375	Steel
3_8 x 29_1_2	0.375	29.5	0.375	Steel
3_8 x 29_3_4	0.375	29.75	0.375	Steel
3_8 x 30	0.375	30	0.375	Steel
3_8 x 30_1_2	0.375	30.5	0.375	Steel
3_8 x 30_3_4	0.375	30.75	0.375	Steel
3_8 x 31	0.375	31	0.375	Steel
3_8 x 31_1_2	0.375	31.5	0.375	Steel
3_8 x 31_3_4	0.375	31.75	0.375	Steel
3_8 x 32	0.375	32	0.375	Steel
3_8 x 32_1_2	0.375	32.5	0.375	Steel
3_8 x 32_3_4	0.375	32.75	0.375	Steel
3_8 x 33	0.375	33	0.375	Steel
3_8 x 33_1_2	0.375	33.5	0.375	Steel
3_8 x 33_3_4	0.375	33.75	0.375	Steel
3_8 x 34	0.375	34	0.375	Steel
3_8 x 34_1_2	0.375	34.5	0.375	Steel
3_8 x 34_3_4	0.375	34.75	0.375	Steel
3_8 x 35	0.375	35	0.375	Steel
3_8 x 35_1_2	0.375	35.5	0.375	Steel
3_8 x 35_3_4	0.375	35.75	0.375	Steel
3_8 x 36	0.375	36	0.375	Steel
3_8 x 36_1_2	0.375	36.5	0.375	Steel
3_8 x 36_3_4	0.375	36.75	0.375	Steel
3_8 x 37	0.375	37	0.375	Steel
3_8 x 37_1_2	0.375	37.5	0.375	Steel
3_8 x 37_3_4	0.375	37.75	0.375	Steel
3_8 x 38	0.375	38	0.375	Steel
3_8 x 38_1_2	0.375	38.5	0.375	Steel
3_8 x 38_3_4	0.375	38.75	0.375	Steel
3_8 x 39	0.375	39	0.375	Steel
3_8 x 39_1_2	0.375	39.5	0.375	Steel
3_8 x 39_3_4	0.375	39.75	0.375	Steel
3_8 x 40	0.375	40	0.375	Steel
3_8 x 40_1_2	0.375	40.5	0.375	Steel
3_8 x 40_3_4	0.375	40.75	0.375	Steel
3_8 x 41	0.375	41	0.375	Steel
3_8 x 41_1_2	0.375	41.5	0.375	Steel
3_8 x 41_3_4	0.375	41.75	0.375	Steel
3_8 x 42	0.375	42	0.375	Steel
3_8 x 42_1_2	0.375	42.5	0.375	Steel
3_8 x 42_3_4	0.375	42.75	0.375	Steel
3_8 x 43	0.375	43	0.375	Steel
3_8 x 43_1_2	0.375	43.5	0.375	Steel
3_8 x 43_3_4	0.375	43.75	0.375	Steel
3_8 x 44	0.375	44	0.375	Steel
3_8 x 44_1_2	0.375	44.5	0.375	Steel
3_8 x 44_3_4	0.375	44.75	0.375	Steel
3_8 x 45	0.375	45	0.375	Steel
3_8 x 45_1_2	0.375	45.5	0.375	Steel
3_8 x 45_3_4	0.375	45.75	0.375	Steel
3_8 x 46	0.375	46	0.375	Steel
3_8 x 46_1_2	0.375	46.5	0.375	Steel
3_8 x 46_3_4	0.375	46.75	0.375	Steel
3_8 x 47	0.375	47	0.375	Steel
3_8 x 47_1_2	0.375	47.5	0.375	Steel
3_8 x 47_3_4	0.375	47.75	0.375	Steel
3_8 x 48	0.375	48	0.375	Steel
3_8 x 48_1_2	0.375	48.5	0.375	Steel
3_8 x 48_3_4	0.375	48.75	0.375	Steel
3_8 x 49	0.375	49	0.375	Steel
3_8 x 49_1_2	0.375	49.5	0.375	Steel
3_8 x 49_3_4	0.375	49.75	0.375	Steel
3_8 x 50	0.375	50	0.375	Steel
3_8 x 50_1_2	0.375	50.5	0.375	Steel
3_8 x 50_3_4	0.375	50.75	0.375	Steel
3_8 x 51	0.375	51	0.375	Steel
3_8 x 51_1_2	0.375	51.5	0.375	Steel
3_8 x 51_3_4	0.375	51.75	0.375	Steel
3_8 x 52	0.375	52	0.375	Steel
3_8 x 52_1_2	0.375	52.5	0.375	Steel
3_8 x 52_3_4	0.375	52.75	0.375	Steel
3_8 x 53	0.375	53	0.375	Steel
3_8 x 53_1_2	0.375	53.5	0.375	Steel
3_8 x 53_3_4	0.375	53.75	0.375	Steel
3_8 x 54	0.375	54	0.375	Steel
3_8 x 54_1_2	0.375	54.5	0.375	Steel
3_8 x 54_3_4	0.375	54.75	0.375	Steel
3_8 x 55	0.375	55	0.375	Steel
3_8 x 55_1_2	0.375	55.5	0.375	Steel
3_8 x 55_3_4	0.375	55.75	0.375	Steel
3_8 x 56	0.375	56	0.375	Steel
3_8 x 56_1_2	0.375	56.5	0.375	Steel
3_8 x 56_3_4	0.375	56.75	0.375	Steel
3_8 x 57	0.375	57	0.375	Steel
3_8 x 57_1_2	0.375	57.5	0.375	Steel
3_8 x 57_3_4	0.375	57.75	0.375	Steel
3_8 x 58	0.375	58	0.375	Steel
3_8 x 58_1_2	0.375	58.5	0.375	Steel
3_8 x 58_3_4	0.375	58.75	0.375	Steel
3_8 x 59	0.375	59	0.375	Steel
3_8 x 59_1_2	0.375	59.5	0.375	Steel
3_8 x 59_3_4	0.375	59.75	0.375	Steel
3_8 x 60	0.375	60	0.375	Steel
3_8 x 60_1_2	0.375	60.5	0.375	Steel
3_8 x 60_3_4	0.375	60.75	0.375	Steel
3_8 x 61	0.375	61	0.375	Steel
3_8 x 61_1_2	0.375	61.5	0.375	Steel
3_8 x 61_3_4	0.375	61.75		



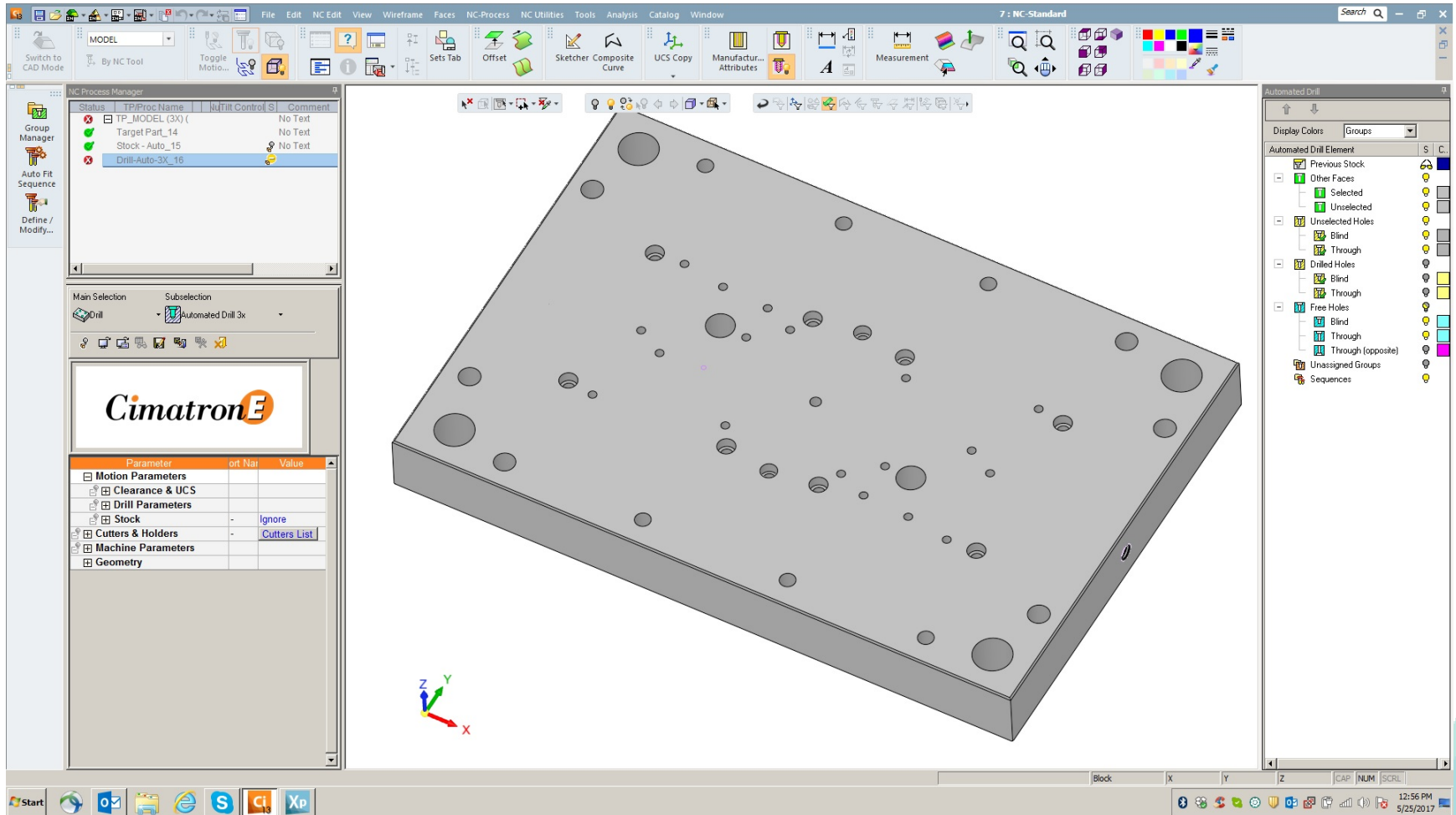
# Standard Catalog Parts



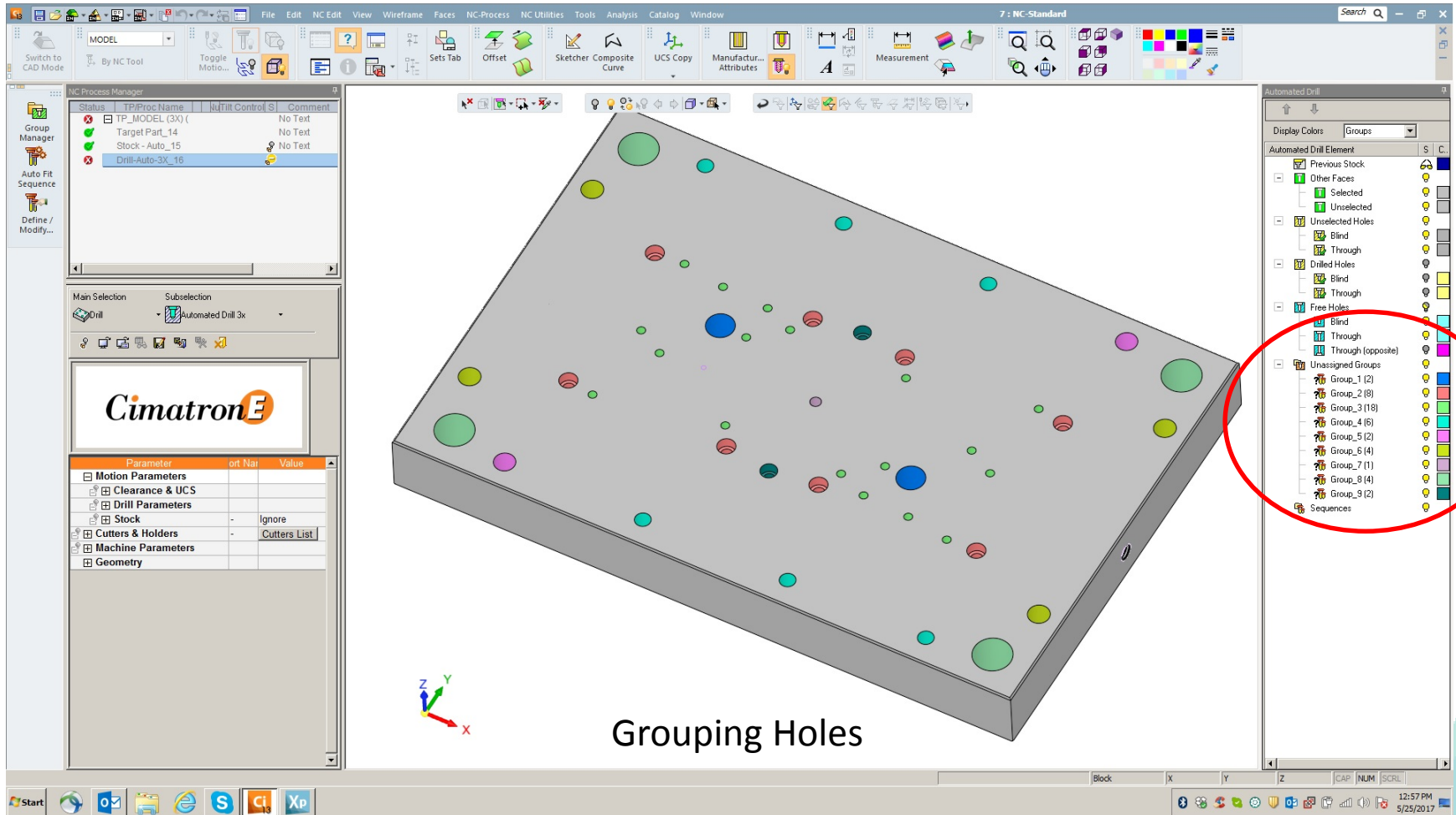
# Standard Catalog Parts



# Automated Drilling



# Automated Drilling



# Automated Drilling

The screenshot displays the Cimatron E software interface for automated drilling. The central 3D model shows a rectangular plate with numerous colored circles representing drill holes. The left sidebar contains the 'Automated Drill 3x' tool configuration, including a parameter table:

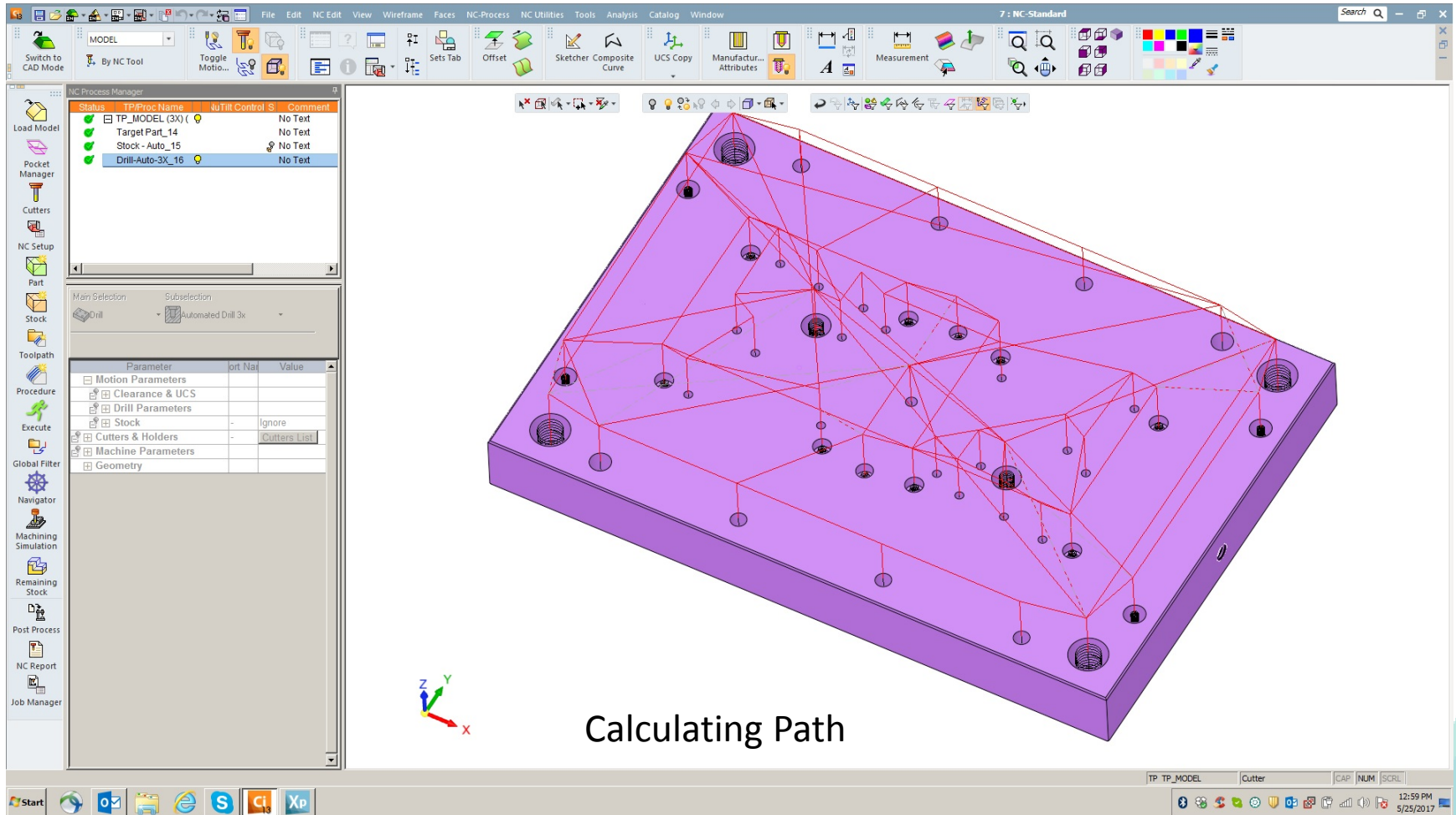
Parameter	ort Nai	Value
Motion Parameters		
Clearance & UCS		
Drill Parameters		
Stock	-	Ignore
Cutters & Holders	-	Cutters List
Machine Parameters		
Geometry		

The right sidebar shows the 'Automated Drill Element' tree view, with a red circle highlighting a 'Sequences' group containing '1\_bore through modif...' and 'Group\_1 (2)'. The bottom status bar shows 'Block' and 'x y z' coordinates.

Assigning Sequences



# Automated Drilling



Calculating Path



# Automated Drilling

The screenshot displays the 'Automated Drill' interface in a CAD application. The main window shows various toolbars and a 3D model area. A red circle highlights the 'Geometrical & Sequence Tables' panel on the left. A larger inset window on the right provides a detailed view of the data tables.

**Geometrical Data Table (Inset):**

Segment	Dim	Nom	Constraint	Min	Max
ST	Height	0.00000	Range	0.00000	0.00000
A	Top ...	0.75000	Fix		
A	Height	2.37500	Range	0.25000	6.00000
MD	Height	1.18750	N/A		
BT	Height	2.37500	N/A		
SB	Height	2.37500	N/A		
SH	Height	2.37500	N/A		

**Cutter Sequence Data Table (Inset):**

Icon	Cu...	Com...	Top Ref	Top Delta	Bot. Ref	E
<input type="checkbox"/>	.18...		DP	0.000000	DP	-C
<input type="checkbox"/>	9/1...		DP	0.000000	A	-C
<input type="checkbox"/>	47/...		DP	0.050000	A	-C
<input type="checkbox"/>	UN...		DP	0.050000	DP	-C
<input type="checkbox"/>	.75 ...		DP	0.000000	A	-C

**Drill/Mill Parameters Table (Main Window):**

Parameter	Unit	Value
<b>Motion Parameters</b>		
Drill Type		Spot Drill
Top Reference		DP
Top Delta		0.00000
Delta Retract		0.03937
Bottom Reference		DP
Bottom Delta		-0.38000
Bottom Type		Cutter Tip
Shift		<input type="checkbox"/>
Dwell		<input type="checkbox"/>
Peck		<input type="checkbox"/>
<b>Cutters &amp; Holders</b>		187 CDRILL
<b>Machine Parameters</b>		
Feed and Spin Calculator		Access
Spin		1000
Feed (inch/min)		13.77953
Coolant		Flood
Spindle Direction		Clockwise
Rotary Axis Preferred Po		None
<b>Geometry</b>		

The interface also includes a 'Cutter Sequence Data' table in the main window, which is partially visible and matches the data in the inset. A 3D coordinate system (X, Y, Z) is shown at the bottom of the main window.

# Automated Drilling

Light press fit

Constraint	Min	Max
Range	0.00000	0.00000
Fix		
Range	0.25000	6.00000
N/A		
N/A		
N/A		
N/A		

Ref	Top Delta	Bot. Ref	i
	0.000000	DP	
	0.000000	A	-C
	0.050000	A	-C
	0.050000	DP	-C
	0.000000	A	-C

Port Name	Value
Drill Type	Spot Drill
Top Reference	DP
Top Delta	0.00000
Delta Retract	0.03937
Bottom Reference	DP
Bottom Delta	-0.38000
Bottom Type	Cutter Tip
Shift	
Dwell	
Peck	
Cutters & Holders	187 CDRILL
Machine Parameters	
Feed and Spin Calculator	Access
Spin	1000
Feed (inch/min)	13.77953
Coolant	Flood
Spindle Direction	Clockwise
Rotary Axis Preferred Po	None
Geometry	

Manufacturing Attributes

Allow attributes on non-cylindrical faces

No Attribute Assigned

Attached Attributes

- Ignore Hole
- Ignore Hole
- Already Drilled
- Tolerance
  - Coded
  - Bi
  - Uni
  - Single
  - Digits Of Preci...
  - Manufacturin...
    - Light Pr...
- Depth Tolerance
  - Bi
  - Uni
  - Single
  - Digits Of Preci...
- Exact Position
  - Exact Position

Restore original colors on exit

Create sets on exit

# Automated Drilling

The screenshot displays a CAD software interface with a 'Cutters and Holders' dialog box open. The dialog box contains a table of cutters and various parameter settings. A red circle highlights the 'Cycle' dropdown menu, which is set to 'High Speed Peck'. To the right, a 3D model of a drill bit is shown above a purple rectangular workpiece. A coordinate system with X, Y, and Z axes is visible at the bottom left of the work area.

S. No.	C. No.	Cutter Name	Magazine No.	In use	Technology	Tip/Type	Taper	Shank1	Shank2	Diameter	Holder	Extens
	(All)	1/4 INCH ME...	11	(All)	Milling	Ball	(All)	(All)	(All)	0.250000	+	(All)
	(All)	.187 CDRI...	3	(All)	Drilling	Center	(All)	(All)	(All)	0.250000	+	(All)
	(All)	.5 DRILL	6	(All)	Drilling	Drill	(All)	(All)	(All)	0.500000	+	(All)
	(All)	.75 DRILL	13	(All)	Drilling	Drill	(All)	(All)	(All)	0.750000	+	(All)
	(All)	.5 FLAT	14	(All)	Milling	Flat	(All)	(All)	(All)	0.500000	+	(All)
	(All)	.5 FLAT FINISH	15	(All)	Milling	Flat	(All)	(All)	(All)	0.500000	+	(All)

Cutter Name: .5 DRILL      Comment: NO COMMENT

Cycle: High Speed Peck

Drill Parameters

Shift    I:    J:     Dwell    Time (millsec.)     Peck    Step:    Dec:   

Misc. Parameters

Misc 1:    Misc 2:    Misc 3:    Misc 4:   

Automated Drill Sort Cutter Type:   

Clear All    Restore

Website:    Go

Pick a location to display the Cutter.

TP\_TP\_MODEL    Cutter Multi Cutters    CAP    NUM    SCRL

1:06 PM  
5/25/2017

Smart tool library

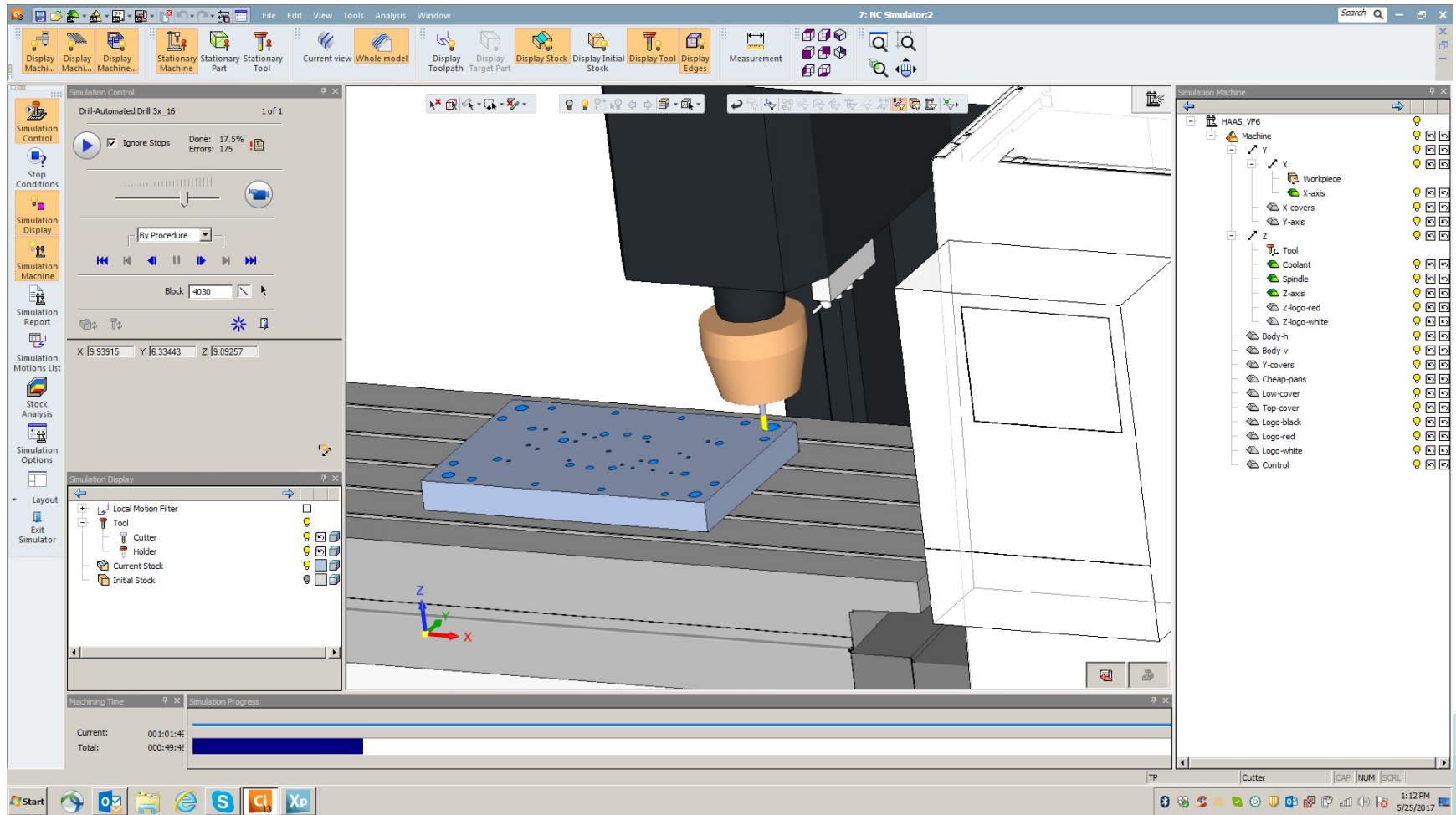
# Automated Drilling

The screenshot displays a CAD/NC software interface with a Notepad window open, showing G-code for automated drilling. The Notepad window title is "7:TP\_MODEL.Mikron\_HSM-400\_ITNC530 - Notepad". The G-code includes parameters for diameter, tool, feed rate, and depth.

```
0 BEGIN PGM 0010 MM
1 BLK FORM 0.1 Z X-200 Y-100 Z-50
2 BLK FORM 0.2 X200 Y100 Z100
3 L Z200 FMAX M91
4 L X0 Y0 FMAX M91
5 ;(DIAMETER: 6.35 CORNER RADIUS: 0)
6 ;(TOOL COMMENT: NO COMMENT)
7 * -1.87 CDRILL D=6.35 L38.1
8 TOOL CALL 3 Z S1000. M03 DR-3.175
9 ;(PROCEDURE: DRILL-AUTOMATED DRILL 3X #16: NO TEXT)
10 L FMAX
11 L X-257.175 Y-166.688 FMAX
12 L Z50.8 FMAX
13 M08
14 L Z1 FMAX
15 CYCL DEF 203 UNIVERSAL DRILLING ~
    Q200=1 ;SET-UP CLEARANCE ~
    Q201=0 ;DEPTH ~
    Q206=350. ;FEED RATE FOR PLUNGING ~
    Q202=0 ;PLUNGING DEPTH ~
    Q210=0 ;DWELL TIME AT TOP ~
    Q203=0 ;SURFACE COORDINATE ~
    Q204=50.8 ;2ND SET-UP CLEARANCE ~
    Q212=0 ;DECREMENT ~
    Q213=3 ;BREAKS ~
    Q205=0 ;MIN. PLUNGING DEPTH ~
    Q211=0.0 ;DWELL TIME AT DEPTH ~
    Q208=5000 ;RETRACTION FEED RATE ~
    Q256=0.2 ;DIST. FOR CHIP BRKNG
16 L M99
17 L Z50.8 FMAX
18 L X-203.2 Y-177.006 FMAX
19 L Z1 FMAX
20 CYCL DEF 203 UNIVERSAL DRILLING ~
    Q200=1 ;SET-UP CLEARANCE ~
    Q201=9.652 ;DEPTH ~
    Q206=350. ;FEED RATE FOR PLUNGING ~
    Q202=0 ;PLUNGING DEPTH ~
```

Post processing

# Automated Drilling




Full machine simulation



# Review

Did you see...

- **Avoidable** pain
  - Capturing the way **you build dies**
  - Software that ensures holding **your standards**
  - **Eliminating NC errors**
- 





Thank You!

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