UPDATING THE TORMACH TOOL TABLE

Introduction

Tormach's PathPilot CNC control software offers a Tool Table facility that will accept up to 1000 different tool entries. This is more than enough tools for the small machine shop and if fully populated would represent a small fortune in tools and collet investment.

In PathPilot when you go to the Offsets tab to edit a tool, the following dialogue box comes up (sorry about the quality of the image ..) suggesting that you can be quite clever with the descriptions of your tools.

How you describe the tool helps local machining settings such as Conversational routines. It has no impact if you are loading an externally created GCode from CAD/CAM packages such as Fusion 360.

When I first started using PathPilot I had never bothered to add this intelligence when I described the tool. I simply wrote something that meant something to me. As time has passed and I have added more and more tools, the prospect of going back into the Tool Table and making edits to conform to these intelligent descriptions did not seem like a glamorous prospect, even for a rainy day job.

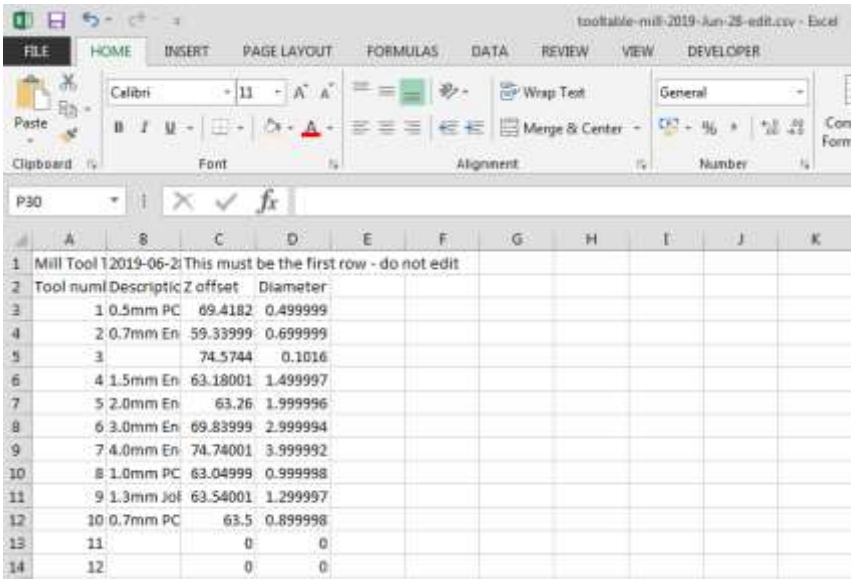
Tormach Changes

What has changed is that in the latest version of PathPilot, Tormach has added a search routine for the tool table. This depends for its success in finding what you are searching for on the consistency of entries in each line description.

There is now an incentive to have a 'rainy day' session and clean up the table entries.

Investigation

PathPilot does give a Tool Table Export and Tool Table Import routine. The buttons for this can be seen on the previous image. The Export button delivers a comma separated file format (.CSV) to the location you chose (memory stick, network folder or Dropbox etc). If you click on this exported file with Excel it will automatically open. I did this and as I expected the Excel sheet showed two lines of header followed by four columns of data. This is just as seen on the PathPilot Offsets screen. (Ignore the squashed effect as the columns do not automatically widen to show their full contents).



	A	B	C	D	E	F	G	H	I	J	K
1	Mill Tool T	2019-06-2	This must be the first row - do not edit								
2	Tool numl	Descriptic	Z offset	Diameter							
3	1	0.5mm PC	69.4182	0.499999							
4	2	0.7mm En	59.33999	0.699999							
5	3		74.5744	0.1016							
6	4	1.5mm En	63.18001	1.499997							
7	5	2.0mm En	63.26	1.999996							
8	6	3.0mm En	69.83999	2.999994							
9	7	4.0mm En	74.74001	3.999992							
10	8	1.0mm PC	63.04999	0.999998							
11	9	1.3mm Jol	63.54001	1.299997							
12	10	0.7mm PC	63.5	0.899998							
13	11		0	0							
14	12		0	0							

If you have done this I would recommend you now make a copy of this data file because if things go wrong you may have to re-enter all your data. To do this perform a 'Save As' and call the new file something you will remember and store it somewhere you will also remember. Retain the .CSV extension to the file name.

Process

Now you will be aware of my love of spreadsheets .... and my lazy man's approach to doing things and I got to thinking. What if I could edit the Tool Table offline in Excel, keep my existing descriptions (which I was so familiar with) but add the extra coded text needed for the PathPilot Conversational routines and search compatibility ?

This ought to be a simple process and with some spreadsheet frills could be made quite painless.

There are two spreadsheets involved - the one I have already described which has been exported out of PathPilot and which opens the Tool Table as a CSV file for viewing in Excel. The second spreadsheet (Tool Table Editor) takes this data, edits and adds to it. The resulting modified data is then copied back over the first sheet for importation back into PathPilot. I have to emphasise that this is really only a one off process to get your existing Tool Table up to the current Tormach recommended format for searching and so be more useful for Conversational milling. Going forward when you add new tools you should use this new recommended format as fits the tool in question.

Beware that if you follow the procedure I am about to describe and subsequently repeat it you will duplicate your text entry. (Hence making a separate copy of the file before you begin).

Technique

The manipulation sheet (Tool Table Editor) uses two features of Excel – 'Data Validation' and the calculation known as 'Concatenation'.

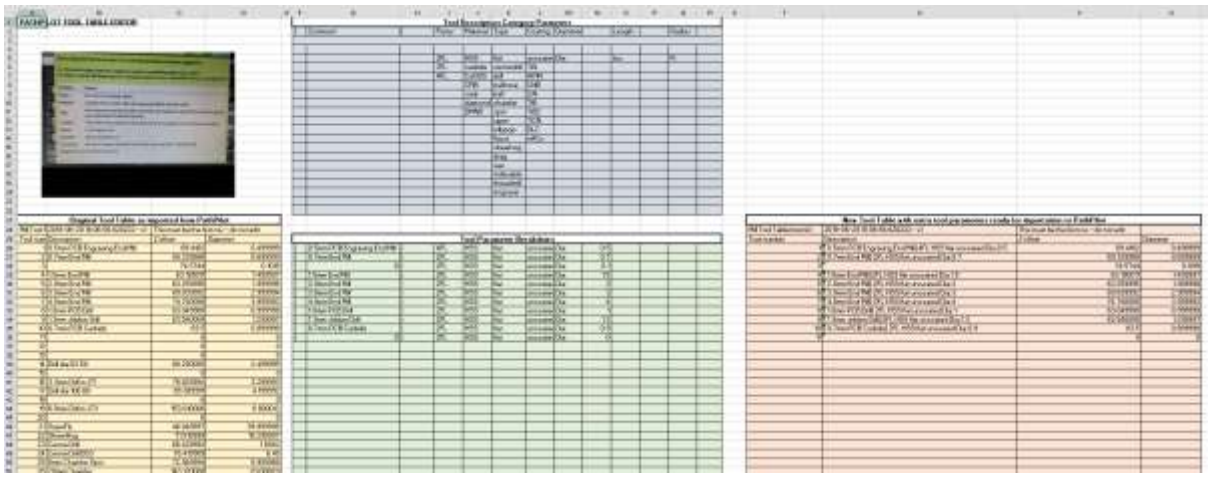
'Data Validation' gives drop down lists of possible entries into a field for the operator to select without having to re-type or copy. 'Concatenation' allows you to stitch together a number of fields into one new field. You can add things like spaces as part of this to make it look the way you want it.

There are a couple of other minor calculations used. The first is 'IF' which allows you to say things like "if there is nothing in this field then leave the result empty but if there is something then enter something else instead". In this instance, this allows the Excel sheet to ignore any existing Tool Table lines that are empty.

The second useful calculation is 'ROUND'. This allows you to take a number in a cell with lots of decimal places and round it up to the nearest value with your choice of the number of decimal places. We are going to use this to round the existing tool table diameters.

Tool Table Editor File

If you open the Tool Table Editor file you will see at the top left the same terrible photographed image of the image of the PathPilot screen detailing the intelligent code formats. I put this there to remind me what PathPilot was expecting to see in the description field.



Below this is a pale yellow box which is the original exported data from PathPilot. The first process is to copy the CSV file data to this yellow area.

To do this, go back to the CSV file that you first opened from the Export data and highlight all 1000 rows of data plus the two header lines and highlight out across the four columns (A,B,C,D). In cell notation you will be highlighting (A1 ...D1002). Once highlighted press Control+C to copy your data to the computer internal clipboard.

Now go to the Tool Table Editor file and put the cursor on cell A24 and press Control+V. This will copy your data from the computer clipboard to the Editor file in the correct place.

Next let's look at the grey box which shows all the parameters that PathPilot recognises as descriptions for the tools together with a listing under each parameter of the preferred text that you should use. Note that at the top of each list is a blank line which will also appear in the listing as something you can select.

(Note that if Tormach change or add to these options you can edit the list in question by overwriting a cell or adding a new option).

F	G	H	I	J	K	L	M	N	O	P	Q	R
Tool Description Category Parmeters												
[	Comment	]	Flutes	Material	Type	Coating	Diameter		Length		Radius	
			2FL	HSS	flat	uncoated	Dia:		loc:		R:	
			3FL	carbide	centredrill	TiN						
			4FL	CoHSS	drill	AlTiN						
				CRB	bullnose	CNB						
				carb	ball	ZrN						
				diamond	chamfer	TiB						
				DMND	spot	TiB2						
					taper	TiCN						
					lollypop	DLC						
					flycut	nACo						
					shearhog							
					drag							
					saw							
					indexable							
					threadmill							
					engraver							

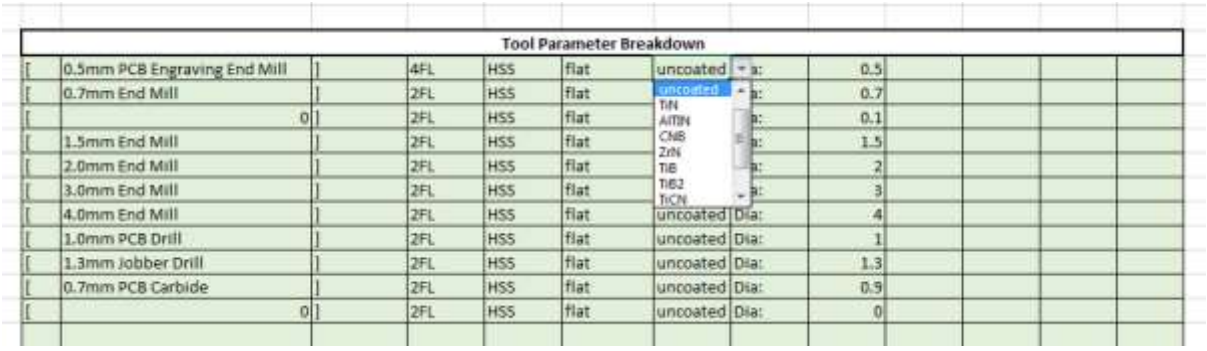
Next let's look at the green box below the grey one. This is where you select the options you wish to use for the tool in question.

Tool Parameter Breakdown												
[	0.5mm PCB Engraving End Mill	]	4FL	HSS	flat	uncoated	Dia:	0.5				
[	0.7mm End Mill	]	2FL	HSS	flat	uncoated	Dia:	0.7				
[	0	]	2FL	HSS	flat	uncoated	Dia:	0.1				
[	1.5mm End Mill	]	2FL	HSS	flat	uncoated	Dia:	1.5				
[	2.0mm End Mill	]	2FL	HSS	flat	uncoated	Dia:	2				
[	3.0mm End Mill	]	2FL	HSS	flat	uncoated	Dia:	3				
[	4.0mm End Mill	]	2FL	HSS	flat	uncoated	Dia:	4				
[	1.0mm PCB Drill	]	2FL	HSS	flat	uncoated	Dia:	1				
[	1.3mm Jobber Drill	]	2FL	HSS	flat	uncoated	Dia:	1.3				
[	0.7mm PCB Carbide	]	2FL	HSS	flat	uncoated	Dia:	0.9				
[	0	]	2FL	HSS	flat	uncoated	Dia:	0				

The first column has an opening square bracket which tells PathPilot that some non-technical text is to follow which it should store but which it will ignore. The second column is the original description text that had been entered in PathPilot for each of your tools. This is the description you are familiar with and want to keep. The third column is a closing square bracket to tell PathPilot the old text has finished.

These three columns do not change in their action for each tool. They grab your old description and copy it inside the square brackets to become part of your new description. Because the old description is inside the square brackets, PathPilot ignores it as not being of interest but clearly to you it means a lot.

The spreadsheet will now add the new parameters after the brackets which PathPilot can understand. The next 10 columns in the green box do this. They look pretty boring but there is magic in some of them. The first four when you click into them offer you a drop down listing of the options you can select for that parameter. The list is automatically created from the listings in the grey box above. All you have to do is click on the little down arrow by the side of the cell and slide up and down the list until you see the option that best fits the tool in question.



Tool Parameter Breakdown												
[	0.5mm PCB Engraving End Mill	]	4FL	HSS	flat	uncoated	a:	0.5				
[	0.7mm End Mill	]	2FL	HSS	flat	uncoated	a:	0.7				
[	0	]	2FL	HSS	flat	TiN	a:	0.1				
[	1.5mm End Mill	]	2FL	HSS	flat	AlTiN	a:	1.5				
[	2.0mm End Mill	]	2FL	HSS	flat	CNB	a:	2				
[	3.0mm End Mill	]	2FL	HSS	flat	ZrN	a:	3				
[	4.0mm End Mill	]	2FL	HSS	flat	TiB	Dia:	4				
[	1.0mm PCB Drill	]	2FL	HSS	flat	TiB2	Dia:	1				
[	1.3mm Jobber Drill	]	2FL	HSS	flat	TiCN	Dia:	1.3				
[	0.7mm PCB Carbide	]	2FL	HSS	flat	uncoated	Dia:	0.9				
[	0	]	2FL	HSS	flat	uncoated	Dia:	0				

The next column is fixed and will always say "Dia:"

The next one uses the original Tool Table data that specified the diameter of the tool. You will notice that this has too many decimal places in the exported data so we use the 'Round' function to restrict the data to just 1 decimal place.

The last four columns are probably less likely to be used. These are Length of Cut and Radius. If these are to be used the drop down list will allow you to select "loc:" and "R:" and then enter a value in the following associated column. If you don't want to use these then select the 'blank' in the dropdown menu options for these columns and do not put any numbers in the associated cell.

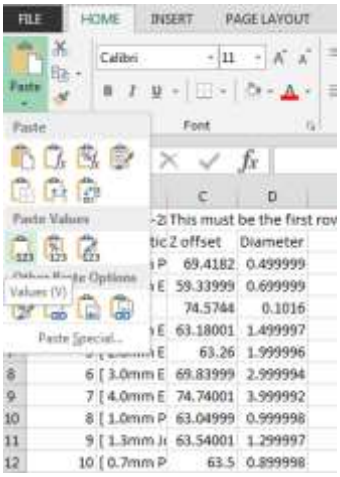
You will notice that as you change the drop down choices in the green boxes so the corresponding entry in the pink area in column U changes to match. This because the data in column U is using the 'Concatenation' command to glue together the contents of each of the columns in the green area.

Apart from column U, all the other data in the pink area is copied from the original data you imported. This pink area will become the new Tool Table. You will import it back into PathPilot but only when you are happy with your edits and changes and have double checked them.

Importing back into PathPilot

To do this you must highlight the whole of the pink area (cell A24 to W1025) and Copy it to the computer's temporary clipboard storage using Control+C.

The next step is important. Go back to the original CSV file taken from PathPilot and put your cursor in the top left cell (A1). If you now tried to copy using Control+V you will create linked data, not actual data. You must instead click on the small down arrow on the Paste icon on the Excel tool bar whereupon more selections for the type of Paste are offered. Select and click the left hand icon in Paste Values (the one with the small 123 only). This will transfer the calculations made in the pink area on your Text Editor sheet as pure text with no confusing calculations.



Your replacement Tool Table is now ready to be transferred back into PathPilot. Do a 'Save As' and rename this new file something like "New Tool Table.csv" and save it either to your memory stick, the Tormach shared network folder or Dropbox as appropriate to your configuration. Excel will probably ask you if you really want to save as a .CSV and you should 'Yes' to this.

Go back to PathPilot Offsets tab and press "Import". You must now point to your new tool data file and click OK. You should immediately see your new format data in the Tool Table.

Here is another terrible photo screen shot of my new Tool Table. For clarity I had only enabled the dia: parameter. You can see Dia: plus the size after my old description in the square brackets.

I said earlier that this routine can be done as a one-time update. If you run it again you will find all your new parameter data now appearing between the two square brackets as text as well as your original description. Beware !