

# Release Notes for NCG CAM v19.0.13

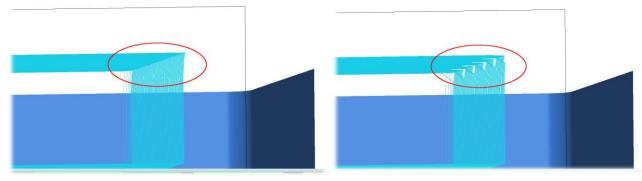
18th February 2024

This new point release fixes several problems and there are several improvements too. One of the fixes relates to linking issue for waterline passes and simplified leads, so it would be wise to install this update as soon as possible. Some of the improvements affect the linking of edited area clearance and waterline passes to give fewer retracts and a smoother motion where possible. (Note: v19.0.12 was not released.)

#### General:

8019: Area Clearance Passes: The default tolerance for Area Clearance, Core Roughing, and Zigzag Roughing passes has been changed. It is now one third of the XY Thickness but will not exceed 0.5mm. Before the Z Thickness was also considered, and the tolerance could exceed 0.5mm.

8066: Area Clearance Passes: Improved cases where Z slice passes were taking shortcuts (truncating corners) when the passes changed between "on surface" and "on boundary" conditions. This would in some cases result in a small amount of material being left on as the cutter moved from a surface contact to a constraining boundary limit. Also fixes tickets 9524, 6538 and 3058.



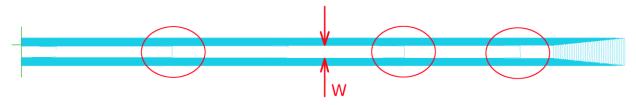
In v19.0.12

In v19.0.11 and older

9410: Waterline Passes: Improved the results of Waterline passes, in cases where contact angle limits are used, to further reduce the possibility of passes being made outside the contact angle limits.

To try and show the issue here, passes were created in a narrow slot, the bottom of the slot was 5° from horizontal, the width (W) between the passes is small, about 10% or less of the cutters diameter. The passes should be created between 20° and 90°, the highlighted bits of pass are on a surface 5° from horizontal.

In v19.0.11 and earlier. Bits of passes can be seen in the bottom of the slot detail, which is outside the contact angle limits.

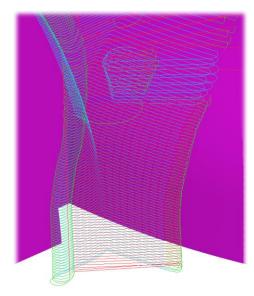


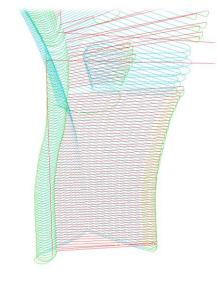
In v19.0.12 the improvement prevents the small passes being created outside of the contact angle limits.





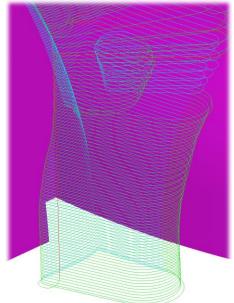
9836: Linking: Improvements have been made to the linking motions, so we can produce non-retracting smooth (direct) connections more often and more consistently for Rest Area Clearance and Waterline style toolpaths.



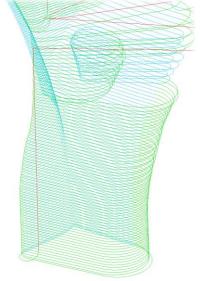


In v19.0.11 and earlier, the linking would typically arc up, the make a short rapid move before arcing down again and finally arcing back on to the next pass.

Rest roughing (with surfaces)



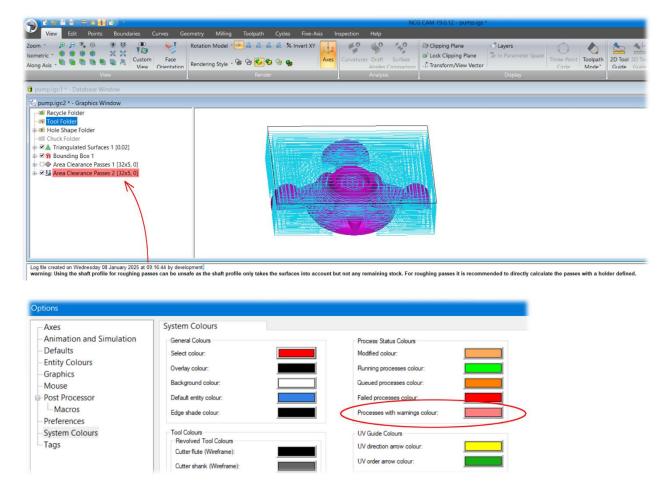
### Rest roughing (without surfaces for clarity)



In v19.0.12 the improved linking moves between the same passes has been improved to make a smooth horizontal arc off, into a smooth ramping motion to the horizontal arc on for the next pass. This will generally give a smoother machine motion and fewer retractions.



9977: User Interface: Plans that produced warnings message in the database log window that should be checked are now highlighted in the tree view in a new colour, which is definable in the system colours. Database: Cancelled plans that are saved to a database now no longer start running on database load. Also fixes ticket 9219.



9982: Curves: Converting a canned cycle tool to a curve created no output, but the plan did not fail. This has now been fixed, and canned cycle tools can be converted to curves correctly now.

9983: Turning: There was a problem when loading a turning tool from a tool database with no holder causing a validation failure in the machining plan, this has now been fixed.

9984: Post processor: Heidenhain: Added the option, "Output Q395 = 0 for Cycle 200, 203 and 205" to suit some newer versions of the Heidenhain control that require Q395 in the cycle parameters. By default, the option is set as false, so existing post processors are not affected.

Options		
Axes Animation and Simulation	Macros Post processor: Heidenhain	
Entity Colours	Parameter	Formula
Graphics	215 Old drill cycle one	false
Mouse	216 Output dwell with CYCL DEF 200	true
Post Processor	217 Output Q395 = 0 for Cycle 200, 203, 205 218 Text to be output before a cycle	false
Macros	219 Text to be output after a cycle	
Droforoncos	220 Text output before spot drilling cycle	



9988: User Interface: Fixed errors that could occur when attempting to move plans underneath a post-processor plan in the tree view.

9989: User Interface: Fixed a problem with plans being shown in the wrong order when moved to the bottom of the tree view.

10007: User Interface: Five axis: The dialog wording for the Five axis console, Folder Selection has been improved, from "Folder" to "Triangulated Surfaces".

Tool	5 Axis Console
Cutter	Surface paths Tool axis control Gouge check Link Roughing Utility
Advanced Holder	Calculation based on Surfaces ~ Pattern
5 Axis Console	Parallel to surface $\checkmark$
Inputs	Edit surfaces:
	Drive surface Drive surfaces offset Folder Selection ? X Triangulated Surfaces Celted Triangulated Surfaces 3
	Triangulated Surfaces:
	Area OK Cancel
	Type Full, av
	Round corners     D Containment
	Extend / trim
	Andle range Surface edge handling

10015: Trim Surfaces: The Trim Surface to boundary option using XYZ trimmed surfaces was sometimes causing an exception and the surface(s) would not be trimmed. This has now been fixed by blocking this type of surface. If surfaces are to be trimmed to a boundary, the surface trimming needs to be UV, not XYZ.

10022: Linking: Fixed a problem which could lead to gouging lead arcs when passes have been created with very small tolerances.

10024: Linking: Rest Waterline Passes: Fixed a problem which could lead to gouges in Waterline linking when simplified leads were used, as the lead out was not applied correctly.

10028: Adaptive Clearance: The ConvexTip cutter type has been implemented for Adaptive Clearance. Select the Advanced Cutter shape to enable the required parameters. This cutter type is also available for 5 axis.

ool	Tool	
Cutter	Recent tools:	Please select
- Advanced Holder	Tool name:	ConvexTip[32x2.5 70, 0]
asses	Cutter diameter:	32
nking	Corner radius:	2.5
haft Profile	Taper (° / side):	0
puts	Upper corner radius:	0
	Upper diameter:	0
	Profile radius:	16
	Flat diameter:	10
	Flute length:	65
	Shank diameter:	32
	Body length:	70
	Overall length:	70
	Cylindrical length:	70
	Advanced	
(	Cutter: Conver	
	Barrel: Standa	rd 🗸
	Shank definition (d, z):	; 32, 0, 32, 5
	Toolholder (d, z):	
	Shank clearance:	0
ын.,	Shank clearance: Holder clearance:	



10034: Linking: Waterline Passes: Fixed a problem which meant we weren't using simplified leads for the first and last pass fragment in a stack of passes.

10037: User Interface: The wrong cycle tool diameter was being used in the recent cutter list in the tool page, if a user defined shank definition was used. There was also an issue when export cycle tools from a tool database to a text file if the user had defined the shank definition. These issues are now fixed.

10044: User Interface: There was a problem with the passes folder plan name when creating a Bore Milling cycle and the depth adjustment parameter was potentially wrong (depending on which page the shank diameter was defined), this has now been fixed.

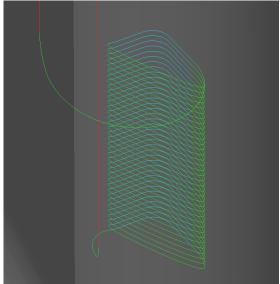
10045: Import: Datakit libraries have been updated to 2025.1. This gives supports for SOLIDWORKS 2025. Also fixes ticket 10036

About NCG CAM 19.0					
General Translators Options Modules System EULA					
<	Module Catia v4 3D Catia v5 GRANITE Parasolid Rhino SolidWorks Unigraphics NX	Version Releases 4.15 to 4.24 Releases 7 to 33 17.0.0.0 Parasolid V37.0 Rhino V8 SolidWorks 2025 NX 2406	Licensed Yes Yes Yes Yes Yes Yes Yes		

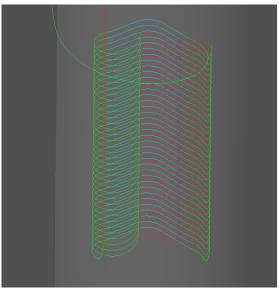
10050: Linking: Linking of Rest Roughing and Rest Core Roughing Passes were not always respecting (retracting far enough to clear) the Clamp Surfaces. This has been fixed.

10057: User Interface: There was a problem when using the Save As context menu option from the image on a tool page. If the tool name contained special characters (asterisk \*, backslash \, forward slash /, angle brackets < and >, quotation mark ", pipe |, question mark ?), the dialog would not appear, this has now been fixed by the removal of any special characters from the default file name.

10059: Linking: Improvements have been made so we can create non-retracting linking moves for edited area clearance and waterline passes in more cases. Specifically, if we cannot fit the lead arcs, we now discard the lead out arc and try and spline directly onto the lead in.



v19.0.12 – edited area clearance toolpath.



v19.0.11 – edited area clearance toolpath.



10061: User Interface: The Label Geometry option was allowing editable plans as input, this should not be permitted and has now been fixed by converting the inputs to non-editable plans.

10067: User Interface: It is now possible to save a tool with the context menu "Save As" option on a Tool, Cutter or Holder page to write the tool to an XML file in Scalable Vector Graphics format (SVG).

10071: User Interface: Fixed a user interface hang that could occur when manually starting a paused plan.

10076: Linking: Fixed a problem with the linking which could cause exceptions when running in more than one thread.

10077: Linking: Improved performance of linking plans when system memory usage is high.

10084: Linking: Waterline Passes with simplified leads and shortest route retracts. Fix an issue which meant rapid moves were not always clear of surfaces and could cause gaps in toolpaths.

10086: Linking: Fixed a problem with the linking of Rest Area Clearance Passes with Minimal Retracts which could cause the retracts to be lifted too high.

10088: Tool Database: Fixed an issue where the image was not updating correctly after deselecting an item on the Tool Database page.

10008: Macros: Macro comments were being output regardless of "Save user variables" setting, this has now been fixed. The default has now been changed to set "Save user variables" to true instead of false.



# Release Notes for NCG CAM v19.0.11

14th November 2024

In order to keep the retracts during the rest roughing linking lower, we calculate the material still present in the process during the linking since v19.0.09. Shortly after completing v19.0.10 we discovered that, particularly when using ball nose cutters, it can happen that the cutter moves through material during the positioning that is later removed. We immediately fixed this error #9966 and created v19.0.11. Please therefore take notice of the release notes for 19.0.11 and 10.

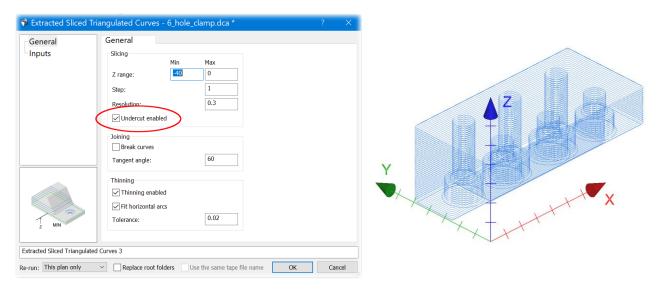
### If you have v19.0.09 installed, you should install 19.0.11 as soon as possible.

#### Important:

9966: Linking: Fixed a problem with the modelling of dynamic stock for rest roughing linking and using minimal vertical retracts. Which could lead to rapid moves at unsafe heights through the remaining stock material, with a risk for tool breakage. Also fixes ticket 9980.

#### New feature:

3484: Curves: It is now possible to extract slice curves from surfaces taking into account undercut areas of the part.



### By default the **Undercut enabled** option is unticked.

#### General:

9940: User Interface: Dialog guide graphics have been added to the Extract Slice Curves and Extract Curves dialogs.

9953: User Interface: The options dialog would allow you to set an invalid parameter and the OK would give a popup warning dialog but it would continue and set the parameter incorrectly. Now the dialog remains open after the error message has been confirmed and cannot be closed until the invalid value has been corrected.

9964: Waterline Stepover Passes: With Waterline Stepover Passes it could happen that the order of the linking was not correct and lower areas were linked before the upper ones. This particularly affected parts with steep walls. Now the order is correct.

9967: Five-Axis: For the transfer to the ModuleWorks libraries, sometimes surfaces have to be re-triangulated in the background. There was a problem that one surface was not trimmed correctly. This problem has now been resolved.



9968: User Interface: Dialog guides have been added to the Shallow Area Detection boundary, Theoretical Rest Areas boundaries, Rest Area boundaries and Cutter Contact Area boundaries.

9969: User Interface: The Bounding Box dialog guide graphics now uses two planes one at Z Min and another at Z Max, instead of a single plane just above the Z Max value.

eneral	General								
puts		Min	Max	Centre	Length				
	X:	-30	30	0	60				
	Y:	-20	20	0	40				
	Z:	0	37	18.5	37				
	Offset:		0					A	Z
	A Rotation:		0						
	B Rotation:		0						
	C Rotation:		0			/			
	Reverse	rotations					Y		
	Rotation mo	del:	AC	~					
ding Box 1									and the second

As a reminder: The dialog guides can be temporarily switched off by pressing the left mouse button in the dialog and tick or untick **Display Dialog Guides** in the context menu. If you don't want dialog guides at all, you can turn them off in **Options > Preferences** under **Menus and Dialogs**.

	Min	Max	Centre	Length	
X:	-30	30	0	60	
Y:	-20	20	0	40	
Z:	0	37	18.5	37	
Offset:		0			
A Rotation		0		Use as Default View Formulas	
B Rotation:		0		Reset	
C Rotation:		0		Reset to System Defa	ults
Reverse	rotations			Copy Parameters	
Rotation m	odel.	AC	~	Paste Parameters	
			~	Display Dialog Guide	s 🔓



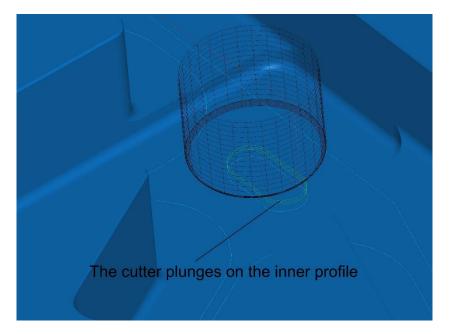
# Release Notes for NCG CAM v19.0.10

05th November 2024

### General:

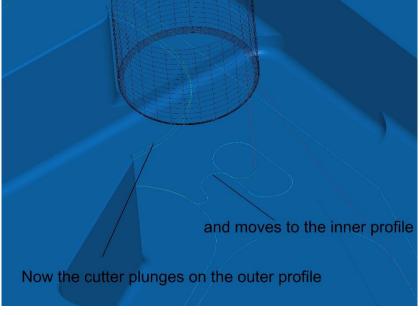
8131, 4394: Linking: Profile ramps. We now allow profile ramps onto the midpoints of open fragments (the smaller bits of line and arc that you see as the passes). This also fixes ticket 4394.

If an area is very narrow during Area Clearance roughing, so that only one path is created on the outside and inside, and the area is also too small to plunge via a helix, the cutter has previously plunged via the profile on the inside. As in the image below.



In the case of an insert cutter, this could result in the cutter getting stuck.

Now the cutter no longer plunges over the small profile, but over the outer profile and moves inwards to clear the area. As shown in the picture below.



If there is enough space for the helix movement, the plunging is carried out as before with a helix.



8988: Turning Chuck: New Chuck Database has been added to Libraries

Secycle Folder	Libraries	?	×
Tool Folder     Hole Shape Folder     Chuck Folder     Chuck Folder     Create Chuck     Create Chuck     Chuck Library     Export to Chuck Database     Import from Chuck Database     Import from Chuck Text File     Select All	Tool Database HoleShape Database Materials -Chuck Database	Chuck Database         Manage         Mex         New         Import From Text         Add Existing         Delete         Set As System Default         Chuck Name Margin Defiltion         + triat 1         + triat 2         + triat 2	3
		Add Edit Copy Delete OK Cancel	

Mouse right on the Chuck folder in Accessing the Chuck database via the libraries. the contents tree.

9319: Linking Rest Finishing: Improvements have been made to the link ordering of rest finishing passes, so we take into account the height of machining passes and not just their steepness. **Note:** For old databases, the passes will need to be rebuilt and re linked.



9677: ModuleWorks: The five axis libraries have been updated MW2024-08 Service Pack 1

9865: Five-Axis: If a 3+2 toolpath is created with the Five-Axis module using the Three-Axis output, and the toolpath is transformed afterwards, the rotation would not be output in the NC program. Also the creation of Stock Models was not possible, these issues have now been fixed.



9870: User Interface: Cutter Animation. You were unable to use the numeric keypad "." keys to set the X,Y,Z position of the cutter in the dialog, this has now been fixed.

Cutter To	olpath	Tools									
Feedrate(%):	100	:									
Position:	243	•	-							1985mm	
Path type: Programmed f	eedrate:	Cutting 1193				HI H	•				
Estimated time		_00:01:44	瞈	~	XYZ:	30.8	-19.1	50	$\supset$		
					X	-65.2724		23.6726	Z	70.5050	

9871: Post processor: Gpost: For a left hand tapping cycle, the pitch is now output as a negative value in the APT output file.

9878: Curves: New options have been added to create a tessellated curve folder from Shaft Profile data and tool plans which create curves of the shaft profile and tool definition respectively.

	View	Edit	Points	Bour	ndaries	Curves	Geometry	v Milling	Toolpath	Cycles	Five-Axis	Inspection	Help	$\sim$	
	ଜ୍ମି 🚱 ଜ ଜ				() ()	XI	⇒( <b>₹</b>	2 7		$( \downarrow )$		なう	21	10	11
× 4	<b>6</b>		act Ext	ract	Join	Break Re	verse Togg	e Flow Clos	e Extend	Thin Plan	arize Z Filter	Trim Offset	Convert	Convert	Direc
		Curv	es Slice (	Curves	Curves	Curves C	urves Dire	ction Curv	es Curves C	urves Cur	ves Curves	Curves Curves	to Curves	Shaft Profile	e Arro
View	Rende	r	Extract											onvert	Gui
🗉 🥵 R	ecycle F	older									/			$\sim$	
	/erkzeu	gordn	er							_					
🖃 🔳 B	ohrung	- sforme	enordnei	r					_						
- 🖬 S	pannfut	terord	ner					_							
· 🖉 🍡	Transf	ormed	Surface	s											
	Water	ine To	olpath 1	1 [20x <sup>-</sup>	1, 0]										

The curve can then be used directly to produce a turning toolpath, to make a custom tool holder.

9887: Adaptive Clearance: The **Safe Distance** parameter has been added to the Linking page of the dialog and the default is set to true. It ensures that during a positioning move in federate, the cutter will keep this distance from the material that will later be removed during the same machining process. This means that there is no collision with any remaining material.

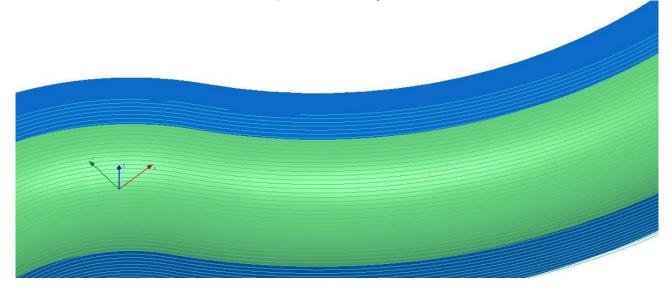
Adaptive Clearance To	oolpath - Part1_2.dca *						
Tool	Linking						
Cutter	Clearance			Adaptive links			
Advanced	Height:	99	9	Link clearance:			0.5
Holder	Clear surface by:	17	7	Stay on surface	within:		100
- Passes - Linking	Retract to Max Z		<	Safe distance	:		1
-Shaft Profile	Strategy			Home Point			
Inputs	Between groups:	Retract to clearance area	$\sim$	Start from ho	ome point		
	Between slices:	Retract to clearance area	$\sim$	XYZ:	0	0	149

9897: Turning: There was a problem if a tool was used from the tool database it was not checked if it had been modified when doing a properties on the Passes plan, this has now been fixed.

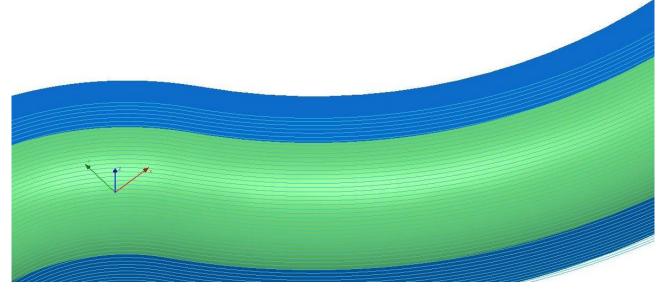


9899: UV Machining: Fixed a problem which could lead to missing or broken passes along the edge of the surfaces, creating unnecessary retract and linking moves.

Below: Passes created before v19.0.10. the passes at the edge are broken.



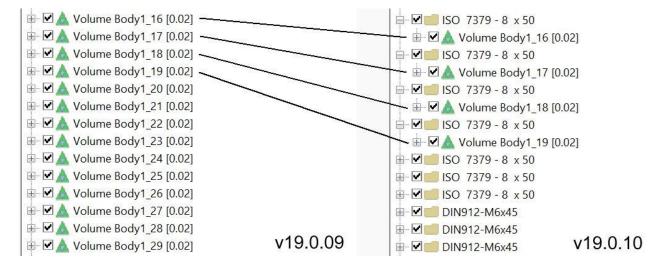
Below: Passes created with 19.0.10. The passes at the edge are closed.





9900: User Interface: The top folder was missing if a STEP file was loaded with Load Component Information and the folder only contained one triangulated surface or curve plan.

The image below shows on the left the tree in v19.0.09, here only the surface folders were created. On the right is the directory tree in version 19.0.10 after reading in the same file. Here the main folders were created with the name of the component, and below them the surface folders. The name of the component in the main folder makes it much easier to sort the individual parts of the component.



9904: Tessellation: There was an issue with building the linearized closed curve, where the triangulation occasionally failed. Surface could be broken depending on the triangulation tolerance. This problem has now been resolved. This also fixes ticket 9786

9915: Linking: Fixed a problem which could lead to missing retract moves to the Safe Z in some 3+2 toolpaths.

9924: Post processor: Siemens: Added options to output the parts limits, motions limits and the stock / tolerance details. Be default they are not output so existing post processors will not be affected. Help file updated to match changes.

9928: Stock Models: There was a problem creating stock models from a toolpath with a Centre Drill, the plan would fail, this has now been fixed.

9935: User Interface: Dialog guides have been added to show the min/max Z Limits to the Edit Passes to Z-Limits dialog .

9939: Linking: Zigzag Roughing: Fixed a problem which could cause NCG CAM to crash.

9942: Transformed Toolpaths: There were examples where a toolpath rotated around the Z axis would have the wrong rotation specified in the NC tape file, this has now been fixed.

9947: Stock Models: When creating a stock model using a rotation with negative values you were not given the option to create an NCG CAM style stock model when you should have, this has now been fixed.

9949: Import: The Datakit libraries have been updated to 2024.4. This supports Parasolid V37.0 and UG NX 2406. Also fixes ticket 9838

9959: Perpendicular Raster Passes: Fixed a problem which resulted in the Z limits not always respected



#### Macro language:

9907: Macros: An option has been added to the Save As Macro command to "Save user variables" in a saved macro.

	Dateiname:	62347_000	_0.mco		~	Speichern
	Dateityp:	Macro Files	(*.mco)		~	Abbrechen
Display:	No dialogs	~	Use input geometry	Prompt for project settings		
On completion:	Do nothing	~	Surface independent	Save folder names		
			Drilling	Save user variables		

If the option is activated, the user variables defined in project settings and the associated comments are saved in the macro and generated when the macro is executed.



## Release Notes for NCG CAM v19.0.09

29th July 2024

This new point release covers several little improvements, the ones likely to be seen as most important are the reduced retracts when rest roughing, smoother simplified leads for waterline toolpaths, there are other improvements to other existing features too.

#### General

8832: Adaptive Clearance: It now possible to set a spindle speed decrease/increase when using ramping helix move into the job, this is done on the **Cutting Parameters** dialog, on the **Feedrate and Spindle Optimisation** page. Some cutter manufactures suggest a reduction of about 35%. A negative value is needed to reduce the spindle speed.

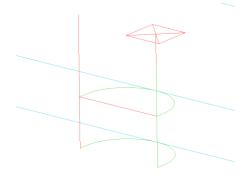
🗘 Cutting Parame	ters - CoreCavity_box.IGS *					
General Feedrate and S	Feedrate and Spindle Optimisation Path Shape Optimisation					
Inputs	Adjust feedrate for path shape					
	Min % : 50 Max % : 100					
	Min % change threshold: 5					
	Full-Width Cut Optimisation					
	Adjust feedrate for full-width cuts					
	Full-width cut % reduction: 60					
	Spindle Speed Optimisation					
	Adjust spindle speed for ramping moves					
	Change % :					

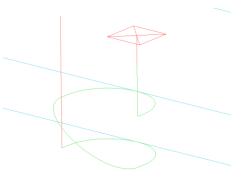
Currently this only works with the GPost, ISO, Siemens post processors for testing, other macros will follow after the testing.

**Note:** If using this feature, you should first check just how the spindle handles the speed changes smoothly before actually machining anything. Ensure there is no dwell between spindle speeds, especially if the machine switches between high and low ranges.

9660: Linking: Simplified leads. We now discard smooth connecting moves between simplified leads if the connection would be lifted.

9688: Linking: A new option has been added to the simplified leads dialog, **Prefer smooth connections**. This allows the user to control whether we try and create smooth, non-retracting connections between the leads, or not. The new smoothed option is enabled by default, and causes the software to behave as before.





Simplified leads without smoothing Rapid connections

Simplified leads with smoothing Smooth connections



Minimise trimming Fully trim pass		Lead out:	2
		Horizontal Leads	
Frimming Max trimming distance:	2.2	Lead in:	6.175
Max uninning distance.	En 9 En	Max ramp angle:	10
Simplified Leads		Ramp height offset:	3
Simplified leads		Lead out:	6.175
Prefer smooth conne	ctions		
Arc in angle:	90	Lead out angle:	0
Linear extension (in):	1		
Arc out angle:	90	Ramp extension:	1.1667
Linear extension (out):	1		
Loop overlap:	0		

9732: Import: Updated Granite to v17.0. This provides support for Creo 11.0 files.



9743: Linking: Axially Offset Horizontal Area Passes: We now consider the axial offset step when setting up the profile **Ramp height offset** distance.

9757: Drilling: There were cases where defining a very small drill would cause an exception, this has now been fixed.

9784: Raster Passes: Tangential and horizontal extensions were not always being applied correctly if a pass was split into multiple frags by the boundaries. This has now been fixed.

9787: Cutter Simulation: There were examples where using the **Skip to End** option on the dialog, sometimes long toolpaths would stop short of the end and you would need to hit the button again, this has now been fixed.

9799: Cutter Simulation: A list has been added to the dialog to show any collisions detected, this replaces the list being shown in the database window.



9799: Cutter Simulation: If **Enable Collision Checks** is activated in the Cutter Simulation, collisions between the tool and the material to be removed are now displayed in the Cutter Simulation dialog.

There are three types of collisions:

- Rapid The flute moves through the material in rapid instead of at feed.
- Shank The shank would remove material.
- Holder The holder would remove material or collide with the material.

The dialog shows in which tool path the collision occurs and at which position.

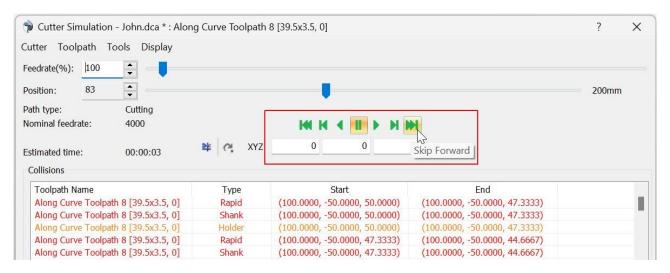
4	on - John.dca * : Alo									?	×
utter Toolpath	Tools Display										
eedrate(%): 100	✓ Enable Collisi	on Che	ecks	Ν							
Position: 200	Save As Stock	< Mod	el	43						200mm	
Path type:	Save As STL									20011111	•
Nominal feedrate:	Options				H H	• • •		M			
Estimated time:	00:00:03	跘	C,	XYZ:	0		0	0			
Collisions											
Toolpath Name			Тур	9		Start			End		
Along Curve Tool	oath 8 [39.5x3.5, 0]		Rapi	d	(100.0000,	-50.0000,	50.0000	)	(100.0000, -50.0000, 47.3333)		
Along Curve Tool	oath 8 [39.5x3.5, 0]		Shan	k	(100.0000,	-50.0000,	50.0000	)	(100.0000, -50.0000, 47.3333)		
Along Curve Tool	oath 8 [39.5x3.5, 0]		Hold	er	(100.0000,	-50.0000,	50.0000	)	(100.0000, -50.0000, 47.3333)		
Along Curve Tool	oath 8 [39.5x3.5, 0]		Rapi	d	(100.0000,	-50.0000,	47.3333	)	(100.0000, -50.0000, 44.6667)		
	oath 8 [39.5x3.5, 0]		Shan	k	(100.0000,	-50.0000,	47.3333	)	(100.0000, -50.0000, 44.6667)		
	oath 8 [39.5x3.5, 0]		Hold	er	(100.0000,				(100.0000, -50.0000, 44.6667)		
	oath 8 [39.5x3.5, 0]		Rapi	d	(100.0000,				(100.0000, -50.0000, 42.0000)		
	oath 8 [39.5x3.5, 0]		Shan	k	(100.0000,				(100.0000, -50.0000, 42.0000)		
Along Curve LOON	ath & [30 5v3 5 0]		Hold	ar	(100 0000				(100 0000 -50 0000 42 0000)		
	212										

The shaft and holder are always checked. In order to detect rapid moves in which the flute moves in rapid through the material, the **Material Removal** check for the **Flute** must be activated in the Simulation **Options**, which is usually the case.

otions					?	
nimation and Simulation	on					
Wireframe Cutter		Bead		Simulation		
Number of rings:	2	Bead radius:	2	Mesh quality:	2	
Number of stripes:	50			Tool Material Removal		
Toolpath Rendering				Flute Shank	Holder	1
Trail length:	300	Last levels:	1	Direction		
Feedrate				Climb milling colour:		
	Min %	Max %		Conventional milling colour:		
Range:	0	4000				
Nominal feedrate:	4000			Collisions Collision colour:		



The collisions are also displayed when you jump directly to the end of the toolpath with Skip Forward.



If a collision is displayed in **orange** instead of **red**, it is not yet a collision, but it shows that the holder is closer to the material than the selected **Holder clearance**. This is the holder clearance that is specified in the simulation options and not the holder clearance in the passes calculation.

9802: Adaptive Clearance: When setting the intermediate step down greater than the step down, the dialog would not allow you to continue but gave no help on what was wrong, this has now been fixed with a suitable pop up message.

Tool	Passes			
■Cutter -Advanced Holder	Passes XY Thickness: Z Thickness:	0	Limits	×
Passes Linking Shaft Profile Inputs	Tolerance: Stepdown: Cutting type: Cutting	0.02 10 Oneway Climb	Please enter a number less than	
	Adaptive Stepd Adaptive st Step order: Stepdown: Profiling		OK	

9817: Adaptive Clearance: The permitted inputs has been made consistent with Area Clearance where you can use a stock model as the machining surfaces.

9822: User Interface: The Rotation Model controls in the Detect Holes and Transformation dialogs were not being disabled correctly in translated languages, this has now been fixed.

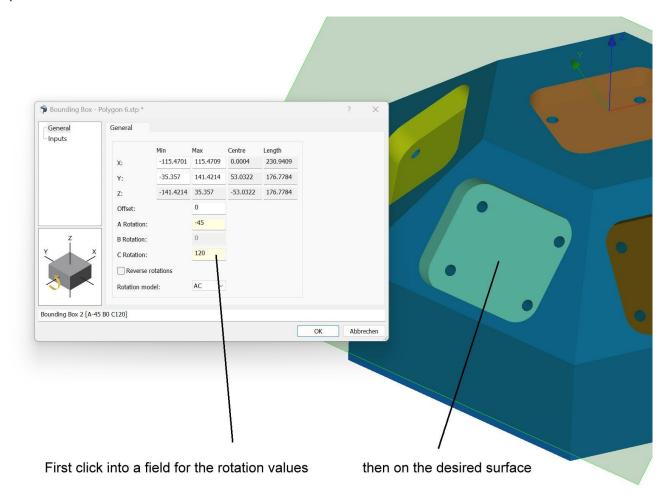
9825: Five-Axis: There were occasions when Five-Axis dialogs could crash when defining a lollipop cutter and swapping to the Passes page, this has now been fixed. End Mills were also being used to calculate cusp height these is not supported so now blocked.

9830: Import: The Datakit libraries have been updated to 2024.3.



9833: User interface: When aligning a 3+2 machining direction to a surface, pressing the N key and clicking on the corresponding surface allows the part to be rotated so that the surface is viewed perpendicularly. This allows a boundary to be created with the corresponding rotation. There is now an additional option to align the part that does not require the part to be graphically rotated to the correct position beforehand.

If a 3+2 Bounding Box is to be created, the dialog for the Bounding Box can be opened without the Ctrl key. If the rotation model is not specified in the dialog, first select the **Rotation model (e.g. AC, BC)**. Then click with the mouse in one of the fields for the rotation values and then on the surface to be aligned with. The corresponding rotation values are entered in the dialog. A dialog guide shows the position of the machining plane.



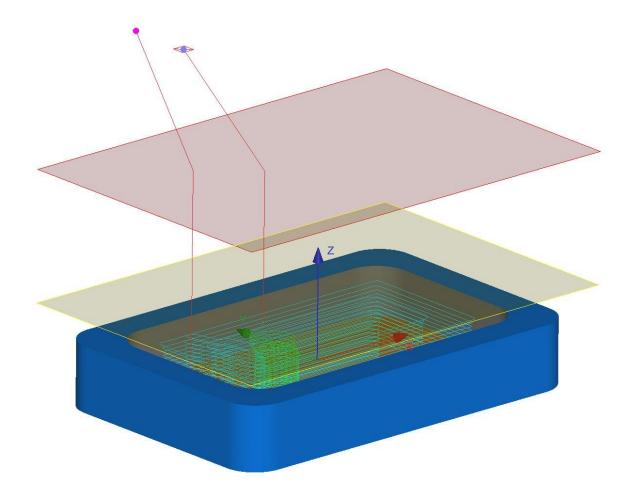
To create a 3+2 Silhouette in this way, start the dialog to create a silhouette boundary with the Ctrl key to display the advanced dialogs. In the dialog for the Bounding Box that appears, proceed as described above.

**Note:** If the Bounding Box or the Silhouette is to be created from selected surfaces, the surfaces must be selected before starting to create the boundary.

9856: User Interface: Cutter Animation - You were unable to use the NumPad +/- keys to set the X/Y/Z position in the Cutter Animation and Cutter Simulation dialogs, this has now been fixed.

9835 and 9852: User Interface: Some dialog guide graphics have been added to the Linking dialogs for Clearance planes, SafeZ, home and return points. A plane is displayed at the corresponding height. At a 3+2 machining, the plane lies in the machining plane. If home points are used, these are displayed as dots.





The dialog guides can be temporarily switched on or off by right-clicking the context menu in the dialog and selecting Display Dialog Guides.

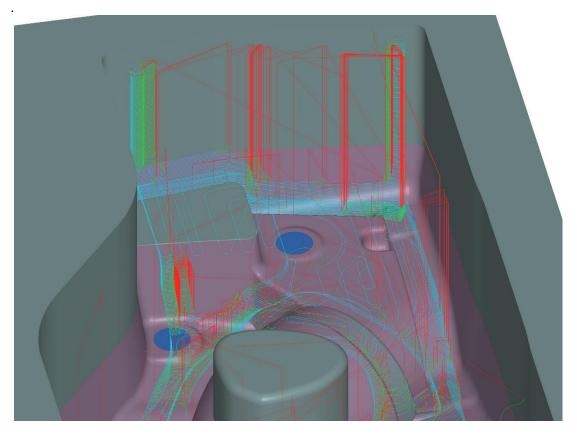
	Reset to System Defaults	>		
	Copy Parameters	>		
	Paste Parameters	>		
~	Display Dialog Guides		OK	Abbrechen

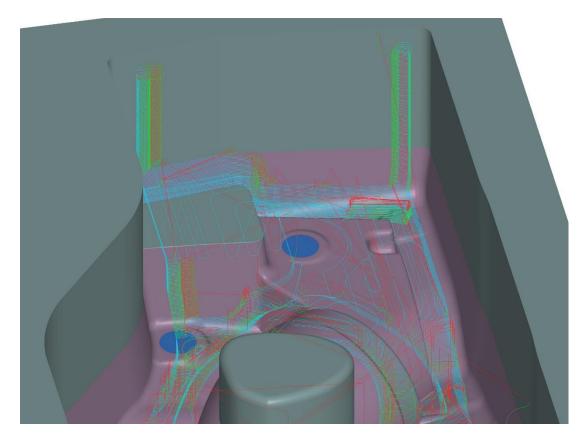
They can be permanently switched on or off under Options > Preferences > Menus and Dialogs > Display dialog guides.

9847: Linking: The linking of rest roughing passes has been significantly improved. When linking rest roughing passes, it is important to determine where there is still material during a machining operation that will later be removed in the same operation. This means that the cutter may not be allowed to pass through certain areas at the beginning of the machining operation, but may be allowed to pass through them later. Now, something like a dynamic stock model is calculated during the linking process in the background, which makes it possible to recognize where there is remaining material during the linking process. This allows fewer safety retracts to be made, as the system knows which areas have already been machined. Tests on 50 components have shown that the length of rapid moves is now 50% shorter on average.



The upper image shows the rest roughing toolpath created in version 19.0.08, while the image below shows the rest roughing toolpath created in version 19.0.09.







# Release Notes for NCG CAM v19.0.08

29th May 2024

This new point release covers several little improvements, like being able to append a toolpath at the post processing stage, and fixes to existing features.

#### General

5947: Post Processing: It is now possible to add a toolpath to the list to post process on the Toolpaths page.

General	Toolpaths			
🖻 Inputs	Toolpath Name	Est. Mach. Time	Tool Number	Tool Name
Toolpaths	Transformed Waterline Toolpath 99 [6x0.5, 0]	00:00:13	264	Toroidal[6x0.5 30, 0
	Transformed Waterline Toolpath 99 [6x0.5, 0]	00:00:13	265	Toroidal[6x0.5 30, 0]
	Transformed Waterline To Transformed Waterline To Folder Selection	on		? ×
	Transformed Waterline To Transformed Waterline To Transformed Waterline To	read Milling Cycle -	ОК	Cancel
	Transformed Waterline Toopath 100 [6x0.5, 0] Transformed Waterline Toolpath 100 [6x0.5, 0]		26	Toroidal[6x0.5 30, 0
	<ul> <li>Control Control Control</li></ul>	achining Time All ~	05:29:55	

Post Processor [O\_Ring\_001\_thread\_mill105.simpl]

Clicking the Add button will display an additional dialog from where the toolpath may be selected. It will be appended to the current selected toolpath whenever possible. It can then also be moved up the list as required.

7709: Stock Models: The creation of Stock Models containing thin features/walls has been improved.

8323: Surface Trimming: The performance of trimming surfaces with boundaries improved, this also fixes a failure in trimming when using the Keep Exterior option.

9160: Turning: Adding a front clearance angle for the turning insert (the original angle, is also renamed as Rear clearance). In addition it is possible to define a lead angle less than 90 degrees for the position of the insert

Tool	Passes					
Advanced Holder Chuck Passes Inputs	Passes Thideness: Tolerance: Stepover: Direction: Enable profile pass Clearance	0.5	Imits Mir Nameter: 0 2: 0	Max 340 77		
	Front angle: Rear angle: Enable radial groove	3				
ughing Passes 1						



9508: User Interface: A new option has been added to the Options > Preferences page to set the default "Display Dialog Guides" option (the graphical planes displayed for the Z-min / Z-max when creating passes).

Axes	Preferences	
Animation and Simulation Defaults Entity Colours Graphics Mouse Post Processor Macros	Triangulator Tolerance: Default Triangulation Tolerance: Disiling Data Depth Tolerance: 0.05 C Re-Triangulate when setting coordinate system Include hidden goometry by default	Contents Tree  Contents Tree  Show state by colour  Highlight newly created plans  Show simpler tree view  Automatically organise tree view  Delete empty organisation folders
Preferences System Colours Tags	Open File Organise by layer Load component information Convert to NURB Prefer XY2 timming for IGES files Prefer infinite geometry	Menus and Dialogs
	Ceneral Show tool axis on status bar Show tool axis on status bar Show tone and date on status bar Show scale on status bar	Remember Previous           Remember last tool used           Remember dailog values           Remember dailog values

9542: Five-Axis: Improvements to Linking Dialog page to include more options for the selected strategy.

ool	Linking									
Cutter	Clearance area				Home Point					
Advanced	Plane Direction:	Z ~	Height:	35	Start from	n home pol	nt			
Holder	O Cylinder Direction:	Z v	Radius:	69	XYZ:	0	0	25		
asses	Through point:	50	31	0	Return to	home noin				
nking	Sphere Radius:	70				nome pon				
puts					Start Hint	1000	102	102		
	Centre:	50	31	12	XYZ:	0	0	0		
	Clear surface by:	10			Leads					
		Entry/Exit						Ŷ		
	Entry/Exit First entry:	From dear	ance area	~	Radius:	2				
	Last exit:	To dearan		~	02030000	90				
	Last exet:	TO Gearan	ce area		arc (°):	L				
	Strategy				Length:	20				
	Gaps	Gaps Small Large						Tangential arc ~		
	Size: 0.6									
		3/20. 010								
	Slices	Silces Small Large								
	Sma Action: Direct - spline o									
		uive «[[Di	reu · spinie	curve 🗸						
	Size: 3									

9635: Revolved Stock Model: In turning mode, it is now possible to create a revolved stock model from a closed curve.

9662: Drilling Linking: The clearance height for drilling toolpaths is now derived from the setup clearance from the cycles plan's + 2mm as the default.

9670: User Interface: Add Shift and Control options to Label Geometry with Curves to give "Top Triangulated Curves" and "Bottom Triangulated Curves" respectively.

🛛 🚳 Recycle Folder
- 📧 Tool Folder
🗉 💷 Hole Shape Folder
Chuck Folder
□▲ Triangulated Surfaces 2 [0.02]
🕀 🗹 🖸 Extracted Triangulated Curves
🗉 🗹 Top Triangulated Curves 2
Bottom Triangulated Curves 3

9676: Linking: Fixed a problem which could lead to discontinuities in Waterline Constant stepover toolpaths.



9679: Turning: The calculated machining time for Facing and Parting Off plans has been improved.

9681: Cutter Animation: The programmed Feedrate was not displayed correctly for Turning Cutting Parameter plans, this has now been fixed.

9695: Drilling: There were occasions when reading an old dca file with a drilling plan could cause NCG CAM to crash due to a recursive parameter definition, this has now been fixed.

9696: Stock Models: There were occasions where a Multi-Axis stock model would cause a crash if the tool axis swapped directions between two consecutive moves this has now been fixed.

9698: Turning 2D Stock Model: There were examples when this could crash NCG CAM if empty output profiles were created, this has now been fixed.

9699: Turning Stock Models: Selecting a zero or very small Z range for the stock model would cause NCG CAM to crash, this has now been fixed.

9700: UV Machining: Fixed exception that could be thrown when calculating UV passes.

9702: Tool Database: A column for the tool comment has been added to the tool database tools list page.

Milling	Mill						
Cutter	Catalogue:	test1			~		
-Mill Centre Drill	older Clearance	Bottom Diameter	2	Length * 7	Definition *	Comment	7
Drill		30	40	40.1235	0, 0, 30, 0, 40, 20, 40, 40.1235		
Ream		11	46	80	11, 0, 13.72, 26.25, 15.52, 36.75, 18, 42, 18, 45,		
		38	40	23	0, 0, 38, 0, 40, 2, 40, 23		
Тар		11	46	80	11, 0, 13.72, 26.25, 15.52, 36.75, 18, 42, 18, 45,		
Bore		50	52	70	0, 0, 50, 0, 52, 1, 52, 70	index: 1	
Thread		16	20	40	0, 0, 16, 0, 20, 20, 20, 40	test comment	

9712: Linking: Fixed a problem which could cause gouges in axially offset core horizontal area toolpaths.

9713: User Interface: The UV Passes button on the Milling ribbon was not greyed out if a single Stock Model is selected which is not correct, this has now been fixed.

9714: Stock Models: Turning stock models now have the option to select tool parts which remove material, this is now consistent with the milling stock models.

General	General		
Inputs (	Resolution.	in Max 22.1213 77	

9719: Linking: Axially offset horizontal area and axially offset core horizontal area toolpaths. Fixed a problem which meant rapid moves might not respect remaining stock.

9723: Adaptive Clearance: The validation of the intermediate step down has been fixed to ensure that it is greater than or equal to cut tolerance and less than primary slices depth step.

9724: Linking: The retract clearances above machined slices are too low. This has been modified so we try and respect the clear slice by distances in all cases.



9727: Cutter Simulation: A new message has been added to the Collision checking option, to output a message to the database window. if a rapid move has a collision between the flute and the stock.

9728: Cutter Simulation: New options to set Gouge-Excess thresholds when gouge checking with cutter simulation have been added to the Options dialog.

tions					?
imation and Simulati	ion				
Wireframe Cutter	100 A	Bead		Simulation	
Number of rings:	15	Bead radius:	2	Mesh quality:	2
Number of stripes:	12			Tool Material Removal	
Toolpath Rendering				Flute Shank	Holder
Trail length:	300	Last levels:	1		
Trainiengui.		Last levels.		Direction	0
Feedrate				Climb milling colour:	
		Max %		Conventional milling colour:	
Range:	0	4000			·
Nominal feedrate:	4000			Collisions	
				Collision colour:	
				Shank clearance:	0
					1
				Holder clearance:	
				Gouges	
				Gouge colour:	
				In tol colour:	
				Excess colour:	
				Gouge threshold:	-0.1
				Excess threshold:	0.1
				Removed Material	
				Material colour:	
				. accruit corour.	

9730: Post Processor: DATRON next: Added a post for the DATRON next controller. Help file updated.

9731: Import: Datakit libraries have been updated to 2024.2. Supports Parasolid V36.1 and UG NX 2312. Also fixes tickets 9548 and 9596.

bout NCG CA	M 19.0		
General Translator	options Mod	ules System EULA	
	Module Catia v4 3D	Version Releases 4.15 to 4.24	Licensed Yes
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Catia v5	Releases 7 to 33	Yes
	GRANITE	16.0.0.0	Yes
<	Parasolid	Parasolid V36.1	Yes
	Rhino	Rhino V8	Yes
	SolidWorks	SolidWorks 2024	Yes
	Unigraphics NX		Yes

9734: Convert to Boundaries: Was throwing exception when converting extracted slice curves. This has now been fixed.

9737: User Interface: It is no longer possible to select the wrong type of plan as input to an editing (meta) plan through the inputs page. Where this happens in macros the plan now fails with an error message.

9738: Linking: Linking remaining core roughing passes could in some instances generate an exception, this has now been fixed.



9741: Linking: We were adding an additional thickness of 0.1mm to the 'Clear by' distance internally. This has now been removed.

9744: The program could exit when performing multiple selected surface waterline operations at once. This has been fixed.

9745: Fixed strings in autosave macros and macros written via "Save As" not being escaped correctly

9747: Toolsheets: There was a problem where the total machining time for each tool was not always correct, this has now been fixed.

9749: User Interface: The ribbon and tree view icons have been improved for Cycle Linking plans.

### Link Passes...

9751: ZigZag Roughing: Fixed exception in Zig-Zag roughing passes.

9753: Morph Passes: The program would sometimes crash when morph passes were generated within a corrupted boundary. This has now been fixed.

9755: Linking: Fixed an exception in waterline linking with simplified leads option selected.

9756: Turning: There was a problem generating turning profile passes, sometimes a pass was missing, this has now been fixed.

9758: Detect Holes: an exception was thrown when there are no boundaries. This has been fixed.

9759: Edited Toolpath: an exception was thrown when there are no boundaries. This has been fixed.



## Release Notes for NCG CAM v19.0.07

13th March 2024

This point release covers several little improvements, along with several fixes to existing features. There was a problem with retract moves in v19.0.06, this is why we released v19.0.07 earlier, therefore please have a look at the release notes of both versions.

In v19.0.07 is a change (new parameter) in the linking of roughing passes regarding retracts, it is well worth reading the detailed notes on page 2, ticket 9595.

#### General

9470: Surface Trimming: The trimming of vertical surfaces lying wholly within the trimming boundary will no longer be recreated as this is not necessary.

9499: Surface Trimming: Surfaces from a raw file cannot be trimmed with a boundary - the plan will fail. Now the message "Trimming raw surfaces with a boundary is not supported" will be displayed in the database window.

9547: ModuleWorks: Previously the Point Distribution dialog on the advanced page would crash when used for Five-Axis machining, this has now been fixed.

achining angles Constant Z Parallel					
		Advanced options for Surface Quality Pattern creation Chaining tolerance Slow and safe path creation	0.1		?
ZD Containment	Surface quality Cut tolerance Surface edge handling Advanced	Synchronize points Tool path smoothing Smooth tool path Smoothing distance Detection angle	0	~ *	
Advanced	Stepover Maximum stepover Cusp Height	Point distribution Maximum distance Minimum distance Deviation factor	0.5 0.1 1		

9551: Linking: The UV passes linking could hang if horizontal lead arcs were selected for vertical passes. This has been fixed.

9564: Turning: There was a problem when calculating the offset for a round shape insert, this has now been fixed.

9565: Drilling Cycles: There were occasions when the final peck on a thread milling cycle was being output as a single vertical move when it should have been a complete helix move, this has now been fixed.

9571: If a directory with many subdirectories was specified in 'Options > Post Processor > Post-processor directory', NCG CAM crashed if you went back to Options again. Now the directory path can be of any length.

9581: Machine Simulation: There were occasions where NCG CAM could crash if invalid folder selections were made and the simulation was started, this has now been fixed.

9582: Turning: There was a problem generating turning roughing passes, sometimes there is an intermediate pass missing, this has now been fixed.



9586: Boundary Projection: Projecting a boundary onto a surface now copes with edited boundaries correctly.

9588: Stock Model: The defaults for the tool elements being used to remove material have been improved.

9589: UV Passes and Five-Axis: It was possible for a surface folder containing RAW or STL (triangles) surfaces to be used for UV passes or five-axis machining, however the plan would fail with no message. This has now been fixed and displays a pop-up message.

9594: Post Processing: There was a problem, when you select for example 3 toolpaths to post process, then remove one from the Toolpaths list in the Post Processing dialog and post to individual tape files causing NCG CAM to crash. This has now been fixed.

9595: Linking: Fixed an issue with linking (minimal vertical retract) heights for roughing passes which meant the retract could skim the surface of machined slices. This includes a new 'Clear slices by' parameter in the linking.

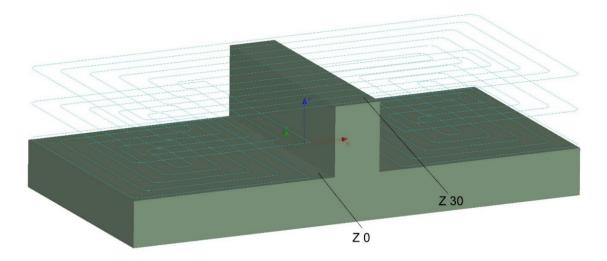
earance lear surface within:	2
6	
lear surface by:	6.5
lear slices by:	2.25
	7.15
1	lear slices by: Irls Irl over: Irl down:

Here is a complete explanation of what has changed since version 19.0.05 and what the new parameter 'Clear slices by' does.

What has changed is the way the rapid moves in a roughing toolpath are carried out over the highest point of the part. In addition, the 'Clearance plane' has an expanded function, also for finishing toolpaths.

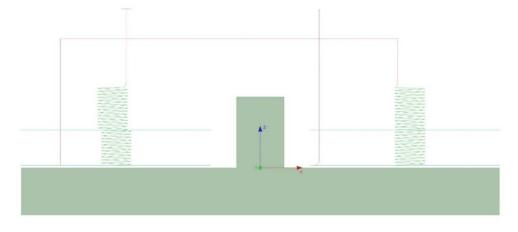
There have been requests to reduce the retract height in some cases, it was more noticeable when big stepdown is used. Here is an example to explain the changes.

The area to machine at the part below is Z30 to Z0. A thickness of 1 is used. So the machining takes place from Z31 to Z1. The first machine slice goes completely over the top of the part. This first level is discarded in the linking process.





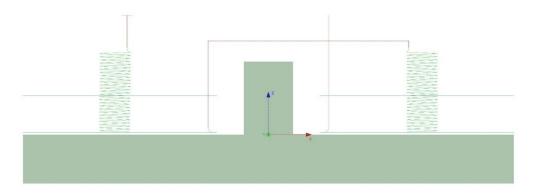
In v19.0.04 and earlier versions, the linking would look like this.



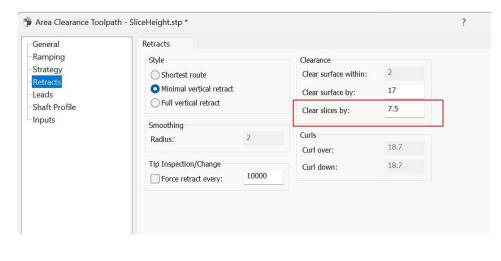
The rapid move from one side to the other is very high above the part. This is because the 'Clear surface by' value is applied to the top of the part. You could not change that, as the 'Clear surface by' value cannot be smaller than the 'Stepdown'. This is for safety reasons, as within the part there can be remaining material of the stepdown height during the roughing operation. Lowering the height of the 'Clearance plane' would not change anything. As there is no material above Z31, it is not necessary to retract so high.

With the latest linking changes, the 'Clear surface by' value is <u>no longer applied to the top</u> of the part, if the first slice of the passes covers the whole area. Like in this example.

The default linking in v19.0.07 looks like this.



To control the distance at which the rapid move goes over the top, there is a new parameter on the Retracts page in the linking dialog, **Clear slices by**.



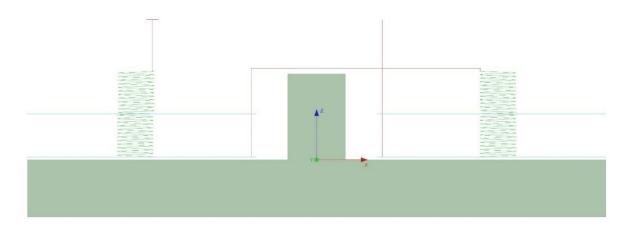


The value of 'Clear slices by' is by default, half the 'Stepdown' value, but not less than 1. The 'Clear slices by' value can be changed to a lower value, but not greater than the 'Clear surface by' value itself.

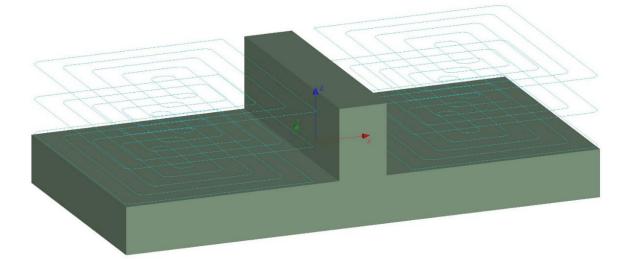
Since the linking in the toolpath image above uses the default values. We have a 'Ramp height offset' of 3 and 'Vertical Leads' of 2. Setting the 'Clear slices by' to 1, it will not achieve that as it cannot be lower than the start of the lead in, as shown below.



Setting the Ramp height offset, Vertical leads and the Ramp extension all to 0 (which you should <u>not</u> do, as the cutter rapids onto the material) the tool rapids at Z2 over the part with a 'Clear slices by' value of 1. (1+Thickness of 1). See the following image.

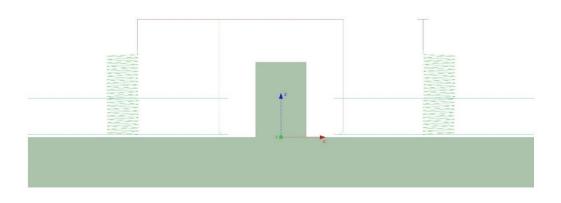


Below is the same machining as above, but this time it starts at Z30 instead of Z31. Because of the thickness the first slice of the passes longer covers the whole area, but is divided into two areas.

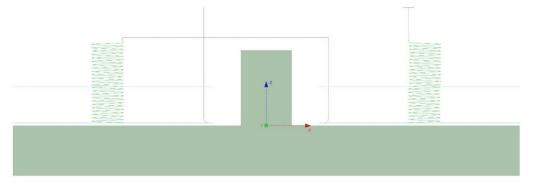




As the software no longer "knows" what is happening at the top, if you link the passes, 'Clear surface by' is therefore also applied to the top like it was in earlier versions.



But there is a difference now. Before changing the 'Clearance plane' to a lower level did not change anything to the retract height. Now you can bring the retracts down by changing the Clearance plane to a lower level. As user you know whether this would be safe or not. Again, the rapid connection move does not go lower than the start of the lead in move. As in the following mage.



**Important:** If the 'Clearance Plane' is set lower than Z Max of the part, which you should not do, the component will not be gouged, but the cutter may scratch over the highest point. This applies to all strategies, not just roughing.

While there appears to be a lot of possible settings now, as usual, if the defaults are maintained, it will be on the safe side.

9598: Post Processing: It was possible to remove all the toolpaths from the list on the inputs page, this should not be allowed and has now been blocked.

9601: Linking: There were cases when linking a Shaft Profile plan derived from Core Roughing passes could sometimes crash NCG CAM, this has now been fixed.

9603: Surface Trimming: Fillet surfaces can't be trimmed with a boundary - the plan will fail, with the message "Trimming fillet surfaces with a boundary is not supported" will be displayed in the database window, Before it was failing to trim and creating an error report.

9606: User Interface: There were situations when interactively creating boundaries and using the Shift + Ctrl left mouse sequence would cause NCG CAM to crash if Esc had also been pressed, this has now been fixed.

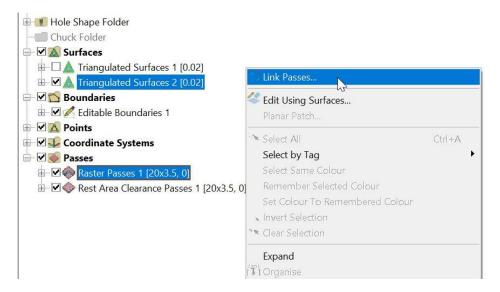
9609: Fixed an exception that could occur when generating rest area clearance passes.



9616: Turning: There were cases where the linking moves for roughing passes could gouge, this has now been fixed.

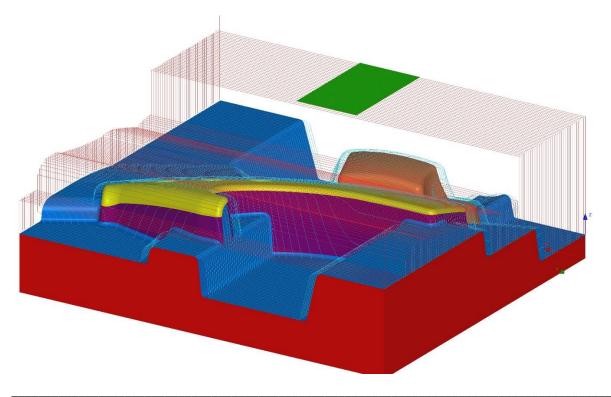
9620: User Interface: The context menus for selecting Passes & Surfaces with optional Points has been improved to include the Linking option.

9620: User interface: If a folder with surfaces is also selected in addition to a folder with passes, the context menu now offers 'Link Passes...'. Previously the linking always had to be chosen in the ribbon menu if surfaces were selected as well.



The possibility of selecting a surface folder when linking is not new. Anyway, here is an explanation of what it does.

In the image below, a planar patch surface has been created (green surface). The folder containing this surface has been selected along with the passes to be linked. In the area of the green surface the retracts go up to this surface. The other areas are linked normally.





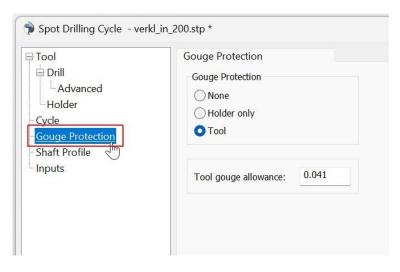
9621: Project Settings: There was a problem saving the default profile to a dca file causing the Options > Default to be used instead, this has now been fixed.

9625: User Interface: The preview image of Tapered Barrel cutter was not maximised correctly in plan dialog or the Tool Database, this has now been fixed.

9626: Security: Fixed network dongles not being usable when launching the application on the machine that the dongle is plugged in to.

9630: Five-Axis: Flank Machining would allow the definition of a Lens cutter to be used. This is not supported and has now been blocked.

9638: User interface: The Gouge Protection page in the dialog tree for Cycles is now on the main level and no longer below the Tool page. This means that the position in the dialog is now consistent with the Machine Along Curve dialog.



9639: Post Processor: ISO & Siemens: Added the following four options, 'Feedrate variable list Rapid comment', 'Feedrate variable list Ramp down comment', 'Feedrate variable list Cutting comment', 'Feedrate variable list Ramp up comment' to allow a comment to be output with the feedrate variables if used and defined in the NC tape file. There is no default comment set, so exiting post processors will not be affected.

Macros Post processo	r: ISO	
Parame 289 Cutting		Formula "#3"
290 Rampu		"#4"
291 Feedra	e variable list Rapid comment	
292 Feedra	e variable list Ramp down comment	m
293 Feedra	e variable list Cutting comment	
294 Feedra	e variable list Ramp up comment	
295 Non-Mo	dal feedrates	false
TOOL	CHANGE SETTINGS	
296 Output	tool change	true

9643: Linking: The linking of core horizontal area passes differed significantly after simple manual editing. This has been corrected so that the linking is now the same for edited and unedited passes.

9646: Post processor: ISO: Added the option 'Output the diameter offset with the height offset' which if set true allows the diameter offset to be part of the height offset block. By default, this option is false, so existing post processors are not affected.



9647: User Interface: Improved the Advanced tool pulldown list for Five-Axis machining. Now only the tools types are shown which can be used with the chosen Five-Axis strategy.

🕈 Five-Axis Flank Machining Toolp	ath - 6_hole_clamp.	dca *
<ul> <li>Five-Axis Flank Machining Toolp</li> <li>Tool</li> <li>Cutter</li> <li>Advanced</li> <li>Holder</li> <li>Passes</li> <li>Linking</li> <li>Inputs</li> </ul>	ath - 6_hole_clamp. Tool Recent tools: Tool name: Cutter diameter: Corner radius: Taper (° / side): Upper corner radius:	dca *       Please select       Toroidal[20x3.5 60, 0]       20       3.5       0       0
	Upper diameter: Profile radius: Flat diameter: Flute length: Shank diameter:	0 0 13 50 20
	Body length: Overall length: Cylindrical length: Advanced Cutter: Barrel: Default Doveta	
	Shank definition (d. z):	20, 0, 20, 10

9651: User Interface: If calculations for the were carried out in a dialog, such as 3/2 in the picture below, the result was converted to integers and the decimal places were omitted. Now the result is correct.

Passes				
Passes		Limits		
XY Thickness:	0		Min	
Z Thickness:	0	Z:	-30	
Tolerance:	0.02	Angle:	0	
Stepover:	Stepover: 3/2		t areas only	
Angle: 0		Limit by Se	Limit by Surface Stepove	
True surface ma	True surface machining		<ul> <li>Disabled</li> <li>Limit stepover</li> </ul>	
Pass Extension	Pass Extension		stepover	



9652: Five-Axis Swarf: An option has been added to the ModuleWorks advance dialog to allows edge curves to be selected or changed.

⊟ Tool	5 Axis Console
<ul> <li>☐ Cutter</li> <li>☐ Advanced</li> <li>Holder</li> <li>☐ 5 Axis Console</li> </ul>	Surface paths Tool axis control Gouge check Link Roughing Utility Calculation based on Surfaces  Pattern Parallel to multiple curves Edit curves:
<sup>□</sup> Inputs	Edge curves     Folder Selection     ?       Drive surface     Curves 2 [0.02]       Drive surface     Extracted Triangulated Curves 2 [0.02]       Drive surface offset     O

9656: Adaptive Clearance: With UV Direction Surfaces selected, Adaptive Clearance was a selectable toolpath and would cause the plan to fail. This has now been fixed.



# Release Notes for NCG CAM v19.0.06

24th January 2024

This point release covers several little improvements, along with several fixes to existing features.

#### General

6689: User Interface: Fixed a problem with the licence expiry message box being moved behind the main application window.

6851: Five-Axis: We now support tilt option to tilt through lines (curves) for Parallel cuts plan.

Hole Shape Folder		Passes					
Triangulated Surfaces 1 [0.02]	Cutter Advanced	Output type:	5 Axis	Gouge Avoidance			
	Holder	4th axis rotation:	Rotate about X ~ v ds	Check-surface clearance:	0 Retract along tool axis		
Drive Triangulated Surfaces 1	king			Primary gouge avoidance:			~
Check Triangulated Surfaces 2	uts	XY Thickness:			Test Drive	Test Check	
Editable Points 1		Z Thickness:	0	Secondary gouge avoidance:	None		~
		Z Thickness:			Test Drive	Test Check	
		Path Angle from X towards Y:	90	Stock Model Overthickness:		0	
		Cutting type: Angle from Z towards X:	One way v	Point Spacing			
		Cutting direction:	Climb ~	Maximum distance:		0.5	
		Machine by:	Lanes ~	Minimum distance:		0.1	
		Stepover: Flip	1.5	Tool Axis Smoothing			
		Cusp height:	0.0282	Enabled			
		Calculation based on tool	centre	Global Max tilt ang	le:	90	
		Tilt Preference					
		Tilt point XYZ: 0	Tilt through lines	Relative to rotary axis	X As	xis 🗸	
				Tilt angle:	Min -10	Max 10	
		Lead/lag angle:	0	Rotary tilt a			
		Side tilt angle:	0		righti		
		Surface Edge Merging		Relative to cutting directi	on Min	Max	
		Objective Objective	0.1	Lead tilt ang	-10	10	
		By % of tool diameter:	0	Side tilt ang	-10	10	

8521: Stock Models: Added the 'Material Removal' section to the dialog. It is now possible to select the tool sections to use when creating a stock model flute/shaft/holder, this is only available when creating a closed stock model.

General	General		
-Inputs	Resolution: 1.05 Z: Material Removal	Min Max 0 0	
tock Model 103	Extend tool		

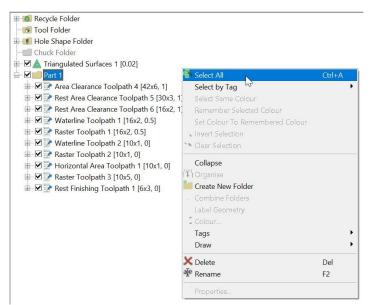
9038: Turning profile pass: There were examples which did not create profile passes correctly, this has now been fixed.



9221: User Interface: The colour of text in the tree view for selected items now changes to suit the back-ground colour. If the selected colour is light, then text will be shown in black, not white.



9365: User Interface: With 'Select All' in the context menu, or the keyboard shortcut Ctrl-A, all subfolders in a folder can now be selected. For example, to select the folders for a post-processor run as shown in the picture below. The selection order corresponds to the order of the folders in the tree.



9431: Tool Sheets and Post Processor: There was a problem with incorrect tool details being out for Canned Cycle Tools, this has now been fixed.

9435: Turning: It is now possible to use a Turning Stock Model plan as input to a Face Passes plan.

9440: User Interface: Fixed input boundaries to Constant Stepover Passes being always drawn by default.

9443: User Interface: The context menu for rest roughing was not always being displayed correctly if a tool was selected from the tool folder, this has now been fixed.

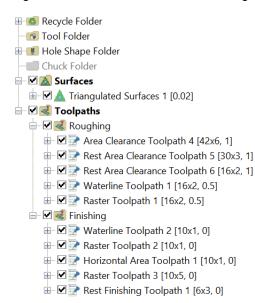
9444: User Interface: Added an option to the preferences page that controls whether empty organisation folders are deleted automatically.

Options		
Axes Animation and Simulation Defaults Entity Colours Graphics Mouse Post Processor Macros	Preferences Triangulator Tolerance Default Triangulation Tolerance: Drilling Data Depth Tolerance: 0.02 Drilling Data Depth Tolerance: Re-Triangulate when setting coordinate system Include hidden geometry by default	Contents Tree Show state by colour Highlight newly created plans Show simpler tree view Automatically organise tree view Delete empty organisation folders
- <mark>Preferences</mark> -System Colours	Open File	Menus and Dialogs



9445: Geometry: There was a problem with Internally Trimmed Surfaces not trimming correctly, this has now been fixed.

9446: User Interface: The 'Create New Folder' option can now be used on the automatically created organisation folders to create nested organisation folders.



9453: Five-Axis: The advanced parameters for flipping step-over and point distribution have been added to the NCG CAM dialog.

Tool	Passes					
Cutter Advanced Holder Passes Linking Inputs	Output type: 4th axis rotation: Point tool to rotary axis Tolerance: XY Thickness: Z Thickness:	5 Axis           Rotate about X           0.02           0           0	× ~	Gouge Avoidance Test for holder gouging Check-surface clearance: Primary gouge avoidance: Secondary gouge avoidance:	0 Tilt Test Drive Retract along to Test Drive	✓ Test Check
	Path Cutting pattern: Cutting type: Cutting direction: Machine by: Stepover:	Morph between curves       One way       Climb       Lanes       1.5       0	~	Stock Model Overthickness: Point Spacing Maximum distance: Minimum distance:		0 0.5 0.1

9454: Five-Axis - The current tool is now always updated into the MW Advanced dialog to ensure correct options are enabled and updated, for example the cusp height value is updated when cutter is changed.

9457: Linking: For Area Clearance, Core Roughing and Zig Zag roughing linking we now set a default ramp extension of 2mm if the vertical lead in arc radius is set to zero.

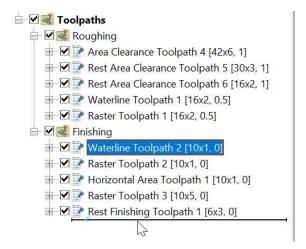


9460: Five-Axis: The advanced parameter for the machining area option (Lanes and Regions) has been added to the NCG CAM dialog.

Tool Cutter	Passes	
Advanced	Output type:	5 Axis
Holder	4th axis rotation:	Rotate about X
Passes	Point tool to rotary axis	
Linking	Tolerance:	0.02
Inputs	XY Thickness:	0
	Z Thickness:	0
	Path	
	Cutting pattern:	Morph between curves
	Cutting type:	One way ~
	Cutting direction:	Climb ~
	Machine by:	Lanes
	Stepover: Flip	Lanes Regions
	Cusp height:	0

9461: User Interface: The tree view was enabling Milling Edited passes when in Turning mode, they should be disabled, this has now been fixed.

9462: User Interface: Plans can now be moved to the end of the tree view when holding the shift key.



9463: Editable Toolsheet Builder: Fixed issue where multiline tool comments were added to the previous comments.



9465: Five-Axis: Advanced smoothing parameters have been added to the NCG CAM dialog. It's only available for Ball nose and Lolli-pop cutters.

Maximum distance:		0.5
Minimum distance:		0.1
Tool Axis Smoothing		
Enabled		
Global Max tilt angle:		90
		L
O Relative to rotary axis	X Axis	
	Min	Max
Tilt angle:	-10	10
Rotary tilt angle:	-10	10
Relative to cutting direction	Min	Max
	-10	10
Lead tilt angle:	40	

9467: User Interface: Tool Folder - The labels for the tools in the folder now only comprise of the tool name, the 'Milling tool', 'Turning tool' text is omitted.

9468: User Interface: An option to sort the tool folder has been added to its context menu.

The un-sorted list of tools.	Sorting the Tools Folder.	The list after sorting.
Ball Nose[10x5 20, 0] T3 Toroidal[20x3.5 40, 0] T1 Toroidal[10x1 20, 0] T2 Ball Nose[3x1.5 6, 0] T4	Ball N     Sort Tools       Toroi     Create Milling Tool       Ball N     Create Centre Drilling Tool	Ball Nose[3x1.5 6, 0] T4 Toroidal[10x1 20, 0] T2 Toroidal[20x3.5 40, 0] T1
🗆 📧 Tool Folder	Tool Fol to Purge Tools	Tool Folder

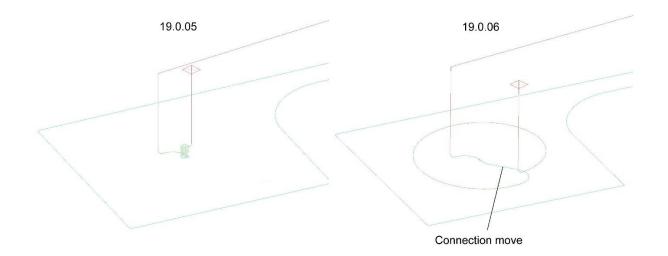
The ordering is alphabetical on the name, with upper case before lower case.

9478: Boundaries: There was a problem using 'Combined Boundaries' option with boundaries that have rotations not honouring the rotations correctly, this has now been fixed.

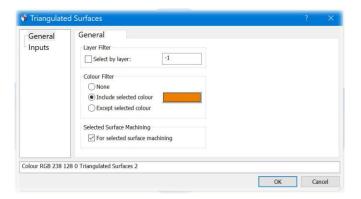


9476: Linking: If roughing passes are linked, the basic setting is to plunge in via a helix. The helix is usually placed over a pass profile. If it is a narrow pocket so that no helix can be placed between the inner pass and the outside of the pocket, the plunging switches from 'Helix ramping' to 'Profile ramping'. If the profile is very small in the middle, it has resulted that the cutter is plunging in a very small area. Which is a problem, particularly for cutters with inserts. If there is no room for a helix above a pass, the Helix is now placed in the middle of the pocket.

Below were the same passes linked in 19.0.05 and 19.0.06. On the left, the plunging takes place on a very small profile; on the right, the helix is placed in the middle, with a connection move to the small profile.



9479: User Interface: Edit: Folder by Colour and Folder by Layer: It is now possible to display the dialog using the Ctrl key. Giving access to the following dialog.



9480: Five-Axis: The option to define machining stepover by cusp height has been added to the NCG CAM dialog.

9481: Turning: There was a problem where some conical surfaces were being detected as cylinders, causing the passes to be created incorrectly, this has now been fixed.

9482: Interactive Tool definition: There was a problem where some boundaries do not activate the import to definition button, and did not indicate the error, this has now been fixed.

9486: User Interface: Fixed a potential system crash when selecting a drilling data top folder plan with an empty input.



9488: Five-Axis: The options to set Surface edge merging have been added to the NCG CAM dialog.

Tilt preference:	Parallel to surface ruling	~
Lead/lag angle:	0	
Surface Edge Merging	]	
Surface Edge Merging <ul> <li>By distance:</li> </ul>	0.1	

9489: Inspection: It is now possible to convert Inspection Vectors to points in the same way you do for Drilling Data. Points > Convert to Points.

9491: Tool Folder: It was not possible to create a Dovetail tool in the Tool Folder, this has now been fixed.

9492: User Interface: The status bar RGB display is now set when selecting raw surfaces.

9495: Machining: There was a problem where using Raw Surfaces for Selected Surface Raster passes could cause NCG CAM to crash, this has now been fixed.

9496: User Interface: Fixed nested folder plans not updating correctly.

9497: Five-Axis: The advanced parameter for "calculation based on tool centre" has been added to the NCG CAM dialog.

Tool	Passes		
Cutter Advanced Holder Passes	Output type: 4th axis rotation: Point tool to rotary axis	Image: Second	Gouge Avoidance Test for holder of Check-surface cleara Primary gouge avoid
- Linking - Inputs	Tolerance: XY Thickness: Z Thickness:	0.02 0 0	Secondary gouge an
	Path Angle from X towards Y:	90	Stock Model Overthickness:
	Cutting type: Angle from Z towards X: Cutting direction: Machine by:	One way v 0 Climb v Lanes v	Point Spacing Maximum distan Minimum distan
	Stepover: Flip	<b>1.5</b> 0	Tool Axis Smoothing
	Calculation based on tool	l centre	Global M
	Tilt Preference Tilt preference:	Tilt relative to cut direction $\qquad \lor$	Relative to rot

9498: User Interface: Fixed a performance regression when manipulating large stock models in the graphics view.

9507: Stock Models: We now create ModuleWorks stock models when the "Closed" option is set for single axis toolpaths.

9509: Import: There was a problem when trying to load an empty geometry file causing NCG CAM to crash, this has now been fixed.

9510: User Interface: The 'Drilling Data' entity colour is now opaque by default.



9513: Curves: There was a problem selecting an STL triangulation for the Extract Curves option causing NCGCAM to crash, this has now been fixed.

9518: Stock Models: There was a problem creating a stock model of a Centre Drill toolpath with the default settings where the plan failed, this has now been fixed.

9521: Five-Axis: The "Tilted with fixed angle to surface normal" tilt axis preference option has been added to the Five-Axis plan dialogs. There is one limitation in that the only way to set the Reference Surface in the plan is via the Inputs page or the ModuleWorks advanced dialog.

Tool	Inputs		□ Tool	Passes				
<ul> <li>☐ Tool</li> <li>☐ Cutter</li> <li>☐ Advanced</li> <li>Holder</li> <li>Passes</li> <li>Linking</li> <li>Inputs</li> </ul>	Inputs	Check Triangulated Surfaces 2 <null> <null> <null></null></null></null>	Cutter Advanced Holder Passes Linking Inputs	Output type:         4th axis rotation:         Point tool to rotary axis         Tolerance:         XY Thickness:         Z Thickness:         Cutting type:         Angle from X towards Y:         Cutting type:         Angle from X towards X:         Cutting direction:         Machine by:         Stepover:       Flip         Calculation based on too         Tilt Preference:         Tilt preference:         Tilt preference:         Tilt preference:         Tilt preference:         Surface Edge Merging          By % of tool diameter:	S Axis       V         Rotate about X       V         0.02       0         0       0         0       0         One way       V         0       0         Climb       V         Lances       V         1.5       0         No Tilt       Titt with fixed angle to surface not V         No Tilt       Titt evolop notit         Titt work on out direction       Titt evolop notit         Titt evolop notit       No Tilt         No Tilt       No Tilt         Titt evolop notit       No Tilt         One       No Tilt         No Tilt       No Tilt	Gouge Avoidance Test for holder gouging Check-surface dearance: Primary gouge avoidance: Secondary gouge avoidance: Stock Model Overthickness: Point Spacing Maximum distance: Tool Axis Smoothing Enabled Global Max tilt angle: Rotary tilt avoid and tilt avoid and tilt angle: Rotary tilt avoid and tilt avoid avoid and tilt avoid	X A Min -10 angle: -10 lon Min gle: -10	Test Ched  Test Ched  Test Ched  O

9528: Turning: There was a problem when calculating profile passes, when the input curves has overlapping vertical curves, this has now been fixed.

9531: Rest Roughing: When calculating the Z-Min/Max values for machining, the heights of the stock model is now also included. Previously, only the Z values of the part plus the thickness were used. If a stock model is higher than the surfaces, the passes are now calculated by default from the highest point of the stock model for safety reasons.

Height of the stock model	
Part height	

### Please note:

When rest roughing is performed without a stock model having been previously calculated, a stock model is calculated in the background. It may be that the stock model is not yet finished when the dialog is closed with OK. In this case, if the machining model is higher than the surfaces, the Z value is updated in the background.



This means you are definitely on the safe side. Of course, the above only happens if the default values are left in the dialog. Values entered by the user will not be changed.

9532: Points: There was a problem with Tessellated Points losing their colour attribute when used as input to a plan, this has now been fixed.

9533: Points: Folder by colour/layer will now except a Points Folder as input.

9534: Import: Datakit libraries have been updated to 2024.1. Supports SOLIDWORKS 2024

eneral Transla	tors Options Mod	lules System EULA	
_eaa	Module	Version	Licensed
Sec.	Catia v4 3D Catia v5	Releases 4.15 to 4.24 Releases 7 to 33	Yes
- 10 A	GRANITE	16000	Yes
	Parasolid	Parasolid V36.0	Yes
	Rhino	Rhino V8	Yes
<	SolidWorks	SolidWorks 2024	Yes
	Unigraphics NX	NX 2306	Yes

9537: Export: It is now possible to export the shaft profile data from a drilling cycle plan to an excel file.

9540: Cutter Simulation: Two new display modes "Solid" and "Removed Material" have been added, Solid draws simulation in one solid stock colour and Removed Material draws the simulation in 2 colours one for unmachined stock and the other for removed material.

Animation and Cimulati	on.					
nimation and Simulati Wireframe Cutter Number of rings: Number of stripes: Toolpath Rendering	12	Bead Bead radius:	2	Simulation Mesh quality: Tool Material Removal Flute Shank	2 Holder	
Trail length: Feedrate Range: Nominal feedrate:	300 Min % 0 4000	Last levels:		Direction Climb milling colour: Conventional milling colour: Collision Collision colour: Shank dearance: Holder dearance: Holder dearance: Gouges Gouge colour: In toi colour: Excess colour: Removed Material Material colour:	0 1 1	• Cutter Simulation - kidney_tray_sml.dca *: Core Roughing T           ?             Cutter Toolpath Tools           Display             Feedrate(%):           1503             Position:           15303             Path type:           Cutting             Programmed feedrate:           1193             Estimated time:           00:0€03             X -72:1329           Y -7.7855             X -72:1329           Y -7.7855

9544: Cycles: It was possible to select the Milling Detect Holes plan to create Drilling Data plans in Turning, this has now been blocked.

9545: All combined boundaries now accept 3D as well as 2D boundaries as input. This fixes a problem in earlier releases.

9552: User Interface: The icons for the tags context menu were not always displayed, this has now been fixed.

9556: Turning: There was a problem when checking whether insert tips are inside the holder, this has now been fixed.



# Release Notes for NCG CAM v19.0.05

12th November 2023

This point release covers several little improvements, along with several fixes to existing features.

## General

6111: Shaft Profile Analysis: The default sample distance for shaft profile analysis has been reduced from 2mm to 0.25mm to improve the accuracy of the calculation. With the old 2mm default it was possible to mislead you in to thinking that a holder was clear when it could touch the part.

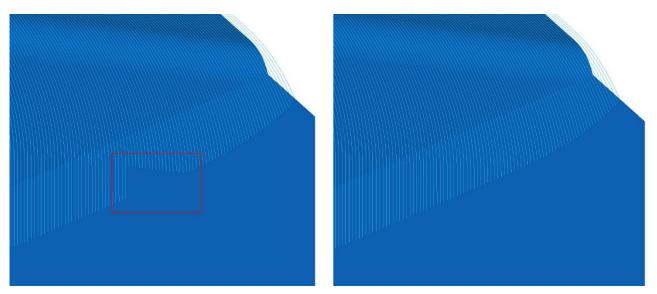
General	Shaft Profile		
Strategy Retracts	✓ Enable		
Leads	Sample distance:		0.25
Shaft Profile	Slice height:		0.1
Inputs	Shaft diameter:	1	100

The greater accuracy does increase the calculation time slightly.

8103: Post Processor: ISO: Added the option 'Output the toolchange for every toolpath' for a controller that needed to see the tool change for every toolpath, even if it was the same as the previous tool number. The default is false so existing post processor will not be affected.

8422: Raster Passes: The contact angle trimming of raster passes on vertical walls has been improved.

In the image below on the left, the passes were created before version 19.0.05 and you can see that a small area on the vertical surfaces was left out. In the image on the right, the paths were created with version 19.0.05 and show complete passes.



8472: Linking: Fixed a problem that was causing excessive lifting when using the minimal retract option.



8645: Linking: The 'Prefer Order by Offset' has been enabled for edited axially offset boundary and pencil passes. This also fixes ticket 4686.

General	General					
Strategy Ramping Retracts Leads Down/Up Mill Cleanup Shaft Profile Inputs	Direction One way Down mill Up mill Prefer dimb m Home Point Start from hom XYZ: 0		97	Retracts Safe Z: Clearance plane: Use clearance plane Start Hint XY: 0 Order Passes	47 47 e only 0	
	Return to hom	0	97	Prefer order by off	iet	

8871: Surface Trimming: A problem has been fixed where the trimming of surfaces with seamed geometries, such as cones and cylinders, could fail.

8891: Selected Surface Waterline: A problem has been fixed where incorrect results could be obtained when the selected surfaces were the product of repeated sub-selections.

8913: ModuleWorks: The libraries updated to MW2023-08, this also fixes ticket 8643.

8948: Surface trimming: The trimmed surface now has a smooth (and more accurate) circular boundary sections with both Keep Interior and Keep Exterior.

8950: Trim Surfaces with Boundary: A problem has been fixed where result of trimming an IGES Trimmed Parametric Surface could be incorrect.

8951: Surface Trimming: A problem has been fixed where selecting "Keep Exterior" could produce the same result as "Keep Interior".

9002: User Interface: An invert tool button has been added to the 3D Tool Guide for turning tools.

3D Tool Guide	? ×	
Double-click to position the tool : (	trl + arrow key to move the tool	
Context		
	rning Tool 1 [QC12-SDJCR Insert +	
Target surfaces:	Triangulated Surfaces 1 [0.02]	
Gouge avoidance:	On	
Tool Placement		
Target position (XZ):	0 0	
	Apply	
	Арріу	
Tool Orientation		
Invert tool		
11.923 Z -22.000		A X
		<b>A</b> ^



9078: User Interface: An option to set the chuck colour has been added to the system colour page.

Cutter flute (Solid):	
	Analysis Colours
Cutter shank (Solid):	Out of range colour high:
Cutter overall (Solid):	Out of range colour low:
Tool holder (Solid):	
Shaft profile:	Axis Colours
Shaft profile (Gouges):	X Axis:
Gouge (3D Tool guide):	Y Axis:
	Z Axis:
Turning Tool Colours	
Insert (Wireframe):	Turning Colours
Holder (Wireframe):	Chuck:
Insert (Solid):	
Holder(Solid):	
Insert tip:	
	OK Abbrechen

9090: Import: The file loading now has an option to load infinite geometry. If surfaces are written into a geometry file as infinite geometry by the CAD system, they are usually not read by NCG CAM. If geometry elements are missing after reading into NCG CAM, you can try to read the file again with the Prefer infinite geometry option to get the missing geometry elements. The 'Prefer infinite geometry' option can be enabled under Options > Preferences, but in most cases it is not required

Axes	Preferences				
Animation and Simulation	Triangulator				
Defaults	Tolerance				
Entity Colours	Default Triangulation Tolerance:	0.02			
Graphics	Drilling Data Depth Tolerance:	0.05			
Mouse					
Post Processor	Re-Triangulate when setting coordinate system				
Macros	Include hidden geometry by default				
Preferences	0.5				
System Colours	Open File				
Tags	Organise by layer				
2	Load component information				
	Convert to NURB				
	Prefer XYZ trimming for IGES files				

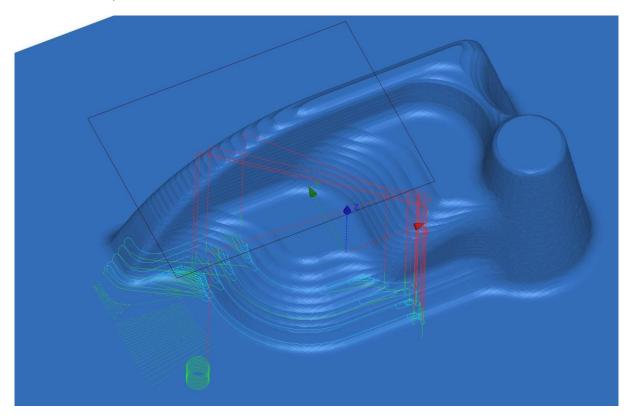
9093: Import: The 'Organized by layer' options for Step and IGES files were not being handled correctly, this has now been fixed.

9101: Turning: There was a problem where some holder definitions were being flagged as invalid, when they were in fact ok, this has now been fixed.

9122: Turning: Trimmed Torus geometry from IGES files was not always being handled correctly, this has now been fixed.



9137: Adaptive Clearance: It is now possible to do Adaptive clearance - rest machining inside a constraint boundary by supplying a stock model and boundary plan. Up to now, the rest roughing has always been carried out completely within the selected stock model. In the picture below, adaptive rest roughing was carried out within a boundary.



9149: Stock Models: There were occasions when creating Multi-Axis stock models with a tight resolution could cause NCG CAM to be unresponsive, this has now been fixed by improving the validation of the resolution.

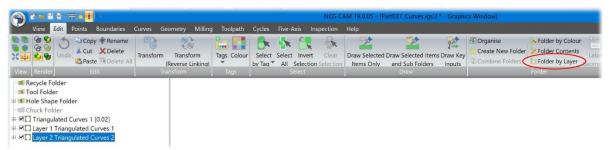
9150: Tool Holder: There was an issue when creating a holder definition with the start point height was close to zero but not exactly zero. This has now been fixed.

9157: Curves: On the View ribbons Display section had 'Levels', the wording has changed to 'Layers', this makes the wording more consistent.





It is now also possible to separate curves by layer.



9158: Post Processors: ISO, Siemens, and Heidenhain: Added an intermittent air blast option. It is dependent on Air external being selected as the coolant type in the cutting parameters. In the Post processor options there are two additional parameters: "Coolant air blast off distance", and "Coolant air blast on distance". Setting the "Coolant air blast off distance" to a value greater than 0 activates it and sets the distance the air will be off for, while the "Coolant air blast on distance" sets the distance the air will be on for. "Coolant air blast off distance" is set at 0 by default so exiting posts are not affected. The distances are not exact, as the check is made on moves in the toolpath.

9159: User Interface: When a database is saved with multiple graphics windows they will now be loaded in the correct order when the dca file is reopened.

9170: Tool Database: When adding a new drill directly in the tool database, it was not possible to change the drill diameter. This has been fixed.

9173: Installer: The DNCManager is no longer installed by default as there is less need for it now. It can still be installed by checking its box on the "Select Components" page of the installer if it is needed.

Ject Components Which components should be installed?		( all
Select the components you want to install; clear the components install. Click Next when you are ready to continue.	onents you do not want to	
Full installation		$\sim$
Main Installation	1,043.5 MB	~
Tutorial Files	13.6 MB	
DNC Manager	0.5 MB	
Licensing Software	7.4 MB	
✓ Translations	1,189.9 MB	
Chinese Simplified Translation Files	83.9 MB	
Chinese Traditional Translation Files	83.8 MB	
Czech Translation Files	79.9 MB	
German Translation Files	03 8 MR	Y
Current selection requires at least 2.21 GB of disk space.		
current selection requires at least 2.21 Gb of disk space.		

9178: User Interface: Project settings: When the user's full name is not set, display the login name instead for the Engineer's name, and in the database window banner.

9180: Linking: Corrected a thickness addition that was applied to retract moves. Also limit minimal retracts so they aren't higher than full retracts.

9183: User Interface: Fixed an issue when using multiple graphics windows, that could result in all windows closing after saving and closing one of the graphics windows.

9185: Linking: The default formula for Clearance height and Safe Z have been modified so they do not include the Curl over and Curl down radius.

9190: Fixed a hang that could occur when a database archiver runs at the same time as a passes plan. Also fixes ticket 9214.



9192: User Interface: Fixed an issue with all created plans being selected when loading a geometry file.

9198: User Interface: The Z Level graphical guides have been added to the Rest Finishing Passes dialog.

9200: Cutter Simulation: Turning - A toolpath which has a holder defined with zero length segments in the holder definition, it would cause NCG CAM to crash, this has now been fixed.

9201: Curves: The separate Folder by Colour option is now enabled for curves.

A **		= a <mark>  </mark>   -						NO	G CAM 19.	0.05 - [Pa	art037_Curves.dca:2	2 * - Graph	iics Window]	
Vie	w Edit	Points Boundaries	Curves	Geometry N	dilling Toolpat	n Cycles	Five-Ax	s Inspect	on Help					
	Undo	Copy Rename Cut Celete	Transform	m Transform (Reverse Lini		ur Select	Select	UK I		Selected ns Only	Draw Selected Item and Sub Folders	1->	Create New Folder	Folder by Colour Folder Contents
Chuck	Folder Shape Fold k Folder angulated (	er Curves 1 [0.02]				A	<u> </u>	7	A	AT-	A CONTRACTOR			

9202: User Interface: Fixed a problem of not being able to open files by double-clicking on them in Windows Explorer.

9204: User Interface: The application name in the Windows Explorer "Open with" menu now includes the version number.

🕈 Turning_tutorial_1.mco	18/07/2023 12:15	NCG CAM Macro	40 KB
Turning_		M Datab	1,073 KB
TurningOpen		M Datab	573 KB
Turning Share with Skype		M Datab	1,031 KB
🧉 dialogue 📓 Edit with Notepad++		ITML Do	3 KB
🐞 Revolvec 🕂 Scan with Microsoft 🛛	Defender	ITML Do	4 KB
🖻 Share			
Open with		🖉 📌 NCG CA	M 19.0
👫 TortoiseSVN		> 📌 NCG CA	M Application
100		Search	the Microsoft St

9205: A date string is now always appended to the file names for autosave databases and macros.

9211: Adaptive Clearance: When using pre-drill points the toolpath would not always use them correctly, this has now been fixed.

9212: Adaptive Clearance: There was a problem when using an edited boundary plan as input and then using the ModuleWorks advanced dialogs giving an incorrect toolpath, this has now been fixed.

9218: Linking: Improved the performance of linking edited waterline stepover passes.



9222: ModuleWorks: An option to select stock models from the Advanced dialog has been added.

Tool	5 Axis Console			
Cutter	Surface paths Part definition	Tool axis contro	ol Gouge check Lir	nk Utility
Advanced	Part definition			
Holder	Part surfaces		Stock to leave	0
5 Axis Console Inputs	Floor surfaces		Stock to leave	0
inputs	Ceiling surfaces			
	Fixture surfaces		Stock to leave	0
	Stock defi	nition	I	
	Folder Selec	tion		? ×
	5.11.2 M	<null></null>		
	Folder:	<null></null>		
	Sec. 19	Stock Model 1	UN UN	Gancer

9225: Toolsheets: Fixed an issue that would result in the cutter diameter in the CSV toolsheet toolpath summary being incorrect for drilling toolpaths.

9229: Main: Previously all files over a month old were purged when the number of files in the Program data folders (which by default is: ProgramData\NCGCAM Solutions) became too large, now the oldest files are purged until the number of files has been reduced to an acceptable level.

9230: Main: Fixed a problem with files created in languages other than English not being cleared from the Program data folders.

9237: User Interface: The option to display turning toolpaths at centre or tip has now been activated on the view ribbon, also an option has been added to the Cutter Animation/Simulation dialog to make swapping modes easier.

**Note**: Now that the default mode of drawing turning toolpaths is cutter tip (the same as milling) which is different to how it was displayed previously.

9238: Toolsheet: The CSV toolsheet now correctly supports multi-line Toolpath comments. The cutter compensation side (if any) is now output on a separate line.

9239: Editable ToolSheet Builder: Toolpath Comments field will now accept multiline comments

9240: Toolsheets: Fixed the status bar processing message in the Editable Toolsheet Builder application to show "completed" only when the process has completed.

9241: Editable ToolSheet Builder: The last used template will be remembered and set as the active toolsheet template by default.

9242: User Interface: Fixed a problem with toolpaths not being drawn correctly when translucency is enabled.

9245: Toolsheets: The post-processor name is now included in the output of a CSV toolsheet.

9247: User Interface: Fixed an issue with the ribbon not being updated when switching between graphics views.

9249: Ruled Surface: It was possible for the ruled surface plan to crash when run from a macro, this has now been fixed.

9251: Post Processors: ISO and Siemens: It was possible for a coolant on M-code not to be output if the option "Stop the coolant between toolpaths" was set 'true'. This has now been fixed.



9261: Linking: Retract heights. Fixed an issue that could cause unnecessarily high lifts when using minimum retracts.

9262: User Interface: The example image for turning toolsheets was not being displayed in the dialog, this has now been fixed.

9268: Linking: Link Order for Edited Axially Offset Boundary Passes. Fixed up ordering issues with prefer order by offset.

9272: Import: Curves with colours. We now set both line and arc colours when we import a curve with an associated colour.

9277 and 9269: User Interface: The option on the view ribbon to set the toolpath tip display option is now a gallery. Also has improved icons, with different images for milling to turning.

Milling

Turning



9278: Post Processor: ISO Master: Added options to allow a better master file to be created for a Roeder's machine, Most of the new options are in the "TOOL MEASURE", "TOOL CHECK SETTINGS" and "DYNAMICS" sections, but there are some other like the "Sub program suffix" to allow a suffix to be added after the sub program name call. All are set to be false or "" (nothing) by default, so not to affect any existing master post processor. Updated the help to match when there is more detail of the options.

9279: User Interface: When using the advanced ModuleWorks dialogs for 3 to 5 conversion the Surface paths tab was missing from the dialog, this has now been fixed.

🕈 Five-Axis Helical Toolpath	
Tool	5 Axis Console
Cutter	Surface paths Tool axis control Gouge check
Advanced	Calculation based on Existing toolpath
Holder	Operation
-5 Axis Console	Strategy Convert

9282: Five-Axis Conversion: An option has been added to the ModuleWorks advance dialog to select a toolpath to be converted.

Tool	5 Axis Console
Cutter	Surface paths Tool axis control Gouge check Link Roughing Utility
Advanced	Calculation based on Existing toolpath ~
Holder	Operation
5 Axis Console	Strategy Convert ~
	Cut toleranc Folder Selection ? ×
	Ad
	Links Folder: Kelical Toolpath 1 [4x2, 0]
	Use OK Cancel



9283: User Interface: Improved the performance when drawing a large number of spheres.

9286: User Interface: Fixed an issue that could cause surfaces being drawn black when using the curvature or draft analysis rendering modes.

9291: Turning: It was possible to get overlapping geometry curves as inputs (especially cones and cylinders) to a turning passes plan, resulting in incomplete passes being created, this has now been fixed.

9295: Postprocessor: A problem has been fixed where changes to the input toolpaths made on the postprocessor dialogs Toolpath page would not be taken into account.

9303: Adaptive Clearance: There was a problem using the Fit to Arcs option on the ModuleWorks advanced dialog giving an incorrect toolpath, this has now been fixed.

9304: Adaptive Clearance: Options to enable Arc Fitting of toolpaths have been added to the NCG CAM dialog.

Tool	Passes	
Cutter Advanced Holder Passes Linking Shaft Profile	Passes XY Thickness: 0 Z Thickness: 0 Tolerance: 0.02 Stepdown: 15 Cutting type: Oneway	Limits Stock Stock User defined Min Max Z: -59,6352 -4.7604
	Cutting Climb Adaptive Stepdown Cladptive stepdown Step order: After each depth step	Smoothing     Arc Fitting     Enable     Fitting factor: 0.5
	Stepdown: 3.75 Profiling Profile After each depth step After last depth step	Point Spacing

9306: Fixed an exception that could be thrown when setting up machining calculations.

9309: Ruled Surface: attempting to generate a ruled surface with the wrong number of input curves now shows an error message.

9310: Linking: Minimal retracts. Fixed a problem which meant we were linking as if we were outside of the profiles. For example, applying the clear surface by distance, even when a linking move was entirely above the top cleared slice.

9314: User Interface: Fixed an issue with the draw states being set incorrectly when setting the coordinate system of an edited plan.

9320: User Interface: It is now possible to resize the Advanced folder selection dialog from the Advanced ModuleWorks dialog page.

9323: Fixed the issue with NCG CAM failing to launch on versions of Windows 10 older than 1703 (10.0.15063).

9325: User Interface: There was a problem when creating a points folder from mouse hits with a 2D Stock Model displayed crashing NCG CAM, this will now not crash, but the 2D Stock Model cannot be used to snap points to.

9328: Geometry: It is now possible to Reverse Orientation of a surface folder without having to select surfaces first.

9329: Geometry: It is now possible to create offset surfaces of a surface folder without having to select the surfaces first.



9331: Linking: Retract Heights. Retract heights and ramp extensions have been improved for profile ramping.

9341: User Interface: Tapered tools were not always being displayed correctly in the Tool Database, this has now been fixed.

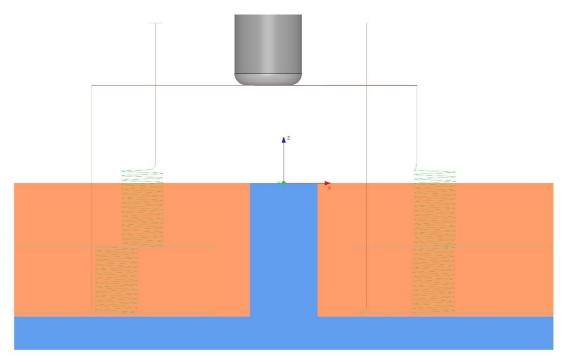
9347: User Interface: The ModuleWorks dialog pages can now use the translation set via the program command line.

9349: User Interface: The tool folder is now always enabled regardless of the status of the tools within it, also it was possible to re-run a disabled plan with a double click and control key, this has now been blocked.

9356: User Interface: Fixed selection issue on Intel GPUs resulting in incorrect rotations in the graphics view.

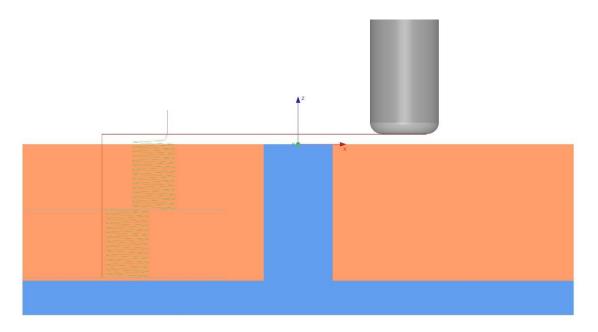
9361: Linking: Clearance heights. The user may now define a clearance plane at any height above the top of the machined surfaces (modified by thickness). Minimal retracts will not go above the clearance plane unless the start and end of the lead moves are already higher.

In the picture below, Area Clearance passes with a stepdown of 20mm were created and linked. The tool moves over the part from one pocket to another at a height of 29 mm. Due to the large stepdown the safety distance is accordingly large. The safety distance is also applied to the top of the component. So far, this height has not been able to be reduced by lowering the clearance plane.





With version 19.0.05, the safety distance is no longer applied to the top of the part. This means that by reducing the height of the clearance plane, the height of the positioning move above the part can be reduced. In the picture below, the clearance plane has been set to 3mm and the cutter is positioned at this height.



9362: Linking. Waterline Passes: We now limit the start of helical ramps to Z Clearance plus the Ramp Height Offset.

9364: Post Processor: GPost: Added PPRINT lines for the Tape file folder and the Tape file prefix.

9366: Linking: The setup of ramp heights for area clearance linking moves has been improved. This also fixes ticket 9355.

9368: Linking: Fixed an issue which caused 3+2 toolpaths retracts to be discarded.

9370: True Surface Machining: Fixed exception that could be thrown due to bad data.

9374: Linking: The handling of thicknesses when linking over profiles has been improved.

9381: User Interface: Fix dialog sizes for Turning profiling and roughing.

9383: User Interface: Fixed a crash when selecting items in the graphics view when using the default Microsoft graphics driver.

9386: Import: The Datakit libraries have been updated to 2023.4. This supports Parasolid V36.0 and UG NX2306

9390: Turning: There were examples which did not create the passes correctly due to overlapping geometry, this has now been fixed.



9391and 9424: Post processors: ISO and Heidenhain: Added an option to allow a pre-positioning move before the rotation move. Because of differences in the two controls and post processors, they are described slightly different in the post processor options. For consistency a pre-existing option has been reworded slightly too.

Macros				
Post proc	essor:	Hurco		
Pa	rameter			Formula
247 For	rce rotatio	ns to zero between toolpaths with the same rotation		false
248 Tex	xt before a	vertical toolpath following a rotated toolpath		m
249 Ou	itput prepo	osition move before the first rotation line		false
		osition move after the first rotation line		false
251 Co	mpensate	for Retation on Preposition move		false
TO	OL COM	P ABC		
252 Co	mpensate	for tool rotation		false
Macro Post pro	ocessor:	Heidenhain 530 BC Plane spatial		
F	Paramete	r	Form	ula
135 5	Start poin	t: 2 axis move (3+2 only)	false	
136 0	Dutput un	compensated preposition move before rotation	faise	
137 0	Dutput un	false		
138 A	After rotat	ion: home point suffix	"M13	0"
N	ACHIN	E AXIS - XYZ		
139 X	( axis pre	fix	"X"	
and the second se				

These options are set false by default, so existing post processors will not be affected.

9392: Stock Models: The speed of Multi-Axis stock models calculation has been improved.

9393: Rest Finishing: A problem has been fixed where rest finishing against stock models could crash NCGCAM.

9396: Coordinate System: There were examples which did not set Coordinate System correctly due to dividing by zero, this has now been fixed.

9399: User Interface: Drilling Cycle Dialog - There were occasions where the drilled hole image in the cycle dialog and plan label was not correct when Drill to Depth was set, this has now been fixed.

9401: Post processor: Heidenhain: Added the option 'Spindle speed variable comment' to allow a comment to be output after the spindle speed variable. By default, there is no comment, so any existing post will not be affected.

9402: Post processor: Heidenhain: Added the option 'Output the tool change for every toolpath' to allows the tool change to be output for every toolpath, even if it is the same tool number as the previous toolpath. The default is false so not to affect existing post processors.

9409: User Interface: Fixed an incorrect behaviour when selecting the focused tree view item when multiple tree view items are selected

9411: User Interface: Fixed an issue with the analysis dialogs remaining active after being closed.

9412: Linking: Fixed a problem which meant the start point could be lifted above the full clearance height.

9422: User Interface: Icons for turning passes and toolpath context menus have been improved and made consistent with the ribbon.

9423: Five-Axis: The advanced plan selection dialog was not filtering out deleted plans when creating the list of selectable inputs, this has now been fixed.



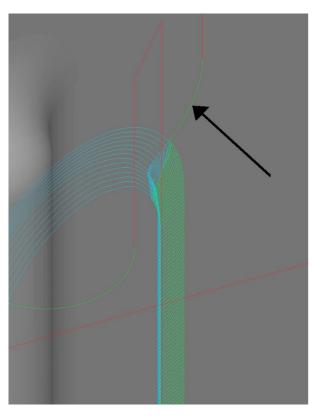
# Release Notes for NCG CAM v19.0.04

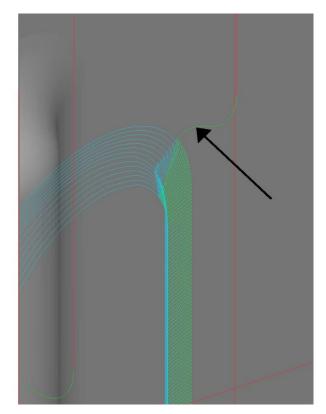
19th July 2023

9018: Linking: Rest Finishing passes: When linking rest finishing passes, it was only possible to define vertical lead arcs. This can sometimes lead to entry and exit moves running along the surface, when the part has vertical walls. Now horizontal leads can also be defined. By default they are 0.

🆈 Rest Finishing Toolpat	h - Cylinder_Angle_Rad 4 Groove 20.dca *		?	×
General Strategy Retracts Leads Down/Up Mill Cleanup Shaft Profile Inputs	Leads Fitting Machine all of pass Minimise trimming Fully trim pass Trimming Max trimming distance: 1.1 Ramp extension: 0	Vertical Leads Lead in: Lead out: Horizontal Leads Lead in: Lead out:		

The image below shows a rest finishing toolpath. On the left only with vertical leads, on the right vertical and horizontal leads combined.





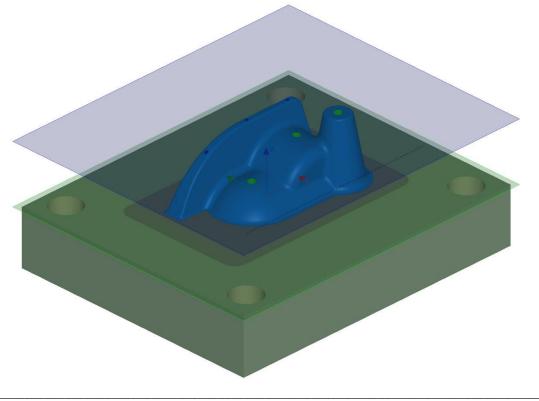


9020: ModuleWorks: In the ModuleWorks advanced dialog pages it is now possible to select the curves, drive and check surface folders directly in the advanced dialog. In the picture below, the second curve for a 5-axis morph milling is changed.

🖈 Five-Axis Morph Toolpath				
₽ Tool	5 Axis Console			
Cutter Advanced Holder - 5 Axis Console Inputs	Drive surfaces offset 0	Second  Second  der Selection  older:  Extracted Triangulated Curves 1  Extracted Triangulated Curves 1  Extracted Triangulated Curves 2  Extracted Triangulated Curves 2  Extracted Triangulated Curves 4	? ×	
	Round corners	2d Containment	Cut tolerance	0.02
		2d Containment		
	Extend / trim			
	Angle range		Surface edge handling	
	Sorting		Advanced	

However, the appropriate folders in the tree view must still be selected in order to start the corresponding 5-axis strategy.

9092: UI: Z limit dialog guides have been added when passes are generated, to visualize the Limits Z max and min of the calculation.





9016: Import: We can now import Rhinoceros .3dm CAD files. As with the Catia and NX interface, this is an additional purchase option.

	F.3dm	19/06/2023 13:06		
Part038.3	3dm	06/06/2023 10:08		
Part0380	2_Files	16/06/2023 16:29		
📒 Part0380	1_Files	16/06/2023 16:26		
Part038_	F10_Files	01/06/2023 14:33		
<b>Part038</b>	F09_Files	01/06/2023 14:32		
Dateiname:	Part038.3dm			~
Dateityp:	Rhino Files (*.3dm) All Types (*.dca;*.msa;*.igs;*.ige;*.iges;*.stp			~



# We are pleased to release NCG CAM version 19.0

These release notes cover the versions 19.0.0 to 19.0.03.

This is a major release so has several new and important features, the addition of turning is possibly the biggest feature. Another area where a lot of development work has gone into is improving the interaction with the software. That means the time it takes until a finished calculation is displayed, until something is selected in the graphic, until a dynamic graphic function starts, the time it takes to load a file etc. Other things like the ability to trim surfaces to a boundary will be useful too. There are many other smaller but equally important improvements as well as general fixes.

**Important:** One of the new features required a change to the tool database structure, if you use a saved tool database in v19.0 you will **not** then be able to use it again in v18.0.

We would strongly suggest you make a backup copy of your tool database(s) before proceeding with v19.0. Also due to the multiple changes to the database it is not possible to load v19.0 dca's into any previous versions of NCG CAM.

## New features

6526: Turning: NCG CAM now offers a Turning module.

#### Mini guide

With the introduction of turning, NCG CAM now has two machining modes. The required machining mode needs to be selected in the quick access toolbar. It will default to milling when NCG CAM is opened.

The Turning mode needs to be selected.

View Edit Points Boundari

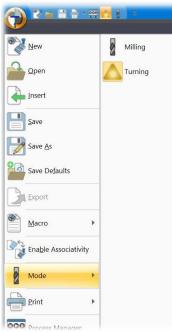
A triangular tip for Turning, and a slot-drill for Milling (shown selected in the image above).

Selecting Turning will change the axis and some ribbon menus.

It is also possible to select the milling / Turning mode via the Application (file) menu > Mode > Milling / Turning.

#### Note:

NCG CAM will always open in the Milling mode.





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To To

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The Milling mode axis and ribbon.

There is a Milling tab (in previously versions of NCG CAM this was Passes).

The Turning mode axis and ribbon.

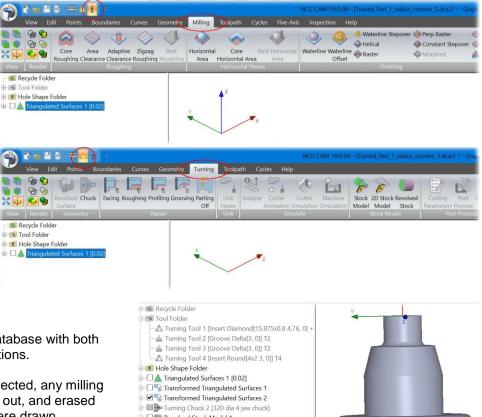
There is a Turning tab. The Five axis menu is also hidden as it is only for milling. The axis only has a X and Y axis.

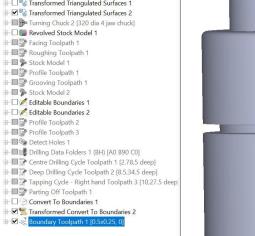
### Note:

It is possible to have a database with both milling and turning operations.

If the Turning mode is selected, any milling operations will be greyed out, and erased from the screen if they were drawn. Any milling tools in the Tool Folder will be greyed out too.

Likewise, selecting the Milling mode will grey out all turning operations and tools.





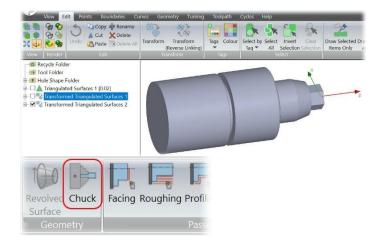


You may need to transform the part, just as you would in milling to align it with the axis and to have Z zero where you want it for machining.

This model has some additional stock at the back (work holding end) – the part is 195 long.

### Define the chuck:

Optionally, a chuck can be defined, from the Turning ribbon.





The easiest way to create the chuck is to use the Design button, and the draw a boundary for the chuck section.

In much the same way as a tool holder can be created in the milling.

Note: When defining the chuck, diameter values are used for the X axis.

It is a section that is needed, this is then revolved around the Z axis to get the 'full; chuck shape.

Once you have the required 'closed' section, use the 'Import to Tool definition' button.

Now you will see the 'full' chuck as a rendered form.

A Chuck margin can be set, so tools should not go past this plane.

The Chuck offset, allows the chuck to be translated along the Z axis. This allows the chuck to be positioned to suit different work pieces.

The chuck will appear in the tree as an item just like a set of triangulated surfaces or bounding box.

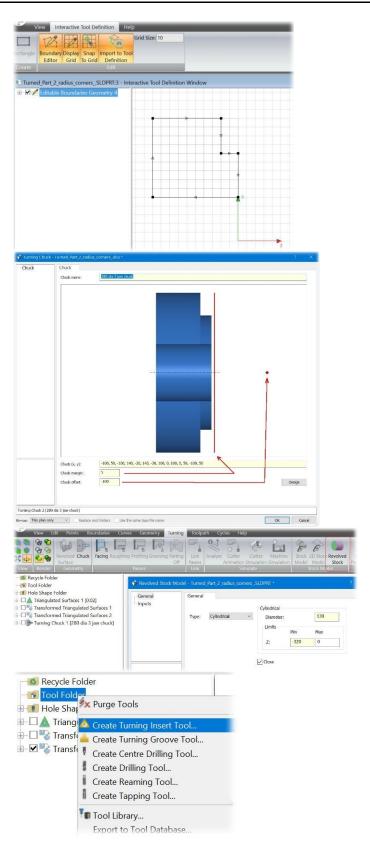
Optionally, a revolved stock can be defined.

Just like a triangulated surface, the colour can be changed and made translucent if you want.

Tools can be created in the Tools Folder prior to the passes.

(Tools can be defined as the passes are created too, but for this example they are created in the Tools folder.)

Note, the Centre Drill is a new tool shape so a centre drill can be defined now too.





# Defining the Turning insert:

It is possible to set all the parameters manually if Custom is selected. But with ISO selected (ANSI if they units are set as inches), it is possible to pick the insert's ISO description / format by setting the required value from a drop-down list. That is the same on the Tool page as in the Insert page.

The Tool page also has options for the inserts angle and position (indicated by the red dot on the tip).

Inserts can also be defined in the Tool Database.

Tool	Tool					
Advanced	Recent tools:	Please select				
Holder	Tool name:	Insert Diamond[12.	7x1.2 1.59, 0]			_
Chuck	Insert format:	Custom	€ ISO		DPGN-1501	12
Passes Inputs	ISO code:	D ~ P ~	G ~ 🛛 🗸	. 15 ~	01 ~ 1	2
	Circle diameter:	12.7	AB			
	Corner radius:	1.2	C F			
	Angle (°):	55	G H J			
	Width:	10				
	Length:	12	M N Q R T U W			
	Depth:	1.59	Ť			
	Relief (°):	11	w x			
	Shape: Dia	mond ~				
	Position	93				
	Lead Angle (°):					
	Trailing Angle (°):	32				
	Toolholder (x, y):					
	Holder clearance: Tool database:	1	Load	Save	Impo	rt
ofile Passes 1						

# Defining the Holder:

**NOTE:** This **really** is needed to ensure the back of the holder clears the part.

This is easiest done via the Holder 'Design' button.

It is then possible to set a suitable grid size and click positions for the holder shape, the Holder requires a closed profile.

The default is for a Right-hand tool, but a lefthand tool can be defined.

The Inverted option is normally ticked, this is for the tool to be at the back with the insert facing down.

The holder's Depth can is set in the Depth field, not so important for O/D turning, but for boring type operations it will be very important.

It would be best (quicker the next time) if the holder is also saved to a tool database.

Turning Tool - Turns			
		SLDPRT · ? ×	
Tool Insert Advanced	Holder Holder name:	General turning tool holder 1	
Holder			•
			*
		Right hand I inverted	
	Depth:	15	



# Facing:

Select the parts Triangulated Surfaces and the Tool from the Tool Folder.

Select 'Facing' in the Turning ribbon

Most or the tool parameters are greyed out in the image (right) because they were set in the Tool Folder.

If you prefer not to define the tool first, the Insert and Holder details can be entered or loaded from the tool database.

Tool	Tool		
☐ Insert Advanced	Recent tools:	Please select	
Holder	Tool name:	Insert Diamond[15.875x0.8 4.76, 0] +	- holder 2
Chuck	Insert format:	Custom ISO	-
Passes Inputs	ISO code:	~ ~ ~ ~ ~	. ~ ~
100 · 100 · 100	Circle diameter:	15.875	
	Corner radius:	0.8	
	Angle (°):	80	
	Width:	10	
	Length:	12	
	Depth:	4.76	
	Relief (°):	0	
	Shape:	iamond ~	
	Position	97	
	Lead Angle (°): Trailing Angle (°)		
	Trailing Angle (*)		
	Toolholder (x, y):	2, -19, 6, -22, 6, -150, 31, -150, 31, -	18, 20, -1, 0, 0, 2, -19
	Holder clearance:	1	
	Tool database:	Load	Save Import
ace Passes 2			

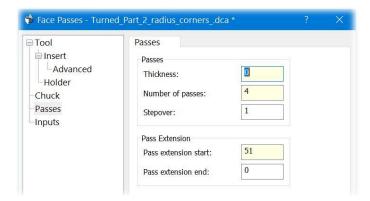
Click on the Passes page.

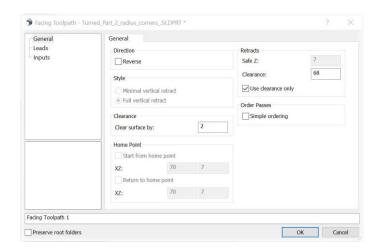
A thickness can be set to leave some material for a finish pass, The 'Number of passes' is set to 4, and a 'Stepover' of 1. Four passes will be taken to face the stock off to +0.2 of size.

In this example, the front of the part is 34.0 diameter, while the stock is 130.0 diameter, so the Pass extension – start' is used to extend the passes to outside the stock diameter.

The passes then need to be linked.

On the General page, things like the clearance can be defined, the defaults are calculated from the part and passes (like the milling) so should be safe, the Clearance plane only option has been selected here.







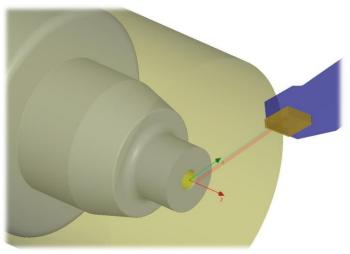
On the Leads page, ramp and lead in / out extensions can be set, along with the lead angles.

Lead in/out arcs can be added too if preferred.



Turning toolpaths can be visualized with the Cutter Animated and Cutter Simulation.

As with the milling, the animation speed and position along the toolpath can be controlled with slider bars, it can be pause and stepped forward or backwards.



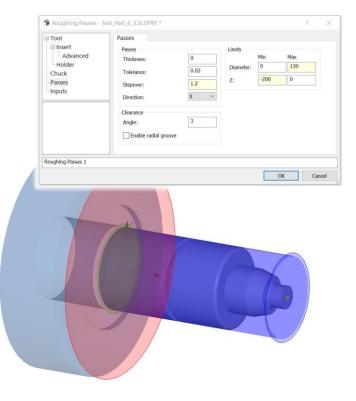
# Roughing out the form:

Select the required tool in the tool folder, and the surfaces folder in the tree. Optionally the chuck (if defined) can be selected too.

From the Turning ribbon, pick Roughing. On the Passes page, the Diameter and Z limits can be set to allow for stock or limit the turning range.

In the graphics window, the area to be turned will be shaded, the chuck will be shown and the guides for the Z Min / Max limits.

A thickness can be set to leave some material for a finish pass. The stepover (depth of cut) can-be set too. The 'Direction' is the axis (X or Z) the stepover is made on. With Diameter set a pass will be made along the diameter, then make another pass along the diameter that is 2x the stepover smaller





The passes need to be linked to create the toolpath.

It is possible to select any 'unwanted' passes and delete them prior to linking if needed.

The Toolpath can be seen in the image to the right. There are no passes can be seen that groove as the tool could not get in there.

Another reason for there being no passes in the groove is that the Enable radial groove option has not been enabled.

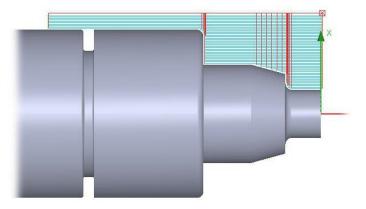
The Enable radial groove option (if enabled) allows areas that would be undercut when looking along the Z axis to be detected and considered for turning. The Clearance angle gives a minimum clearance as the tool turns in to the groove area.

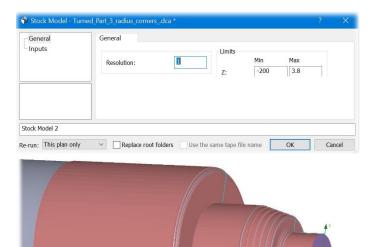
(It is also available in the profiling).

## Creating a stock model:

To see what it will look like; a stock model may be created. Select the toolpaths so far Facing and Roughing.

'Stock Model' can be selected in the turning ribbon. The dialog that is displayed is like the milling stock model, allowing the Z limits to be defined (the defaults will come from the selected toolpaths).



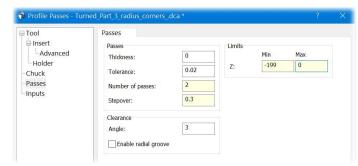


The resulting stock model.

## **Profiling:**

Select the part and optionally Tool and Chuck, then pick 'Profiling' from the ribbon. If a tool was selected the parameters will be greyed out, if no tool was selected then a tool will need to be selected from the Most Recent tools list, or entered manually

On the passes page, it is possible to define a thickness, a number of passes and a stepover. Here a stepover of 0.3 and 2 passes, so a pass will be made at +0.3, then another at size (as the thickness is 0).





Grooving:

passes / toolpath.

Grooving tool.

radii.

Bgm.-Neumeyr-Str. 7 85391 Allershausen Fon: +49 8166 9982840 Fax: +49 8166 9982842 Email: info@ncgraphics.de Internet: www.ncgraphics.de

Just like the facing and roughing, the profiling passes need linking, on the leads page there are options to control the lead in and out moves.

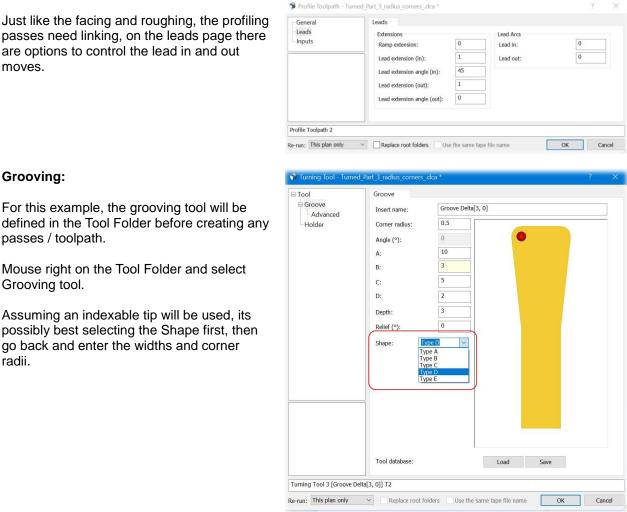
For this example, the grooving tool will be

Mouse right on the Tool Folder and select

Assuming an indexable tip will be used, its

go back and enter the widths and corner

possibly best selecting the Shape first, then



The tool holder can be 'drawn' quickly and easily in the Holder > Design.

Although having tips, holders and tools in a tool database is likely to be even quicker in the long run.

Editor Grid	Edit mers_dca:3 - Interactive T es Geometry 7			
Turning Tool - Turning     Tool     Groove     Advanced     Holder	Holder Holder Holder Holder	dca *	 ? ×	
				v



Select the part and optionally tool and chuck, then pick Grooving from the ribbon.

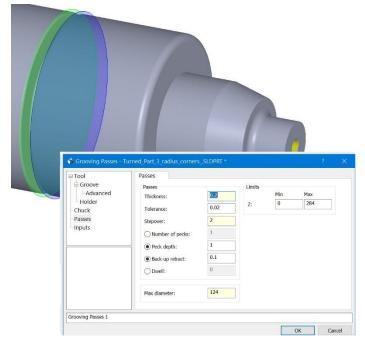
On the passes page, then Z min and Z max fields can be used to restrict the machining just to the groove. Rotating the part and clicking on the relevant surface is the quickest and easiest way to do that. A thickness can be added, so a finish pass can be taken later.

Either a Peck depth or Number of pecks can be selected, the peck depth is the default.

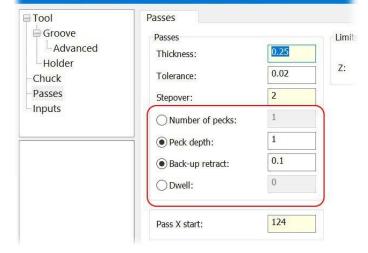
Using the Number of Peck depth option splits the distance from the X starting diameter to the part into the given number of pecks – if the bottom of the groove is conical, the cutting depth for each peck could vary across the width of the groove.

The peck depth option will maintain the cutting depth, but vary the number of pecks required if the bottom of the groove was conical.

After each peck it will by default back off by 0.1 (or used defined distance), or Dwell may be selected and movement of the X axis will stop for the given time (seconds or milliseconds – that will depend on the machine control).



## 🛸 Grooving Passes - Turned\_Part\_3\_radius\_corners\_.dca \*

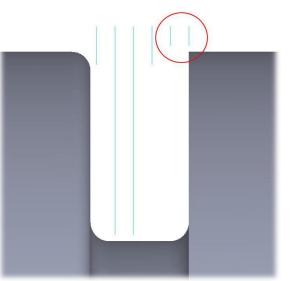


Passes can be deleted if needed.

In the image to the right there are some grooving passes that do not go into the groove. (These are because of the insert width and the Z limits).

Select those, and press delete.

Linking the grooving is the same as linking the profiling.





# Profiling the groove:

The groove has been roughed out, but there will still be some stock from the thickness that was left, and because of stepovers and pecks.

To finish this form a round Insert will be used, being defined in the Tool Folder first.

To constrain the passes to just one side of the groove, boundaries will be used, they can just be rectangles – one for either side of the groove.

Each boundary is in its own folder, but they have been created to overlap slightly in the groove.

📬 Profile Passes - Turn 🖃 Tool Tool lnsert Please select. Recent tools: Advanced Insert Round[4x2 3, 0] Holder Tool name: Chuck Insert format: Custom OISO Passes ISO code: Inputs 4 Circle diameter: 2 Corner radius 0 Angle (°): 10 Width 12 Lenath 3 Depth: 0 Relief (°) Shape: Round Position Lead Angle (°): 93 Trailing Angle (°): 0 -1.75, -125, 25, -125, 25, -35, 1.75, -14, 1.75, -1, -1.75, -1, -1.75, -1 Toolholder (x, y): Holder clearance: 1 Tool database: Load Save Import Profile Passes 7 OK Cancel 🚳 Recycle Folder Tool Folder ▲ Turning Tool 1 [Insert Diamond[15.875x0.8 4.76, 0] Turning Tool 2 [Groove Delta[3, 0]] T2
Turning Tool 3 [Groove Delta[3, 0]] T2 🛆 Turning Tool 4 [Insert Round[4x2 3, 0]] T4 Hole Shape Folder Triangulated Surfaces 1 [0.02] 🗉 🗆 🛂 Transformed Triangulated Surfaces 1 Transformed Triangulated Surfaces 2 - Turning Chuck 2 [320 dia 4 jaw chuck] Revolved Stock Model 1
 Facing Toolpath 1
 Roughing Toolpath 1 Stock Model 1 - - Profile Toolpath 1 Grooving Toolpath 1 Grooving Toolpath 1 Clitable Boundaries

0

2

0.02

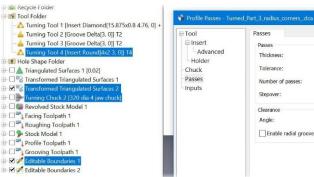
0.12

3

7

-284 0

With the Tool, Triangulated Surfaces, Chuck, and the righthand boundary folder selected, pick profiling. On the passes page, the number of passes has been set to 2, and a stepover of 0.12

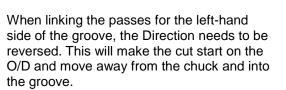




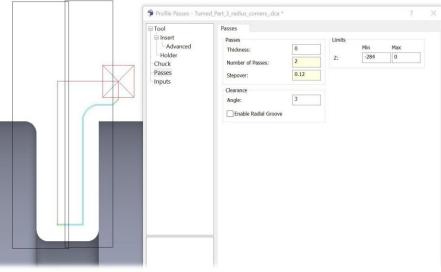
Those passes can then be linked, in the same manner as the main form was profiled was linked. With the Tool, Triangulated Surfaces, Chuck, and left-hand boundary folder selected, pick profiling.

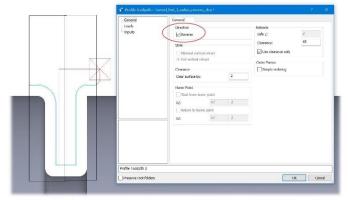
On the passes page, the number of passes has been set to 2, and a stepover of 0.12

Note: The previous profile toolpath can be seen here for the righthand side of the groove.



If the reverse is not set, it will start at the bottom of the groove, and pull out and move towards the chuck.





# Drilling (on the Centre Line):

This part has a M10 hole in the centre that can be drilled and tapped. With the Triangulated Surfaces selected, mouse right and pick 'Detect Centre Line Holes'.

Or the 'Detect Holes' option can be used in the Cycles ribbon.

Because the hole must be on the Z axis, a lot of the filters are greyed out.

Then the drilling data folder can be created.

×



Expand the Drilling Data folder and select the hole, then from the Cycles ribbon or mouse right menu, pick Centre drill.

The centre drill size can be selected from a list, and it will update all the relevant fields.

On the passes page you may want to adjust the depth or, set a dwell time.

Then link the Centre Drilling cycle.

Gouge Protection Centre Drill	Recent centre drills:	Please select		
Advanced	Fool name:	Centre Dell[2.78, 120°x1	5.68]	
Holder ( Cycle	Code:	3 ~		
Cycle Shaft Profile	Drill tip diameter:	2.78		
Inputs	Tip angle:	120		5
	Tip length:	0.8025		4
	Flute length:	2.78		4
	Shank diameter:	6.35		3
	Taper angle:	30		2
	Body length:	16.68		2
	Overall length:	50.8		1
				0
	Shank definition (d, z):	2.78, 0, 2.78, 1.9775, 6.3	5 5 0692 6 35 15 8775	0
	Toolholder (d, z):		.,,,	
	Shank dearance:	0		
	Holder dearance:	1		
			1	
	Tool database:		Load S	ave In

Deep Drilling the hole is basically the same as Centre Drilling, select the hole in the Drilling Data folder, mouse right and pick 'Deep Drilling', define an 8.5 drill, and then on the Cycle page, set the Peck Depth, and Chip Break if needed.

Then link the Deep Drilling

Gouge Protection Duili -Advanced Holder       Orde Parameters Bate dearance:       93       To end of part:       Image Parameters Ptd:       0.002         Dearance:       93       To end of part:       Image Parameters Ptd:       0.002         Dearance:       93       To end of part:       Image Parameters Ptd:       0.002         Dearance:       93       To end of part:       Image Parameters Ptd:       Image Parameters Ptd:       Ptd:         Dearance:       93       10       O 34.5       34.5       O Image Parameters Ptd:       Image Para	Gouge Protection         Drill         Advanced         Holder         Holder         Holder         Holder         Basic         Detrini         Holder	Deep Drilling Cycle - Turne		and the second				- 19 -
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		n: This plan only apping Cycle - Turned_Pa bol Gouge Protection Tap - Advanced Holder ycle ant Profile	Replace root folders	1 34.5 1 0 10 ane at: 0 0	From start of     To end of pa     Offset start b     Drill to d     Chip brea     Measure     0     Kart Dist. End Dist.	f part: 1 rt: 0 sy: 0 spth k depth from pla	~	7 Thread Parameters PRch: Left hand  Right hand
		n: This plan only apping Cycle - Turned_Pa bol Gouge Protection Tap - Advanced Holder ycle ant Profile	Replace root folders	1 34.5 1 0 10 ane at: 0 0	From start of     To end of pa     Offset start b     Drill to d     Chip brea     Measure     0     Kart Dist. End Dist.	f part: 1 rt: 0 sy: 0 spth k depth from pla	~	7 Thread Parameters PRch: Left hand  Right hand
		n: This plan only apping Cycle - Turned_Pa bol Gouge Protection Tap Advanced Holder ycle haft Profile	Replace root folders	1 34.5 1 0 10 ane at: 0 0	From start of     To end of pa     Offset start b     Drill to d     Chip brea     Measure     0     Kart Dist. End Dist.	f part: 1 rt: 0 sy: 0 spth k depth from pla	~	7 Thread Parameters PRch: Left hand  Right hand
		n: This plan only apping Cycle - Turned_Pa bol Gouge Protection Tap Advanced Holder ycle haft Profile	Replace root folders	1 34.5 1 0 10 ane at: 0 0	From start of     To end of pa     Offset start b     Drill to d     Chip brea     Measure     0     Kart Dist. End Dist.	f part: 1 rt: 0 sy: 0 spth k depth from pla	~	7 Thread Parameters PRch: Left hand  Right hand
	Sing Code - Brith hand 31(1) 22.5 dem	n: This plan only apping Cycle - Turned Pa ool Gouge Protection Tap Advanced Holder ycle haft Profile	Replace root folders	1 34.5 1 0 10 ane at: 0 0	From start of     To end of pa     Offset start b     Drill to d     Chip brea     Measure     0     Kart Dist. End Dist.	f part: 1 rt: 0 sy: 0 spth k depth from pla	~	7 Thread Parameters PRch: Left hand  Right hand
	sing Cords - Stoth band 31(1) 22 5 deen	n: This plan only apping Cycle - Turned Pa ool Gouge Protection Tap Advanced Holder ycle haft Profile	Replace root folders	1 34.5 1 0 10 ane at: 0 0	From start of     To end of pa     Offset start b     Drill to d     Chip brea     Measure     0     Kart Dist. End Dist.	f part: 1 rt: 0 sy: 0 spth k depth from pla	~	7 Thread Parameters PRch: Left hand  Right hand
	Sing Cycle - Birth Eard 3 (10 22 5 deer)	n: This plan only apping Cycle - Turned_Pa bol Gouge Protection Tap Advanced Holder ycle haft Profile	Replace root folders	1 34.5 1 0 10 ane at: 0 0	From start of     To end of pa     Offset start b     Drill to d     Chip brea     Measure     0     Kart Dist. End Dist.	f part: 1 rt: 0 sy: 0 spth k depth from pla	~	7 Thread Parameters PRch: Left hand  Right hand
	inn Cyrle - Brobt hand 2 [10.27.5 deen]	n: This plan only apping Cycle - Turned_Pa bol Gouge Protection Tap Advanced Holder ycle haft Profile	Replace root folders	1 34.5 1 0 10 ane at: 0 0	From start of     To end of pa     Offset start b     Drill to d     Chip brea     Measure     0     Kart Dist. End Dist.	f part: 1 rt: 0 sy: 0 spth k depth from pla	~	7 Thread Parameters PRch: Left hand  Right hand
	ing Cycle - Bight band 3 [10 27 5 deen]	n: This plan only apping Cycle - Turned_Pa bol Gouge Protection Tap - Advanced Holder ycle ant Profile	Replace root folders	1 34.5 1 0 10 ane at: 0 0	From start of     To end of pa     Offset start b     Drill to d     Chip brea     Measure     0     Kart Dist. End Dist.	f part: 1 rt: 0 sy: 0 spth k depth from pla	~	7 Thread Parameters PRch: Left hand  Right hand
	ing Cycle - Right hand 3 110 27.5 deen	n: This plan only apping Cycle - Turned_Pa bol Gouge Protection Tap - Advanced Holder ycle ant Profile	Replace root folders	1 34.5 1 0 10 ane at: 0 0	From start of     To end of pa     Offset start b     Drill to d     Chip brea     Measure     0     Kart Dist. End Dist.	f part: 1 rt: 0 sy: 0 spth k depth from pla	~	7 Thread Parameters PRch: Left hand  Right hand

Tapping is the same again, just a different cycle, the Pitch will need setting, and ensure to stop short of the bottom of the hole.

It you have created a compound cycle for this type of hole, that could be used also.



## Parting off:

Parting off is very similar to the grooving, the main difference being the parting off position, there is a DZ point, from when the parting off is to start.

For this example, the part is 120 diameter, so X will default to 60, and Z has been set to -195

For the Pass Extension, 3 has been set, so the pass starts 3mm before the part, and the end set to -1.5; setting -1.5 will force the pass to stop 1.5mm short, so the part remains attached to the stock by a 3mm diameter pip.

The parting off does not respect the surfaces, you can part off through the model.

The linking is the same as grooving.

## Cutting parameters:

For the Facing, Roughing, and Profiling, the same tool was used, so all three can be selected in the Operations tree, then click, mouse right > Cutting parameters. Set the tool number, and coolant.

For the Spindle Speed there are two options, 'Use constant cutting speed' (the default), and a cutting speed in m/min. If that option is un-ticked, it will be a constant Spindle Speed and the RPM can be set.

There are two methods of defining the Feedrate too. It can be as feed per rev, or distance per minute. That is controlled by the 'Use feed per revolution' check box.

Other tools are set in the same manner, but clearly the tool number, and other cutting parameter will need to change.

The canned cycles use RPM for the spindle speed, and mm/min for feedrates.

Tool	Passes					
Groove Advanced Holder Chuck Passes Inputs	Passes Thickness: Number of pecks: Peck depth: Back-up retract: Dwell:	0 1 0.1 0	Point DZ:	122	-195	
	Pass Extensions Pass extension start: Pass extension end:	0				

General Inputs	General				
inputs	Toolpath:	Facing Toolpa	th 1		
	Tool name:	Insert Diamor	d[15.875x0.8 4.76, 0	] + holder 2	
	Tool number:	1	Height offset:	0	
	Work offset:	0	Datum offset:	0	
	Coolant:	On		~	
	Speed				
	Use constant	cutting speed			
	Cutting speed:	100	Spindle speed:	1000	
	Direction:	Clockwise	O Anti-clockwise		
	Feedrates				
	Use feed per	revolution			
	Rapid per rev:	100	Ramp in per rev:	0.2	
	Cutting per rev:	0.3	Ramp out per rev:	0.3	
	Estimated machi	ning	15:42:53		
	Optional Stop				
	ST 12 842 /4	nal stop at start nal stop at end			
	Comment				
	4				
ting Toolpath 1					



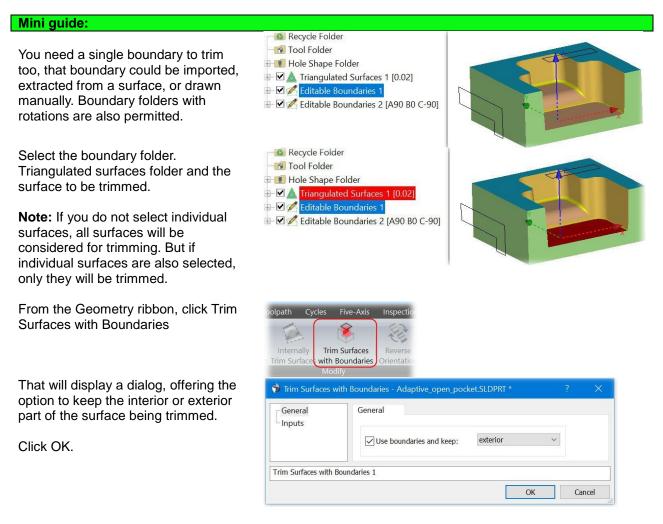
## Post processing.

Select he toolpaths in the order you want to post then and pick Post Process from the turning ribbon. Then select the post (only tuning post will be displayed, in the milling mode only milling posts are displayed).

The order and tool numbers can be checked on the Toolpaths page.

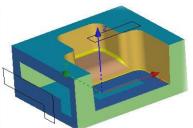
General	General		
Inputs	Format:	ISO_Turning	~
Toolpaths	Filename:	D:\NCGCAM_Testing\Turning\Turned_Part_3_radius_corners_01.iso	
	Units:	mm ~	
	Group a		
	Create		
	Filename:	D:\NCGCAM_Testing\Turning\Turned_Part_3_radius_corners_01	-
ost Processor [Turned_Pa	art. 3 radius corners	01.1501	

4813: It is now possible to trim the surfaces to a given boundary, with options to keep the interior or exterior. Also fixes Tickets 8105 and 8106.





Here the result of having trimmed two individual surfaces, keeping the exterior in both cases. Recycle Folder
 Tool Folder
 Hole Shape Folder
 ✓ Éditable Boundaries 1
 ✓ Éditable Boundaries 2 [A90 B0 C-90]
 ✓ Á Editable Triangulated Surfaces 9



Tip: If the Ctrl key is pressed when clicking on Trim Surfaces with Boundaries, a new Triangulated Surfaces folder will be created.

Note: If an External Trim Surface is applied prior to trimming surface with boundary, the surface trimming will be based on the output of External Trim Surface. No result will be created if the Untrim Surfaces is applied prior to trimming surface with boundary.

## Key enhancement

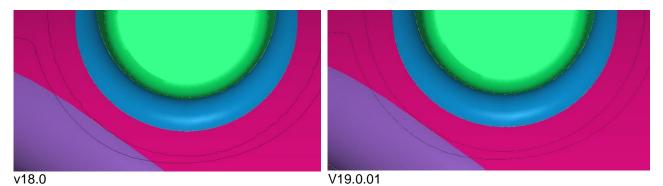
8137 and 8858: Toolsheets: The views of three- and four-view image layouts can now be individually configured. This required the User Interface for the Toolsheets bitmap writer and images dialog to be rearranged grouping relevant options together. Also updated the documentation.

Toolsheet - A	long_curve_02.IGS *					?
General	Images					
Images	Part Image			Toolpath Image		
Inputs	Image			Image		
	Bitmap size: 6	500 <sub>x</sub> 450		Bitmap size:	600 <sub>x</sub> 450	
	Background:			Background:		
	background:			background:		
	View			View		
	Layout: S	ingle view {1x1}	$\sim$	Layout:	Single view {1x1}	~
	View 1	View 2		View 1	View 2	
	Front Left	← Front Left	$\sim$	Front Left	✓ Front Left	$\sim$
	60, 0, -45	60, 0, -45		60, 0, -45	60, 0, -45	
	View 3	View 4		View 3	View 4	
	Front Left	<ul> <li>Front Left</li> </ul>	$\sim$	Front Left	<ul> <li>Front Left</li> </ul>	$\sim$
	60, 0, -45	60, 0, -45		60, 0, -45	60, 0, -45	
	Borders			Borders		
	Render			Render		
	Style: S	mooth shaded	$\sim$	Style:	Smooth shaded	~
	Translucent	Axes		Translucent	Axes	
	Dimensions			Dimensions		
	Linear	✓ Ordinate		✓ Linear	Ordinate	
	Column					
	Colour:			Colour:		
oolsheet [Along_o	curve 0203 xml1			19 - G		
ooisileet [Alolig_t	curve_ozosixiiiij					

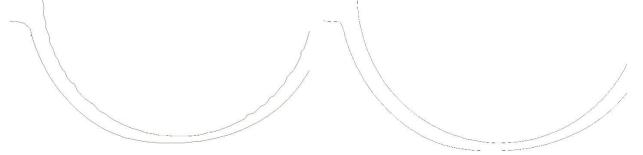


8546: Boundaries: Improvements have been made to the quality of shallow area and cutter contact boundaries. Curvature analysis has been improved by better use of parametric surface data.

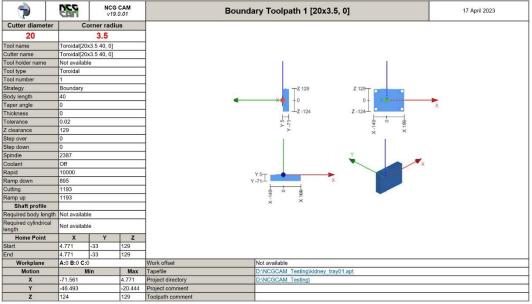
The images below show the shallow area boundaries over the surfaces, using a 10x1 cutter, using the angles  $0^{\circ}$  -  $30^{\circ}$  at 0.02 tolerance.



The surfaces have been removed in the following images for clarity.



While visually looking better, this is extremely helpful when the passes need to follow the boundary, for example constant surface stepover.



8860 and 8733: Toolsheets: Ordinate dimensions can now be drawn on the toolsheet images.

Note: the dimensions can only be shown on views along the XYZ axis, dimensions will be omitted on any rotated view.



対 Toolsheet	- kidney_tray.prt.5 *	? ×
General Images	Images Part Image	Toolpath Image
mputs	Image Bitmap size: x 450 Background:	Image Bitmap size: 600 x 450 Background:
	View         Four view (2x2)         View 1           Layout:         Four view (2x2)         View 2           Side         End         View 3           90, 0, -90         90, 0, 0         View 4           Top         Front Left         View 4           0, 0, 0         60, 0, -45         Others	View         Layout:       Four view (2x2)          View 1       View 2         Side       End          90, 0, -90       90, 0, 0          View 3       View 4          Top       Front Left          0, 0, 0       60, 0, -45          Borders
	Render Style: Smooth shaded ~ Translucent  Axes	Render Style: Smooth shaded ~ Translucent Zaxes
	Dimensions       Inear     Ordinate       Colour:	Dimensions Dimensions Ulinear Colour:
Toolsheet [kidner] Re-run: This pla		OK Cancel

The options are on the image page of the toolsheet dialogs with options for linear and ordinate style dimensions, there is also the ability to change the colour of the dimension arrows.

## General

2854: Import: Loading geometry files is now much faster due to using multi-threading which allows the triangulation of surfaces to be performed in parallel.

3137: User Interface: We now display a minimum of 3 decimal places for coordinates displayed in the status bar.

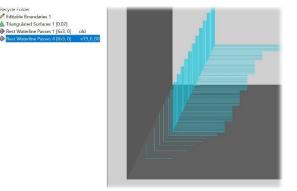
d 100% X 14.226	Y -23.322	Z 25.000
-----------------	-----------	----------

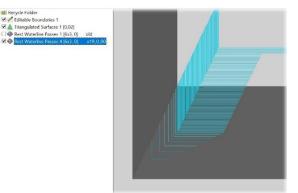


3720: Drilling. The shank definition for drilling tools (except centre drills) now may be modified in a similar manner to milling cutters. Also fixes tickets 6104 and 7672. This will be very useful for micro drills and drills that have a Morse Taper shank, as with the milling, the shank is gouge protected.

- Tool Gouge Protection	Drill		
Drill	Drill name:	Dril[0.5, 118%15]	
- Advanced	Drill diameter:	0.5	
Cycle	Tip angle:	118 • ^ Ø: 3	z: 15 X
Shaft Profile Inputs	Tip length:	0.1502	
inputs	Shank diameter:	3 +	
	Body length:	15	
	Overall length:	15	
	Depth adjustment:	0.1512	z: 10 X
		Ø:0.5 +	z: 3 X
		Ø: 0.5	z: 0.1502
	Shank definition:	0.5, 0, 0.5, 2.8498, 3, 9.8498, 3, 14.8498	
	Shank clearance:	0	Design
	Top connection:		
	Tool database:		Load Save
p Drilling Cycle 1 [0.5,45 deep			

4148: Rest Waterline Passes: The quality and consistency of integrated rest passes has been improved, this should give a better smother appearance to the end of the passes.





Before, the end of the passes would appear to be 'stepped',

In v19.0.00 this is now much smoother and should give better results.

4567: Toolsheets: Part and toolpath images now use the available space more efficiently resulting in a larger image.

5149: Fixed an issue where some databases saved with running plans were not reloading correctly.

5283: Boundaries: When using properties to modify an editable boundaries plan we now copy the boundary collection into a new editable boundaries plan.

5427: Reduced database load times. Also fixes Ticket 6598.



5837: When the 'Program Data Folder' (specified in Options > Defaults) does not exist, the NCG CAM now uses the default folder (C:\ProgramData\NCG CAM Solutions) instead. If this happens, a warning dialog box is also shown.

		ions\Junk\ do	oes not exist.
Using der	ault uata loide		
		Folder C:\ProgramData\NCGCAM Solut Using default data folder.	Folder C:\ProgramData\NCGCAM Solutions\Junk\ do Using default data folder.

6049: Rest Roughing: The Overthickness should now always be calculated as negative value by default.

Tool	Edit Passes	
	Overthickness:	0.3
sses	Resolution:	0.5
- Adaptive Stepdow - Smoothing	Tolerance:	0.1
Anti-Vibration	Pass extension:	1

6117: Export: The VRML option now supports Barrel cutters.

6418: Detect Holes: Added the 'Min' and 'Max' angle to the filter page. The angle range is active when filtering by supplied A B,C axes.

General	General			
-Filter - Inputs	Detect Holes      Find cylindrical, c      Find cylindrical an      Find cylindrical h      Ignore inaccessib      Allow detection o      Join collinear cyli	nd conical holes oles only le cylindrical hole f part holes		
	☐ Join collinear con Rotation Configuration Rotation model: Restricted axis: Axis range:		Second	e
1	Angle:	0	180	
	Point:	0.01		
	Angle:	0.5		
Detect Holes 1				

This could in some cases help when selecting holes by avoiding unwanted holes. The restricted axis must fall within the Angle range.

6864: Spiral Passes: The quality of spiral passes on examples machined to tighter tolerances has been improved.



7094: Datums: We can now set and switch coordinate systems on several selected triangulated surfaces, triangulated curves,, and triangulated points folders, this is possibly most useful when loading a part and using the 'Load component information' option.

In use, create the required 'Coordinate system', expand the folders so any triangulated surfaces, triangulated curves, and triangulated points folders can be selected, select the required 'Coordinate system' too, then 'Set coordinate system' may be picked.

7146: User Interface: Added "Organise by Layer" and "Load Component Information" options to the 'Preferences' page in the Options dialog.

See ticket 7715 for a screen-shot of the dialog.

7206: Selected Surface Waterline Passes: A problem has been fixed, for cases where small gaps could appear in selected surface waterline passes. This also fixes tickets 7993 and 5607.

7559: User Interface: The toolpath naming has been changed so when linking with Protect Surfaces (Linking Clamp surfaces) the new plan isn't labelled as a rest toolpath.

General	Inputs	
Strategy Retracts Leads Down/Up Mill Ccleanup Shaft Profile Inputs	Input Evaluation Machining Passes Raster Passes 3 [20x3,5, 0] Ink Clamp Surfaces Triangulated Surfaces 3 [0.02] Trim Boundaries Snull> Link Control Points <null></null>	
aster Toolpath 3 [20x3.5, 0]		

7715: Import: IGES files loading through the Convert to NURB option now have an option to use 3D trimming curves. This 'Prefer 3D trimming for IGES file loaded with the Convert to NURB can be set in Options > Preferences > Open File.

Axes Animation and Simulation Defaults Entity Colours Graphics Post Processor Macros Preferences System Colours Tags	Preferences         Triangulator         Tolerance         Default Triangulation Tolerance:         Drilling Data Depth Tolerance:         0.0         Re-Triangulate when setting coordinate system         Include hidden geometry by default         Open File         Organise by layer         1 oad component information         ✓ Convert to NURB         ✓ Prefer 3D trimming for IGES files
---	---

They are shown ticked here but are unticked by default.

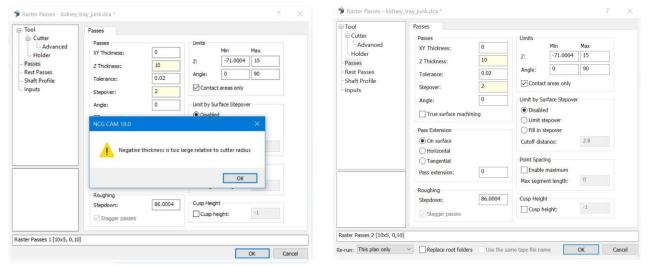


7836: Waterline Passes: The contact angle checks have been tightened. Previously it was possible to get passes on surfaces where the contact angle could be as much as one degree outside the selected range.

7857: User Interface: Fixed an issue when closing a database causing the program to exit, Close should close the database, but keep NCG CAM running, Exit should close the database and close NCG CAM.

7874: Thicknesses: The "Thickness Definitions" page of the reference manual has been updated to improve the description of how unequal XY and Z thicknesses are applied. In addition, error messages for invalid combinations of thicknesses have been improved.

This a can allow for a wider difference between the XY and Z thicknesses, as a shift can now be made on the tool axis. For example, in v18.0 a 0 XY thickness and 10 Z thickness would not be permitted, in v19.0 it is valid It may still require the 'OversizedNegativeThickness.vbs' script to be run first, which can be found in the NCG CAM install folder (usually C:\Program Files\NCG CAM 19.0), but once run for v19.0, it's done. There are some limitations as the calculation cutter cannot be negative. Also fixes ticket 8145.



V18.0 - Thickness: XY = 0 Z = 10 triggers a pop-up V19.00 - Thickness: XY = 0 Z = 10 is permitted. message, and will not allow those thicknesses.

7884: Selected Surface Waterline: A problem has been fixed where use of the Smoothing option could result in excess Selected Surface Waterline passes.

7886: Compound Cycles: We now preserve over-ridden plan labels when loading and running saved compound cycles.

7892: Linking: Along Curve: Valid horizontal lead arcs could be discarded due to floating point precision issues. This has been fixed.



7954: Linking: The default 'Stay on surface, distance has been changed to make it dependent on the cutter diameter. Area Clearance, Core Roughing, Horizontal Areas, and Core Horizontal Areas use the formula 5 x cutter diameter, up to a maximum 'Stay on surface' value of 300.

Tool	Tool				
- Cutter	Recent tools:	Please select	対 Area Clearance Tool	path - Internal_corner_tes	tv19_0_00.dd
Holder	Tool name:	Toroidal[16x1 32,	General	Strategy	
Passes	Cutter diameter:	16	Ramping		
- Adaptive Stepd	Corner radius:	1	Strategy	Stay on surface within	80
- Smoothing - Anti-Vibration	Taper (° / side):	0	Retracts	Linking radius:	1.75
Shaft Profile	Flute length:	1	- Leads - Shaft Profile	Link dearance:	1
Inputs	Shank diameter:	16	Inputs		
	Body length:	32			
	Overall length:	32			

The Adaptive clearance also calculates the 'Stay on surface' value from the cutters diameter but uses 10 x cutter diameter again up to 300 as maximum.

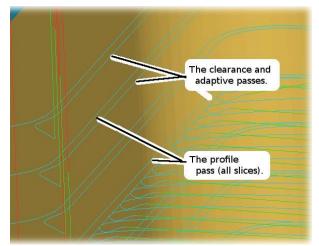
Tool	Cutter						
⊡- <mark>Cutter</mark> Advanced		oroidal[12x0.25 40, 0.3]					
Holder		2					
Passes	Corner radius:	.25	*	^ Ø: 12	z: 40		
Linking	Taper (° / side):			+			
Shaft Profile nputs	Flute length: 3	D					
nputs	Shank diameter: 1	2		Ø: 12	z: 30		
					_		
🐐 Adaptive Clearance To	olpath - Internal_corner_te	stv19_0_00.dca *					?
Adaptive Clearance To	olpath - Internal_corner_tes	st_v19_0_00.dca *					?
		stv19_0_00.dca *		Adaptive lini	ks		?
- Tool	Linking	st_v19_0_00.dca *	61	Adaptive lini Link clearan		0.5	?
- Tool	Linking Clearance	st_v19_0_00.dca *	61	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ce:	0.5	?
- Tool	Linking Clearance Height:			Link dearan	ce:		7
- Tool Cutter Holder Passes Shaft Profile	Linking Clearance Height: Clear surface by:			Link dearan Stay on surf Home Point	ce:		?
Tool Cutter Advanced Holder Passes Linking	Linking Clearance Height: Clear surface by: Retract to Max 2		20	Link dearan Stay on surf Home Point	ce: face within:		i

7965: User Interface: Improved performance of updating items in the graphics window.



7973: Adaptive Clearance: An option to do a final profile pass on each slice or on the last slice has been added to the dialog.

- Tool	Passes			
Cutter Advanced Holder - Passes - Linking - Shaft Profile - Inputs	Passes XY Thidoness: Z Thidoness: Tolerance: Stepdown: Cutting type:	0.3 0.1 12 Oneway	Limits Surfaces Stock Surfaces and stock User defined Z: 0	Max 40,301
	Cutting direction: Adaptive Stepdor Adaptive step Step order: Stepdown:	wn	Point Spacing	0
	Profiling Profile (a) All sitces Cast slice Spacing:	0.5	Minimum width: General Stock dearance: Minimum radius:	3
	Min cut width: Machine by: Max stepover: Stepover:	0 Regions		



The clearance and adaptive passes hold off slightly, the profile pass then goes to size while respecting the thicknesses.

This extra pass will give a better surface finish in most cases.

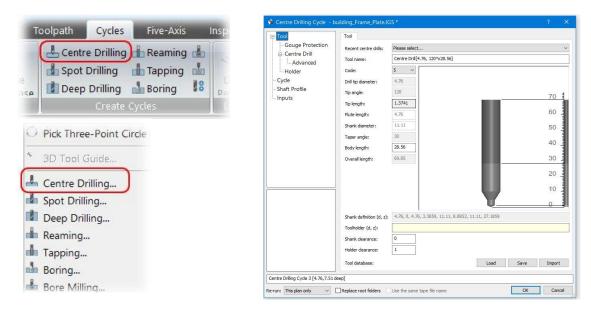
7988: Linking: Improvements have been made to reduce the height or retract moves when linking rest passes in vertical corners.

7999: Import: Allow rearranging order of composite curve to reduce gap for CATIA V5 R19 files.

8010: Import: There were occasions when reading surfaces from an IGES file using the Convert to NURB option, would not read in all the surfaces, this has now been fixed.

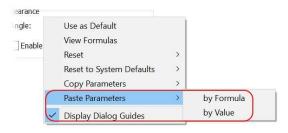
8011: Import: Changed the surface colour loading for step files, priority is given to a correctly defined style, if the style is incorrectly defined, all styles will be read.

8037: Drilling: Centre drills (also known as slocombe drills) are now supported for drilling cycles.





8053: User Interface: The wording on the context menus for copy/paste on a dialog have been improved.



8062: Stock Models: Intersecting Multi-axis stock models, or subtracting one from another, sometimes did not give the correct result. This problem has now been fixed.

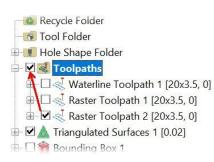
8063: Macros: Fixed a problem causing the running of drilling macros on editable drilling data plans to fail. Note when we make a non-editable copy of an editable drilling data plan, or an editable points plan, we now retain the plan label if it was changed from default. This is consistent with the existing behaviour for editable boundary plans.

8073: Stock Models: Add an option to create a revolved surfaces around an axis (X/Y or Z only).

General Inputs	General	Cylindrical			
	Type: Cylindrid Cylindrid Swept		Min -284	100 Max 0	
		Close			

8079: Transform: Fixed a problem where rotating or mirroring a curve which itself was extracted with a rotation could go wrong.

8080: User Interface: Created folder plans are now drawn by default if any of the plans in the folder are drawn



8083: Not having a valid project settings folder prevented the backup macro from being written to the program data area. This has been fixed.



8084: Post Processors: ISO, Siemens, and Heidenhain: Added the option to "Output the cutter's required body length" as a comment, by default this is set to false so as not to modify existing post processors. It also needs the pre-existing "Output the cutter's body length" to be set 'true' too. If there is no required body length, "Not available" will be output in the comment.

It is also output for the G-Post / APT, but has no option, as it will be reprocessed within G-Post, if there is no required body length, 0 will be output.

Axes	Macros	
Animation and Simulation Defaults	Post processor: Haas VF Series	
Entity Colours	Parameter	Formula
Graphics	57 Output cutter details	true
Mouse	58 Output the cutter and thickness details on the same line	false
	59 Output the cutter's body length	false
Post Processor	60 Output the cutter's required body length	false
Macros	61 Output the holder length	false
Preferences	62 Suffix to the holder length	uu

8085: User Interface: The context menu on plan dialogs was not enabling the option to reset tool page parameters correctly, this has now been fixed.

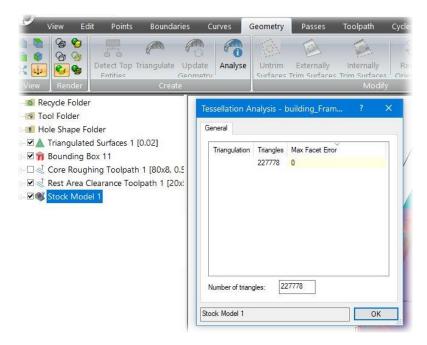
8095: User Interface: It is now possible to select more than 2 stock models to union together.

8096: Stock Models: When creating a Prismatic Stock Model from a Bounding Box with a rotation the result was incorrect, this has now been fixed.

8100: Along Curve: A warning message about loops in the passes was being triggered inaccurately in some cases. This has been fixed.

8107: Shaft Profile Analysis: We were picking up the tool name from the input passes plan. This would not correctly handle the addition or modification of holders. We now generate the tool name from the present selection.

8109: Stock Models: We can now perform a Geometry > Analyse on 3D stock models to count the number of triangles.





8123: Detect Holes: The accuracy of the detect holes operation has been improved to allow holes of similar, but different, rotations to be distinguished.

8133: User Interface: The "Preserve Root Folders" option has been added to the Five-Axis Conversion dialog.

8135: Cutter Animation: The text 'Programed Feedrate:' was being truncated and only showing 'Programed', this has now been fixed.

8138: Drilling: When detecting holes and creating drilling data we now attach colour information. Additionally, any hole shapes can be defined with colour and used as an additional search criteria to identify hole types for compound drilling cycles. Also fixes a problem where duplicate holes could be added to collections.

omposite Hole Ty	/pe Design				? ×	Hole Shape Database Management	?	×
Composite Hole Typ	e Design					Hole Shapes		
Select database: Hole Shape name:	-	t 35	 · · · ·			Catalogue: General ~		_
Part Start Diam 1 35	End Diam St 35	art Dist End Dis 0 40		h (Max) 00	z: 0	ID Name Colour Shape * 7 * 7 * 7 * 7 * 7 2 hole test 25 35,35,40, 20, 100		
				d: :	5		L	
						Add Edit Copy Delete Create		
					z: -40	ОК	Ca	ancel
Insert Part	Delete Part	Reset		Use Colour				
					OK Cancel			

8140: Cutter Simulation: There were occasions when creating a stock model would ignore the modified Z Limits, this has now been fixed.

8146: User Interface: Any collision points and compensated toolpaths will now be drawn automatically whenever a toolpath is set to drawn in the tree view

8148: Post processors: ISO, Heidenhain, and Siemens: Added the option "Start point: 3 axis move (3+2 only)" so that the start point can be performed as a XYZ motion in the same block, if the toolpath is a 3+2 toolpath. (A 3-axis toolpath will move XY, then Z or Z then XY depending on the existing "Start point: move Z axis before XY" post setting. By default, "Start point: 3-axis move (3\_2 only)" is set false so not to affect existing post processors.

Axes	Macros		
Animation and Simulation	Post processor: He	denhain 3+2 BC eVolution 50	
Defaults			
Entity Colours	Parameter		Formula
Graphics	HOME POSIT	ION	
Mouse	122 Output home poi	nt	false
	123 Output home poi	nt end	false
Post Processor	124 Home point		MakePoint(0, 0, 0)
Macros	125 Use incremental	home point	false
Preferences	126 Move Z axis befo	ore XY	true
	127 Move 3 axis (XY)	Z together)	false
System Colours	128 Start point: move	Z axis before XY	false
Tags	129 Start point: 3 axis	smove (XYZ together)	false
	130 Start point: 3 axis	s move (3+2 only)	false
	131 Output uncompe	nsated home point after rotation	false

8149: User Interface: Boundary grid was not centred correctly in rotated views. This has been fixed.

8150: Linking: Waterline Offset Toolpaths were not always respecting the "min Profile Diameter". This has been fixed.



8156: User Interface: Add a tool comment option onto the cutter's advanced page. It can also be stored in the tool database and optionally output into tape file as a comment.

Tool	Advanced			
🗆 Cutter	Tool		Machining	
- Advanced - Holder	Tool number:		Spindle speed:	2387
Passes	Cutter		Feed per tooth:	0.25
- Adaptive Stepdown - Smoothing	Number of teeth:	2	Cutting feedrate:	1193
Rest Passes	Centre cutting		Ramp down:	895
Shaft Profile	Cutter step over:	4	Ramp up:	1193
Inputs	Cutter step down:	1.1667	Rapid:	10000
	Thickness		Cutting speed (m/min):	149.98
	XY Thickness:	0	Coolant: Off	~
	Z Thickness:	0		
Shaft Profile Inputs	Comment			

8157: User Interface: The grid size and holder and shank definitions now import correctly from the interactive tool design when the units are set as inches.

8158: On the Triangulated Surfaces or Triangulated Curves general pages, a Colour option had been added when re-triangulating.

General	General				
Workplane	Tolerances				
Inputs	General:	0.02			
	P-Curve:	0.0067			
	Trimming				
	Trimming	As in ge	eometry file	$\sim$	
	Offset				
	Offset selected surfaces		Offset:	0	
	Use help direction:	0	0	1	
	Edit trim selected surfac	ces			
	Re-triangulate selected	surfaces			
	Reverse orientation of s	elected surfa	ces		
	Order surfaces alphabet	tically			
	Colours			J	
	Default colour				
	◯ Custom				
iangulated Surfaces	7 [0.02]				

8161: Import: Display support for NX version 2000.



8163: User Interface: Added a Default Macro Folder in Options > Defaults.

Options				? ×
- Axes - Animation and Simulation - Defaults	Defaults Default Parameters Default parameters:	<system defaults=""></system>	~	Program Data Folder C:\Program Data \VCGCAM Solutions\
Entity Colours Graphics Mouse	Remove Impo	t from earlier versions	Export	Default Tape Folder
Post Processor Macros Preferences	Number of cutters List Utters displayed:		Clear	Use default folder for tape files Use sub-folder of default folder for individual post-processor files
System Colours Tags	Parallel Processing Maximum worker threads:	11		Default Macro Folder
	Auto Save Database	15	Clean Up	Use default folder for macro files

This allow any macros used regularly to be placed in a common folder, and then selected more efficiently as there is less searching.

8165: Adaptive Clearance: The default cut tolerance when thickness is applied has been changed so that it will not be greater than 0.1, this is to stop polygon shaped lead-in and lead-out arcs.

8168: User Interface: Improvements to Drilling Cycle dialog, the drill is now overlayed the hole so the depth can be checked, also the colour of hole denotes if it is blind or through.

- Tool	Cycle		⊟-Tool	Cycle				
Guge Protection Guge Protection Guge Holder Gype Shaft Profile Inputs	Cycle Parameters         Extur dearance:         1         From start of part:         1           Depth:         30         To end of part:         V           Peck depth:         1.15         Offset start by:         0           Dwell:         0         Omit to depth         0           Dwell:         0         Omit to depth         0           Dwell:         0         Omit to depth         0           Dameter:         11.5         Chip break         0           Part Start driling at:         0         0         0           Part Start Dam         End Dam Start Dat         Depth         1           1         1.5         0         26.575         26.575           2         1.15         0.12         2.65.75         26.575	Bore Parameters Spindle orientate Bore offset: 0 Pre-Orill diameters Pre-Orill diameters Pitch: 0.1457 Threads per steps 1 Number of starts: 1 0 Left hand @ Right hand @ Internal Climb milling	Gouge Protection Drill Advanced Holder -Shaft Profile Inputs	Cycle Parameters Setup clearance: Depth: Peck depth: Dueter: Diameter: Diameter: Part Start foling Reference XY2: Part Start Dam 1 17.5	0 0	n start of part end of part: set start by: Drill to depth Chip break Measure depth 0 End Dist 35	 []	0 0.125 1 1 Right hand External
	Overlay of the drill / tap / reamer in the hole Hole shape colour helps indicate it is a blind or through holes							

8172: User Interface: Removed the "Show User Advanced Page" option from the 5-axis dialogs.

8178: User Interface: Along Curve Passes: We no longer pop the bounding box dialog to set a rotation model if the input curve has no underlying rotation.



8180: User Interface: The Radial and Spiral Passes dialog, it is now possible to use a mouse hit in the graphics area to set the centre point of the passes.

	Passes							
- Cutter - Advanced - Holder asses est Passes naft Profile	Passes	<u> </u>	Limits	Min	Max			
a second s	XY Thickness:	0						 
	Z Thickness:	0	Z:	0	40			
	Tolerance:	0.02	Angle:	0	50		/	
haft Profile	Stepover:	0.1729	Conta	ct areas on	ly			
iputs	Centre: -22.809	0.3094	Point Spa	Point Spacing				Mouse left click
	Angle: 80	280	ጥ 🗌	e maximum				made here
	Radii: 0	32.5981	Max segm	nent length:	0			N.
	True surface mach	ning	Cusp Heig	jht				•
	Pass Extension		Cusp ł	neight:	0.003			
	<ul> <li>On surface</li> <li>Horizontal</li> <li>Tangential</li> <li>Pass extension:</li> </ul>	0	t	he coo	entre' takes ordinates of ouse click.			

8193: User Interface: Prevented the tree view scrolling / jumping when re-running expanded plans and the tree is longer than the screen height.

8194: Detect Holes: the axis restrictions were not always being applied correctly to the rotations when detecting holes. This has now been fixed.

8195: Post processors: Heidenhain: Add the facility for a 'Spindle speed suffix', by default nothing is set, so existing posts will not be affected.

- Axes	Macros			
– Animation and Simulation – Defaults	Post p	rocessor:	Heidenhain 426	
Entity Colours	55	Parameter		Formula
Graphics	381	Duplicate	the toolchange after probing	false
- Mouse		SPINDL	ESETTINGS	
	382	Output spi	ndle speed	true
Post Processor	383	Start spind	lle early	false
Macros	384	Stop spind	le before rotation	true
- Preferences	385	Spindle-op	eed prefix	"S"
	386	Spindle sp	eed suffix	.011
- System Colours	387	Spindle clo	ockwise	"M03"
- Tags	388	Spindle an	ti-clockwise	"M04"

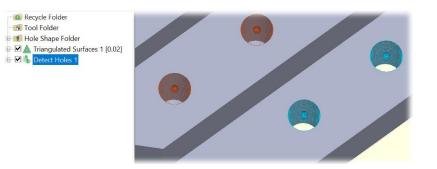
8196: Cutter Simulation: The default collision tolerance used was not consistent with that used for Machine Simulation, leading to different and misleading results for the same toolpaths. This problem has now been fixed.

8200: Cutter Simulation: There were occasions when Simulating multiple toolpaths that the cutter was not always being drawn, this has now been fixed.

8203: User Interface: The labelling of editable boundaries plans created by running properties on another editable boundaries plan has been improved to be clearer and more useful.



8204: User Interface: The default colour of Blind Holes has been modified to make them stand out better.



8211: Detect Holes: The axis restrictions were not always being applied correctly to the rotations for the drilling data. This has now been fixed.

8215: Adaptive Clearance: Will create Helix moves instead of line segments where ever possible for ramping sections.

8216: Selected Surface Waterline: Toolpaths based on selected surface waterline passes could include unnecessary linking moves in some instances. This problem has been fixed.

8225: User Interface: Fixed the tree view flickering when running a plan.

8226: The auto-save macro and auto-save database now include plans from all open graphics windows, rather than just the one currently active. Also fixed a case where the program would not exit correctly.

8228: Along Curve Passes: A problem existed which meant in places the passes might not follow the supplied curves. This has been fixed.

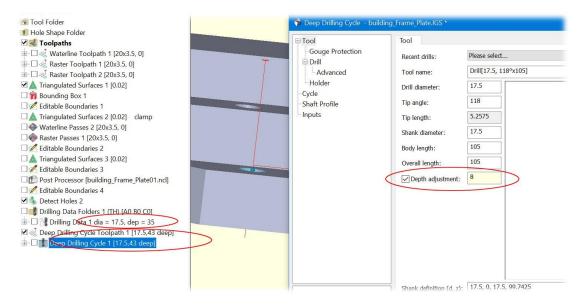
8238: Cutter Animation: There were rare occasions when animating a toolpath would not display the holder the first time it was animated, this has now been fixed.

8245: Triangulation: When Editing a surface (Untrim, Externally trim, Internally trim, Offset or Reverse direction) the newly created triangulated surface uses the surface tolerance from the input plan. Before it would revert to the import tolerance.

8247: Five-Axis: Surface machining plans were not using the correct default Clearance height when a rotated boundary was selected, this has now been fixed.



8248: User Interface: The depth shown in plan labels for Drilling Cycles now includes the depth adjustment distance.



The hole is detected as 35 deep, in the drilling cycle a Depth adjustment of 8.0 was set, so in the passes and toolpath, a depth of 43 is displayed.

8258: User Interface: Fixed Cutter Simulation stock not being captured when saving the view to a bitmap or printing.

8277: Selected Surface Waterline: A problem has been fixed where selected surface waterline passes would sometimes not be calculated when XY and Z thicknesses were different.

8290: Tool Database: Removed the option "Import From Old Database" from the Tool Database libraries page as it is no longer functional.

8303: Horizontal Area Passes: It was possible when the Z min and max limits were equal to miss a planar surface which should be detected. This has been fixed.

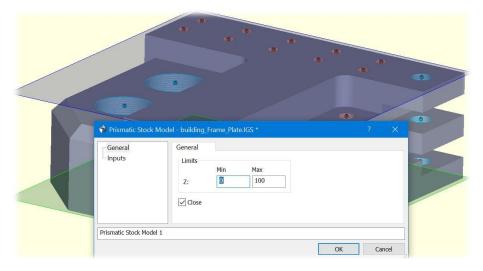
8313: ModuleWorks: Updated to new MW2022-12 Libraries.

8314: Import: Fixed a crash that could occur while loading a geometry file.

8322: A macro created by NCG CAM could crash if it created an empty boundary. This has been fixed.



8325 & 8370: User Interface: Dialog guide graphics have been added to the Stock Model dialogs to display a Translucent plane at the Z Min and Z Max limits, also a cylinder will be drawn for a revolved stock model.



There is also new option in the Plan dialog context menu, so that you can now toggle the dialog guide graphics on and off.

General	General		
-Inputs	Limits Z: Close		
	Use as Default		
	View Formulas		
	Reset	>	
	Reset to System Defaults	>	
	Copy Parameters	>	
	Paste Parameters	>	
<	✓ Display Dialog Guides		
rismatic Stock Model 1			

8329: User Interface: Disabled ribbon shortcuts when editing labels in the tree view

8331: Rest Machining: There was a problem when using a transformed stock model as input when editing passes, an exception could be thrown, this has now been fixed,

8340: Post Processor: when using a Proxy Post Processor on multiple files the process was not completing correctly, this has now been fixed.

8344: User Interface: Nested folder plans in the tree view are now updated correctly when a plan is added to the bottom folder plan. Improved performance when populating the tree view.

8357: Macros: The recycle folder will now not be output in written macros.



8366: ISO, Siemen and Heidenhain Master posts. Added the option to output the cutter details / description as a comment prior to a tool change. By default, it is set 'false' so as not to affect existing post processors. The new parameters being 'Output cutter details', 'Current cutter details Prefix', 'Text Prefix for the 'drill' diameter', 'Text Prefix for the cutter diameter', and 'Text Prefix for the cutter corner radius, and Text separator between diameter and radius'. Help files updated to match

ost	processor: ISO Master File		
	Parameter	Formula	Туре
26	Output engineer's name	true	bool
27	Output project comment	true	bool
28	Output cutter details	false	bool
29	Current cutter details Prefix	(m))	string
30	Text Prefix for the 'drill' diameter	"Drilling tool: "	string
31	Text Prefix for the cutter diameter	"Cutter: "	string
32	Text Prefix for the cutter corner radius		string
33	Text separator between diameter and radius	" <b>x</b> "	string
34	Output the previous tool details before a toolchange	false	bool
35	Previous cutter details prefix	"Previous tool details: "	string

8373: ISO, Siemens and Heidenhain, including the Master-file posts for those formats. Added the option 'Output previous cutter details before a tool change', if set true the basic details of the previous cutter (for example: T5 6x0.5) can be output as a comment, just before the tool change.

It can also use the additional options: 'Previous tool details prefix' and 'Previous tool details suffix' to aid with any additional formatting that is required, that were also added.

ISO and Siemens: Some pre-existing options like the 'Tool number prefix' are used for the 'T' in the example above.

Heidenhain: Because the Heidenhain typically uses 'Toolcall' or 'ToolDef' as the 'Tool number prefix' it is not used. But the 'Previous tool details prefix' can be used to output a "T" before the tool number.

Post	processor: ISO Master File Roders			~	Set Def
_	Parameter	Formula	Туре	^	
28	Output cutter details	false	bool		
29	Current cutter details Prefix		string		Save
30	Text Prefix for the 'drill' diameter	"Drilling tool: "	string		
31	Text Prefix for the cutter diameter	"Cutter: "	string		Save A
32	Text Prefix for the cutter corner radius	100	string		
33	Text separator between diameter and radius	"x"	string		Export
34	Output the previous tool details before a toolchange	false	bool		
35	Previous cutter details prefix	"Previous tool details: "	string		Rese
36	Previous cutter details suffix	100	string		
37	Comment start	"( "	string		Delet
38	Comment end	")"	string		
39	Start mode	"Macoor -all\nLoadzero=\"1\""	string		
40	End mode	"cleanoff\nTlm -clean -r=2.9"	string		
41	End of program stop	"//Moff\nM30"	string		Add Pro
	UNITS & FORMAT				

If post processing a master-file and sub-files, the 'Previous tool details' can only appear in the master-file, not the sub-file. If the tool change is not output in the master-file, only the cutter size is output as a comment. The default setting for 'Output previous cutter details' is false, so existing post processors are not affected.

The help files have been updated to match.

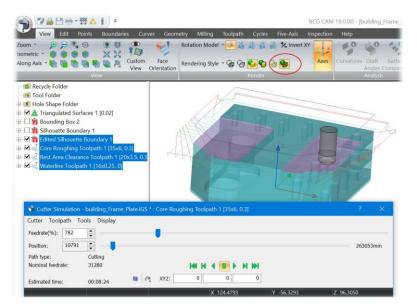
8378: User Interface: "Paste Parameters > by Value" has been disabled in the Cutting Parameters dialog. Copying values here could change things like plan names, which would cause confusion.



8381: User Interface: Fixed a memory leak caused by opening dialogs.

8387: Export: Writing surfaces as a RAW file could fail if a surface was empty. This has been fixed.

8392: Cutter Simulation: It is now possible to display the simulation with transparency enabled.



8393: User Interface: Corrected the description of the Boundary on Surface Plan in the database window.

8397: User Interface: Fixed the tool definition icon not updating when added to the quick-access toolbar.

8399: User Interface: When changing the Co-Ordinate plan in the inputs page of a machining dialog the origin values were not being reset to 0.0, this has now been fixed.

8403: User Interface: Fixed a crash when drawing a surface or stock model with an extremely large number of vertices.

8408: User Interface: The 3D Tool Guide will now use the rotations from the selected Drilling Data or Drilling Data Top Folder plan, as it currently does from Boundary plans.

8409: User Interface: The creation of Five-Axis tools in the tool database has been disabled if there is no Five-Axis license.

8412: User Interface: Fixed the printing page scaling modes not working correctly when the "OpenGL printing" option is set.

8413: User Interface: Fixed "Maximise view scale" not working correctly when a datum point is drawn. The height at which boundaries are drawn is no longer affected by the datum point axes.

8414: User Interface: Using "Maximise view scale" when only a single point is drawn will now centre the view on the point and reset the scale to 1.

8421: Linking: Fixed a problem which meant Waterline passes generated with highly tapered cutters could be linked out of order.

8431: Import: Update Datakit libraries to 2022.4. Supports Parasolid V35.0 and the latest NX version 2206.

8432: Machining: fixed a program crash when calculating horizontal area passes.

8436: Machining - improved the error handling when passes are created with invalid protection surfaces.



8437: Linking: Fixed minor gaps in toolpaths due to numerical inaccuracies.

8438: Waterline Machining: when invalid protected surfaces are selected, the dialog will now give a validation failure.

8439: Detect Holes: Fixed an exception thrown when detecting holes on a raw surface.

8440: Badly formed edited plans now fail more cleanly.

8441: Detect Holes now works correctly when input folders are combined.

8442: Triangulator: Fixed the exception that could be thrown when generating triangulated surfaces from a 2D stock model. Note that though the exception is fixed, no triangles are produced.

8443: Fixed an exception that could arise when linking core horizontal area passes.

8447: Machining: Fixed an exception that could be generated when calculating horizontal area passes

8449: Linking: Along Curve Passes: We now use the passes cutter compensation setting before the cutter offset setting to better determine which side of along curve passes to try and position lead arcs.

8450: Surfaces: 2D stock models are no longer accepted as an input to triangulation.

8451: User Interface: Improved selection performance.

8454: User Interface: The option to design a shank or holder on the tool pages has been disabled if a tool has been selected as an input.

8460: Post Processors: ISO: Added an option 'Cycle definition uses X Y position only', for the canned cycles to allow only the XY position of the hole to be output within the cycle. The default setting is false, so existing post processors are unaffected.

Axes	Macros				
Animation and Simulation Defaults	Post processor: ISO			~	Set Default
Entity Colours	Parameter	Formula	Type	^	
Graphics	159 Output Z coordinate in a 3+2 cycle	true	bool		
Mouse	160 Start cycles at clearance level	false	bool		Save
Post Processor	161 Cycle definition uses X Y position only	false	bool		
Macros	162 Cycle prefix	100	string		Save As
references	163 Cycle initial return Z level prefix		string		
	164 Cancel cycle	"G80"	string		Export
System Colours	165 Spot drilling cycle	"G81 G98"	string		
Tags	166 Spot drilling cycle with dwell	"G82 G98"	string		Reset
	167 Deep drilling cycle	"G83 G98"	string		

8462: 3D Tool Guide: Performance improvement.

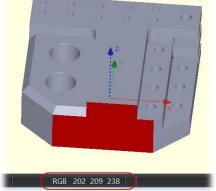
8463: Cutter Animation: The display of Barrel cutters with Wireframe with the default settings has been improved.



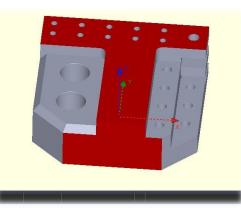
8465: Post Processors: ISO: For a particular machine control, the spindle needed to be restarted before every tapping cycle. Added the option "Restart spindle before tapping cycle", this is set false by default so existing post processor are not affected.

Axes	Macros			
Animation and Simulation Defaults	Post processor: ISO			✓ Set Default
Entity Colours Graphics	Parameter 197 Reaming block suffix	Formula	Type string	^
Mouse	198 Tapping block suffix		string	Save
Post Processor	199 Boring block suffix		string	
Macros	200 Stop spindle before tapping cycle	false	bool	Save As
Preferences	201 Restart spindle before tapping cycle	false	bool	
	202 Emulate contre drilling cycle	faise	bool	Export
System Colours	203 Emulate spot drilling cycle	false	bool	
Tags	204 Emulate deep drilling cycle	false	bool	Reset
	205 Emulate reaming cycle	false	bool	
	206 Emulate boring cycle	false	bool	Delete
	207 Emulate bore milling cycle	true	bool	
	208 Emulate thread milling cycle	true	bool	
	209 Dwell MC code for emulated cycles	"G4"	string	
	MACHINE AXIS - ABC			Add Proxy.
	210 A rotation prefix	"A"	string	
	211 B rotation profix	"D"	etring	Edit Proxy

8468: User Interface: The status bar RGB value (if enabled in the user Preferences) is now only set when selecting a single item.



The RGB value with a single item.



With multiple items selected, the RGB is not shown.

8477: The GPost APT post now outputs the projects Prefix and Folder as PPRINT comments. This is additional information and will not affect any existing GPost post processors. This will not affect any exiting posts.

General	General		
inputs	Z Depth: C Keep above Keep below		
 -		Use as Default	
		View Formulas	
		Reset	>
		Reset to System Defaults	>
		Copy Parameters Paste Parameters	
?		Display Dialog Guides	-
Z Trim Stock Model			
		OK	Cancel
		•	

8478: User Interface: Dialog guide graphics have been added to the ZTrim Stock Model option.



8479: User Interface: Improved the selection performance.

8482: Linking: Fixed a problem which could introduce bad vertical arcs into toolpaths during a shortest route connections.

8485: User Interface: Fixed edges not always being drawn correctly with the "Shaded with Edge" and "Wireframe HLR" drawing modes.

8486: User Interface: Improved graphics performance of the inspection results.

8489: Tool Database: It is now possible to import tools from a tool database text file into the Tool Folder.

8487: User Interface: Improved the selection performance when drawing running plans.

8501: User Interface: Fixed a check box being added to the recycle folder.

8502: User Interface: Improved the graphics performance when drawing overlays like the drag box. 8504: User Interface: Fixed the bottom tree view item being cut off when loading a database with a large number of items.

8506: ModuleWorks: The validation for Taper angle has been updated as when using a Taper Mill in Five-Axis or Adaptive clearance plans the taper angle must be between 0.1 and 89 degrees, otherwise an exception will be thrown.

Tool	Tool		
Cutter	Recent tools:	Please select	
Holder	Tool name:	Tapered End Mill[10x0 35, 0]	
Passes	Cutter diameter:	10	
Linking Shaft Profile	Comer radius:	0	
Inputs	Taper (° / side):	0.05 NG CAM 19.0	×
	Flute length:	25	30
	Shank diameter:	10.0436 Enter a number between	
	Body length:	35	
	Overall length:	35	20 _
	Cylindrical length:	35	ок
			10
			0

8507: Stock Models: There were occasions when supplying a flat plane as a stock model input to a plan would cause an exception, this has now been fixed.

8512: Database loading: An exception is no longer thrown when attempting to insert an empty file into a database.

8514: Toolsheets: The length of axes in toolsheet images, was set by the general axes length option, is now treated as a fixed length relative the rest of the geometry in the image.

8515: Linking: The default Helix diameter has been changed so it is calculated from the actual tool used (not adjusted by the thicknesses). Note this will change the default horizontal lead arc radii for Helical and Waterline style passes.

8516: User Interface: Removed "Use accelerated OpenGL" graphics option page.

8517: User Interface: Fixed an issue with the selected dynamic rendering style not always being used.

8518: User Interface: Reduced time taken for completed plans to be updated in the graphics view.

8520: Machining: Selecting a collection of boundaries as constraint boundary for passes caused the program to fail. These are now removed from the list of acceptable inputs.



8524: UV Passes: The UV passes could sometimes hang NCG CAM, this has now been fixed.

8525: Toolsheets: Added "Cut Tolerance" to the CSV toolsheet.

8526: Toolsheets: Fixed calculation of toolpath "Min Z" value.

8527: Toolsheets: Fixed CSV toolsheet generation failing with 5-axis toolpaths.

8528: Toolsheets: Added the part image path to the CSV toolsheet.

8529: Toolsheets: Added part lengths and centre point to the CSV toolsheet.

8540: Post processors: ISO, Heidenhain and Siemens: The work offset is only output when it changes and the "Performance over spindles RPM check" option is set 'true', this avoids duplicate work offsets being output.

8551: User Interface: Improved performance when organising the tree view.

8554: User Interface: Improved tree view performance.

8555: Thicknesses: A problem has been fixed where, when an oversized negative thicknesses is enabled and the net negative thickness is exactly half the cutter radius in size, a validation error occurred, erroneously.

8559: Fixed an exception that could be thrown when calculating along curve passes.

8561: Toolsheets: When viewing an XML toolsheet through the context menu the default is now to launch an Internet Explorer window (not Edge), including Windows 11. This is set in the NCG CAM, Options > Defaults > Toolsheet > Browser > Viewer, which needs to use:- \Program Files\NCG CAM 19.0\Macros\LaunchIE.vbs

8563: Master post processors, ISO, Heidenhain and Siemens: Added the option "Output Machine safe position" which allows the machine safe position to be output or not. The default is true, as the machine save post was always output before, and is considered the safer approach.

There are also four additional parameters for the feedrate variables, "Rapid feedrate suffix", "Ramp down feedrate suffix", "Cutting feedrate suffix", and "Ramp up feedrate suffix", nothing set for these by default so existing posts are not affected.

Axes	Macros			
Animation and Simulation Defaults	Post processor: ISO Master File Roders		~	Set Default
Entity Colours Graphics	Parameter	Formula	Туре	
	47 X axis prefix	"X"	string	C. C
Mouse	48 Y axis prefix	"Y"	string	Save
Post Processor	49 Z axis prefix	"Z"	string	-
Macros	MACHINE TOOL VALUES	a tanta c		Save As
Preferences	50 Output Machine safe position	true	bool	-
System Colours	51 Machine sate X	0	réal	Export
	52 Machine safe Y	-400	real	-
Tags	53 Machine safe Z	620	real	Reset
	54 Machine XY move block prefix	100	string	
	55 Machine Z move block prefix		string	Delete
	56 Machine XY move block suffix		string	
	57 Machine Z move block suffix 58 Machine safe text before sub program call		string	
	69 Spindle stop FEEDRATE CONTROL	M5	sting	
	70 Output values for feedrate variables	true	bool	
	71 Max feedrate	999999999	real	
	72 Feedrate scale factor	1	real	
	73 Rapid feedrate	"VAR\$1"	string	
	74 Ramp down feedrate	"VAR\$2"	string	
	75 Cutting feedrate	"VAR\$3"	string	
	76 Ramp up feedrate	"VAR\$4"	string	
	77 Rapid feedrate suffix	nem (	string	
	78 Ramp down feedrate suffix		string	
	79 Cutting feedrate suffix	-	string	
	80 Ramp up feedrate suffix		string	
	<		>	
	Visible			



8564: Tool Database: There was a problem saving a tool from the tool page which had previously been imported from a text file, this has now been fixed.

8570: Export: Saving a file as VRML which contains tessellated curves, would fail to output the curves, this has now been fixed.

8574: User Interface: Fixed a crash that could occur when creating a folder plan.

8578: Export: Saving a file as VRML which contains tessellated points, would fail to output the curves, this has now been fixed.

8580: Import: Improved performance when loading a geometry file with the "Load Component Information" option enabled.

8586: Database: Fixed a crash that could occur when loading old databases.

8590: User Interface: Fixed plans in the tree view not being replaced when setting the coordinate system with the "Re-Triangulate when setting coordinate system" option enabled.

8617: Import: A performance improvement has been made to reduced time taken to load files with large numbers of components.

8623: User Interface: We now block Folder Plans as inputs to Bounding Box and Stock Model, and Collections where they are inappropriate inputs to the other plans.

8627: User Interface: It is no longer possible to change the coordinate system input to an Transformation plan through the inputs page, since doing so would have no effect.

8628: Coordinate System. The behavior of the coordinate system plan dialog was wrong and has been corrected.

8632: Import: Small correction has been made when getting surface colour for Granite files.

8633: Import: Improved the performance of loading database archives.

8644: Rebuilt the general and five-axis tutorials for NCG CAM.

8646: User Interface: Invalid characters are now removed from project settings automatically, this prevents characters like: \*, ?, >, / being used as part of a prefix or folder name.

8653: Transformation: The option to re-triangulate when setting coordinate systems was being incorrectly applied to edited transformed surfaces plans. This has been corrected.



8655: Toolsheets: When using selecting a Custom view, then rotations for the Toolsheet images set the current view rotation in the edit box automatically, the can still be edited manually if required.

General	Ir	nages					
Images		Part Image	Toolpath Image				
Inputs		Image	Image				
		Bitmap size: 600 x 450 Background:	Bitmap size: Background:	600	x 450		
		View	View				
		Layout: Single view {1x1}	Layout:	Single vie	w {1x1}	~	
	(	View 1 View 2	View 1		View 2		
		Custom ~ Front Lef	→ Front Left	~	Front Left	$\sim$	
		28.4845, -1.478, -34.4488 60 0, -4	60, 0, -45		60, 0, -45		
		View 3 View 4	View 3		View 4		
		Front Left	✓ Front Left	~	Front Left	$\sim$	
		60, 0, -45 60, 0, -4	ō 60, 0, -45		60, 0, -45		
		Borders	Borders				
		Render	Render				
		Style: Smooth shaded		Smooth s	haded	~	
		Translucent Axes	Translucent	2	Axes		
		Dimensions	Dimensions				
		Linear Ordinate	Linear	E	Ordinate		
		Colour:	Colour:				
oolsheet [Alon	g_curve	_0201.xml]					
Preserve root	folders					OK	Cance

8658: Adaptive Clearance: The Overlap option has been added to the profile pass move, this is the length of overlap for closed profile passes add roughing levels.

asses		Limits		
XY Thickness:	0	◯ Surface	s	
Z Thickness:	0	◯ Stock		
Tolerance:	0.02	Ŭ	s and stock	
Stepdown:	15	• User de	fined Min	Max
(ē		× Z:	-20	24
Cutting type:		<u> </u>	1000	
Cutting direction:	Climb	Y Point Spaci	ng	
Adaptive Stepdow	n	Enable	maximum	
✓ Adaptive step	down	Max segme	ent length:	0
Step order:	After each depth step	~		
Stepdown:	3.75	Horizontal	Areas	
		Enable		-
Profiling		Minimum v	width:	1
✓ Profile		General		
After each de		Stock clear	anco.	1.5
○ After last dep	th step			
Allowance:	0	Minimum r	adius:	1
Overlap:	0			



8664: User Interface: The wording in the Revolved Stock Model dialog has been changed from "Swept" to "Revolved".

8665: User Interface: Fixed an issue with the spheres in detect holes plans not scaling correctly in the graphics view when the viewing scale changed.

8675: User Interface: The problem where some right-mouse-button context menus had become disrupted and was not showing all the options it should has been fixed. This also fixes ticket 8696.

8679: Post processing: GPOST: A problem has been fixed where, wrongly, attempts were made to create Master Files when using GPOST for post processing.

8683: Detect Holes: Drilling Data Folders. Fixed a problem which could lead to empty Drilling Data Folders being created. Also fixes ticket 8666.

8686: Stock Models: The speed of calculating Multi-Axis stock models has been improved. The improvement is more noticeable with large toolpaths.

8688: User Interface: Prevented graphical views of the cutter / holder in dialogs being reset when changing values in the dialog, if you has zoomed in or panned the graphics.

8689: User Interface: Fixed a problem being unable to select entities through a clipping plane.

8693: User Interface: The dialog display guides for Stock models were not always drawn correctly, this has now been fixed.

8695: User Interface: The default ribbon category was being set to "View" after the interactive tool definition frame closes, it now restores it to the category it had previously been in.

8698: Tool Database: There was a problem saving canned cycle tools to the tool database from the tool/drill page that resulted in the drill diameter being set incorrectly. This has now been fixed.

8699: User Interface: In Option > Preferences > Open File renamed "Prefer 3D trimming for IGES files" to "Prefer XYZ trimming for IGES files" This is to be more consist with the NCG CAM IGES file reader's option "Prefer XYZ".

8700: User Interface: The Circular Boundary dialog was not displaying all of the label for the "Centre (XY)" string, this has now been fixed.

8701: Tool Library: Export and Import as text options now supports shank definitions for drills.

8705: User Interface: The 3D Tool Guide was failing to get the correct rotations from a silhouette boundary plan, this has now been fixed.

8708: Post Processor: Heidenhain: Added the option 'Output toolpath details as a structured comment' which is false by default so existing posts are not affected. If set true, details of the cutter/drill will be output as a structured comment. For example: \* -Ball Nose [12.000x6.000 24.000, 0.200] for a ball nose 12 diameter, a body length of 24, and a thickness of 0.2 (, Z thickness if different) or for a M10 tap with body length of 60: \* - Tap [10.000x0.000 60.000, 0.000]. The Help file has also been updated to match.

8710: ToolDatabase: There was a problem when exporting a milling tool and the units were set to inches, the shank definition was being output in mm, this has now been fixed.

8714: User Interface: Improved User Interface performance.

8719: User Interface: Creating a prismatic stock model from a silhouette boundary could cause a crash, this has now been fixed.



8721: User Interface: Fixed an issue with surfaces that are not visible in the current view axis not being selectable. For example, a planar patch at Z 0, often was not selectable when viewing along the X or Y axis.

8728: Database: Fixed an issue with memory not being cleared correctly when closing a database.

8732: User Interface: Fixed a problem that could result in some graphical overlays not being drawn in the overlay colour.

8734: Five axis: The option to select a surface folder for tilting has been enabled in the ModuleWorks advanced dialog.

Tool	5 Axis Console
Cutter Advanced Holder 5 Axis Console Inputs	Surface paths Tool axis control Gouge check Link Roughing Utility Output format 5 Axis  Maximum angle step 3 Tool axis will Tilted with fixed angle to surface normal  Reference surface  Folder Selection ?
	Folder: <ul> <li><li><li><li><li><li><li><li><li><li></li></li></li></li></li></li></li></li></li></li></ul>

8735: Coordinate Systems: Creating a datum point plan from an embedded datum point (in a surfaces plan) was not handling the rotations correctly, this has been fixed.

8740: Coordinate Systems: It is now possible to transform multiple suitable plans, by selecting them along with a single "embedded" data point. This makes the behavior consistent with transforming using datum point plans.

8741: Import: When loading a geometry file with the "Load Component information" checked, component folders were being created which contained only one tessellated surfaces plan. This has now been changed so that in these cases the tessellated surfaces plans are placed in the next level above in the tree view.

8742: Post Processors: ISO and Siemens: If the 'Output toolchange' option was set false, the 'Start spindle early' option set true. The 'Start spindle early' was not respected, this has been fixed.

8745: User Interface: Improved tree view performance.

8747: User Interface: The context menu option to collapse or expand items in the tree view will now read "Collapse" when nothing is selected and no folder plan can be expanded.

8748: Linking: Waterline passes. Fixed a problem which could result in some waterline passes being linked out of order.

8753: Tool Database: It was possible to have a drill saved to the tool database and then used in a plan to by loading it and the diameter would be incorrect, this has now been fixed.

8754: Tool Database: The number of decimal places have been reduced when outputting a tool body definition to a text file, it is now restricted to 4 decimal places.

8755: User Interface: Fixed a problem that could occur when using the Shift key while creating interactive holders and chucks which caused NCGCAM to crash.



8756: User Interface: Fixed transformed plans not being created in the tree view when setting the coordinate system of input plans.

8758: Linking: Waterline Passes: There was a problem with linking on surface ramping moves which in some cases could drop too far. This has been fixed.

8760: User Interface: The behaviour of the User Interface if an invalid shaft has been defined on the tool page has been improved.

8762: User Interface: It was possible to use a 2D Stock model as input to an Adaptive Clearance or Five-Axis plan this would cause an exception, this has now been fixed with 2D stock models being blocked.

8763: User Interface: Fixed a problem with the 3D tool guide stopping after holding an arrow key.

8767: Post-processing: Searches for toolpaths, macros, postable toolpaths, and inspection vectors have been extended to nested folders.

8773: Extract Curves: We were only thinning curves if fit horizontal arcs was enabled. This has been corrected.

8775: User Interface: Fixed the flickering that could happen when using the tree view, and the tree view is longer then the screen height.

8776: User Interface: The user interface is now not blocked when creating tessellation plans for geometry files with components, until all components have been loaded.

8777: Adaptive Clearance: There were some examples where ramp lead in/out arcs were not being output correctly, this has now been fixed.

8780: User Interface: Fixed a problem with the selection of rotated curves plans not working correctly.

8781: User Interface: Fixed an issue with surface plans created by trimming surfaces with boundaries not being organised automatically.



8783: Adaptive Clearance: The wording of Profile ordering options "All slices" and "Last slice" has been changed to "After each depth step" and "After last depth step" respectively for clarity.

Passes		
Passes		Limits
XY Thickness:	0	◯ Surfaces
Z Thickness:	0	⊖ Stock
Tolerance:	0.02	<ul> <li>Surfaces and</li> <li>User defined</li> </ul>
Stepdown:	15	Oser denned
Cutting type:	Oneway	Z:
Cutting direction:	Climb	Point Spacing
Adaptive Stepdow	n	Enable maxim
Adaptive step	down	Max segment len
Step order:	After each depth step	
Stepdown:	3.75	Horizontal Areas
Profiling		Minimum width:
Profile		General
<ul> <li>After each dep</li> <li>After last dep</li> </ul>		Stock clearance:
Allowance:	0	Minimum radius
Overlap:	0	
Min cut width:	0	
Machine by:	Regions	7

8788: Tool Database: When loading tools into the tool folder from a text file, if the file only contains cutters or cutters which were not used in tools, these were ignored. We now read these in as a tool.

8802: Tool Database: Some sample turning tools have been added to generalnikken.txt.

8805: User Interface: Fixed graphics four-view mode not rendering correctly.

8808: User Interface: Improved performance of animations and overlays in the graphics view.

8812: User Interface: Fixed a crash that could occur when closing an analysis dialog.

8815: Stock Model: For revolved stock models we now set the default diameter depending on the geometry selected.

8826: User Interface: The parameter space view options can now be set for individual views in four-view mode.

8834: Machining. Improved the accuracy of rest passes when using small cutters. Cutters of diameter greater than 10mm should produce the same result as before.

8853: User Interface: Fixed an issue with the view axes being scaled incorrectly when switching to four-view mode.

8854: Linking: Area Clearance toolpaths. Increase the number of cases where we apply straight-line recovery moves if we fail to fit a smooth S-shaped connection because of the stay on surface distance and position of the linking move.



8856: Linking: Core roughing: We now preferentially machine nearby open core roughing passes before any closed passes in the offsets.

8861: Linking: We were discarding valid horizontal lead out arcs when an associated vertical arc could not fitted, this has been corrected.

8864: User Interface: Fixed a selection performance regression on Intel integrated GPUs.

8867: Import: Datakit libraries have been updated to 2023.2. Supports CATIA V5 R33, Parasolid V35.1 and UG NX2212. Please note, the color setting may not be accurate for the current release, and it will be fixed at by ticket 8882 later.

General Trans	ators Options Mo	odules System EULA	
	Module	Version	Licensed
63153	Catia v4 3D	Releases 4.15 to 4.24	Yes
100	Catia v5	Releases 7 to 33	Yes
	GRANITE	15.0.0.0	Yes
	Parasolid	Parasolid V35.1	Yes
	SolidWorks	SolidWorks 2023	Yes
	Unigraphics N	X NX 2212	Yes

8870: Coordinate Systems: Creating a coordinate system from a datum point was not handling the rotations correctly, this has been fixed.

8875: Linking: Fixed a problem which could cause gouging in helical passes when very small machining tolerances are used.

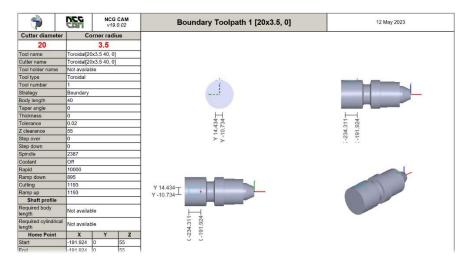
8879: User Interface: Fixed an incorrect draw state that could happen when re-running plans that are not drawn.

8896: Compound Cycles: We now retain modified plan / folder names when loading saved compound cycles

8898: Linking: Performance improvements have been made to address a slowdown caused by ticket 8817 (Profile ramping enhancements).



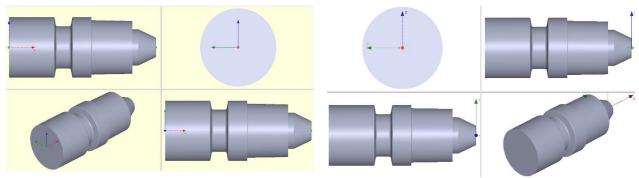
8902: Toolsheets: Dimensions on toolpath images now only measure the toolpath.



8921: Import: Updated Granite to v16.0.0.0. This provides support for Creo 10.0 files.

General Trans	lators Options Mod	dules System EULA	
æ.	Module Catia v4 3D	Version Releases 4.15 to 4.24	Licensed Yes
Contraction of the second	Catia v5	Releases 7 to 33	Yes
	GRANITE	16.0.0.0	Yes
	Parasolid Parasolid V35.1		Yes
	SolidWorks SolidWorks 2023		Yes
	Unigraphics NX	NX 2212	Yes

8930: User Interface: Changed the layout of the four-view mode in graphics views to match the four-view toolsheet image layout for consistency.



Four views in previous versions.

Four views in v10.0.02

8940: Cutter Simulation: There was a problem when unticking and ticking the simulated toolpath in the tree while the Cutter Simulation was paused could cause NCG CAM to crash, this has now been fixed.

8953: User Interface: Fixed an issue with the view not updating when exiting the boundary editor.

8955: User Interface: Made the sizes of overlay elements (measuring rod, 3 point circle, direction arrows, nodes on the boundary, when in boundary edit mode) in graphics views consistent across different monitors.



8956: User Interface: The "Axes length in pixels" option has been removed from the axes options page, replaced by an option to set the length of axes in mm/inches as measured on the screen. An option has been added to scale the axes length with the view, which replaces the previous "Axes length in mm/inches" option.

Options		Options	
Aves - Animation and Simulation - Defaults - Entity Colours - Graphics - Mouse - Post Processor - Preferences - System Colours - Tags	Axes         New windows default to show axes         Axes origin:       model space origin         Axes depth:       hidden lines dotted         Show labels         Axes length:       40         Oistance markings every       5         Axes line width:       2	Axes Animation and Simulation Defaults Fatiy Colours Graphics Mouse Post Processor Macros Preferences System Colours Tags	Axes         New windows default to show axes         Axes origin:       model space origin         Axes depth:       hidden lines dotted         Show labels       Axes length in pixels         Axes length in mm       20         Distance markings every       5         Axes line width:       2
V19.0		v18.0	

Note, the 'Scale with view' option must be enabled if distance markings are required.

8957: User Interface: The bead radius in the cutter animation options is now set in mm/inches.

8958: User Interface: The keyboard translation distance in the graphics options is now measured in mm/inches on the screen when set to "screen space", rather than pixels.

8963: User Interface: The selection of a point/datum when creating a revolved surface is now optional, it will default to (0.0, 0.0, 0.0) for the position.

8986: User Interface: Improved smoothness of spheres in graphics views.

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