

SolidCAM – The Solid Platform for Manufacturing

SolidCAM 2023 SP2
New Functionality

Nov 2023



The unique, revolutionary Milling technology
imachining[®]
patent by SolidCAM

SolidCAM +
Mill Turn & Swiss

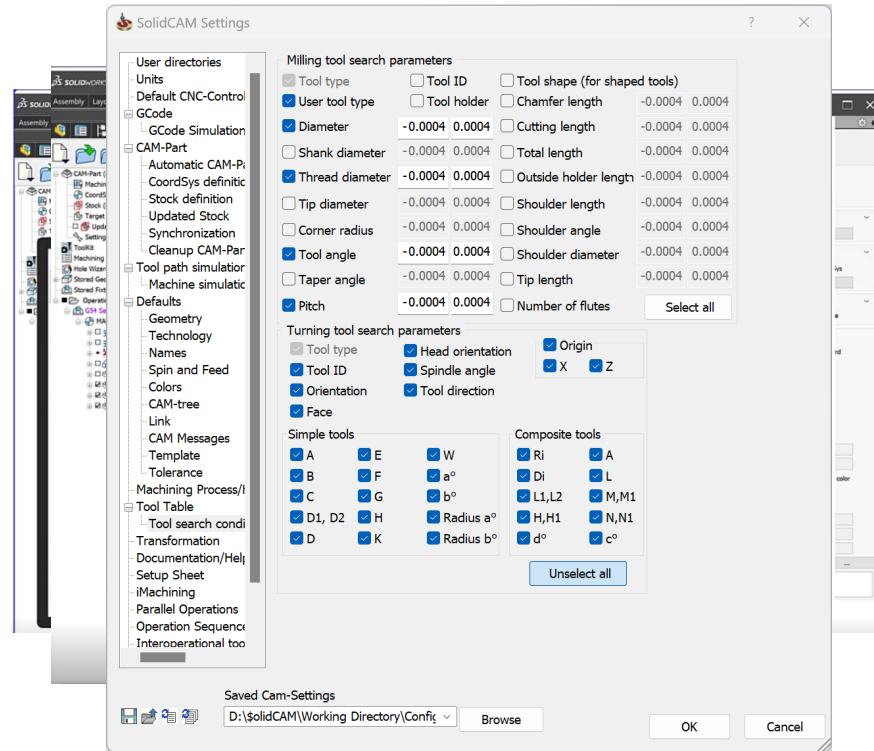
SolidCAM
Additive Manufacturing

SolidCAM 2023 – Hole Wizard Enhancements

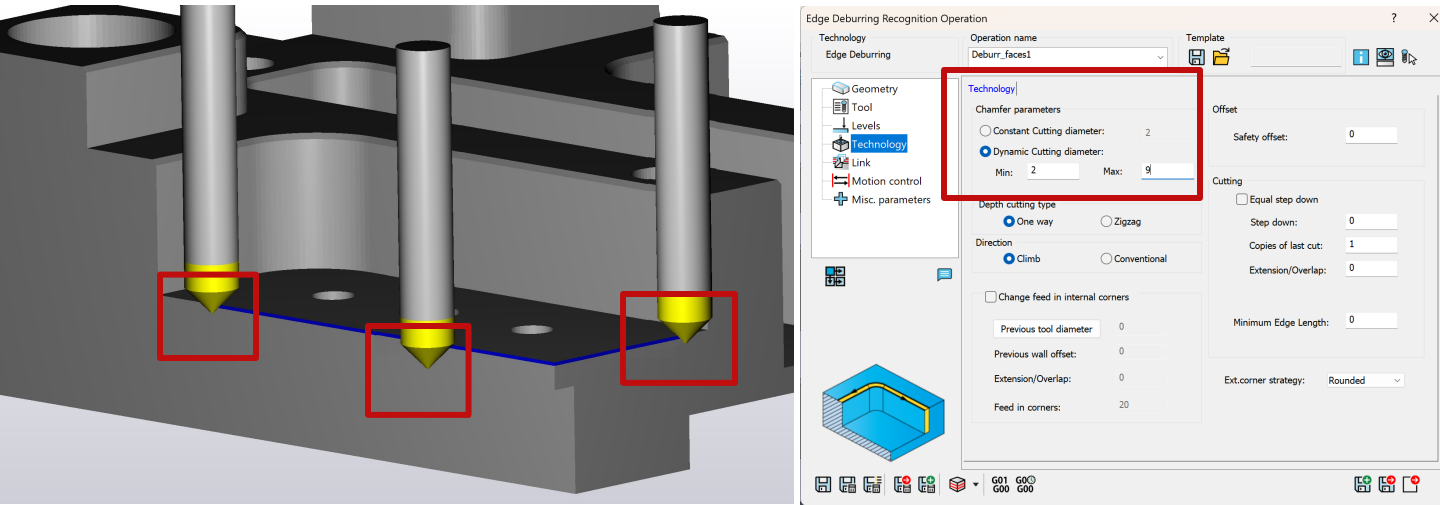
- Advanced Feature Recognition
 - Recognize Once
 - Use repeatedly

- Feature Based Attributes
 - Dimensional Tolerances
 - Feature Color Attribute

- Tool Search Criteria Tolerances



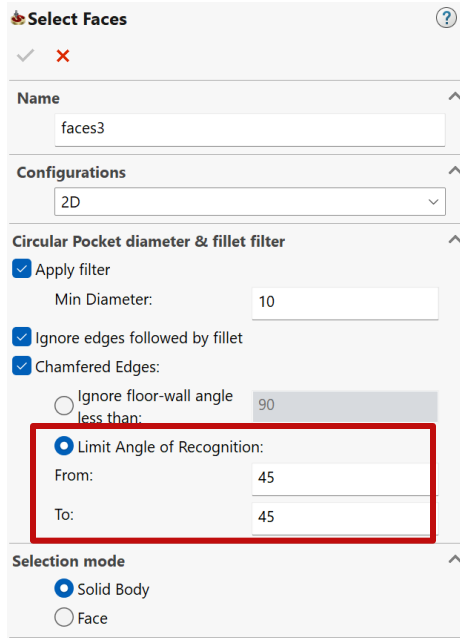
Edge Deburring Recognition – Dynamic Cutting Diameter



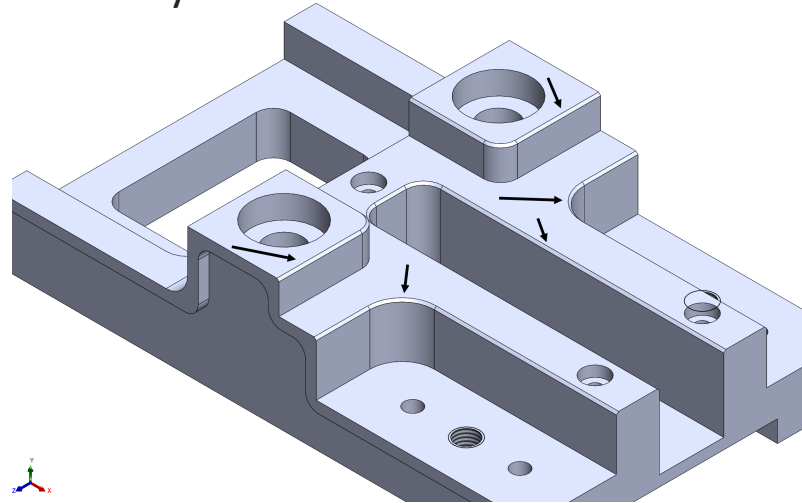
- ❑ Dynamic control between two cutting diameters
- ❑ Allows for less wear on the cutting edge by not cutting constantly on the same cutting point of the tool



Edge Deburring Recognition – Angle Filter For Specific Angle

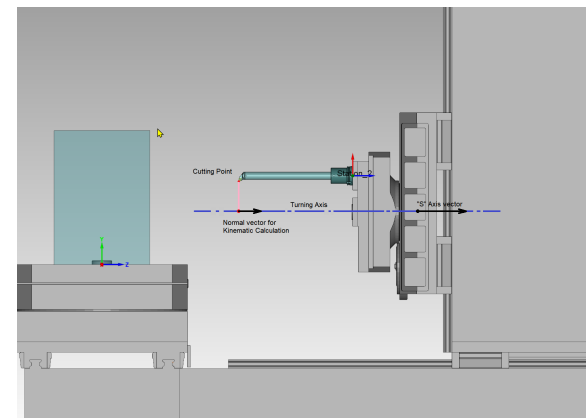
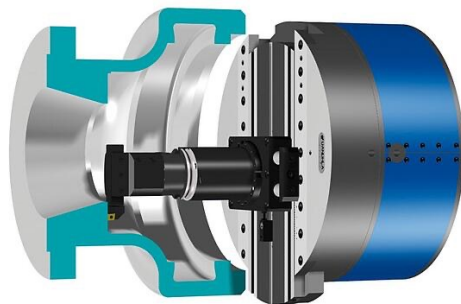
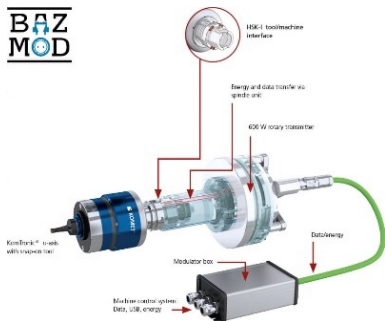
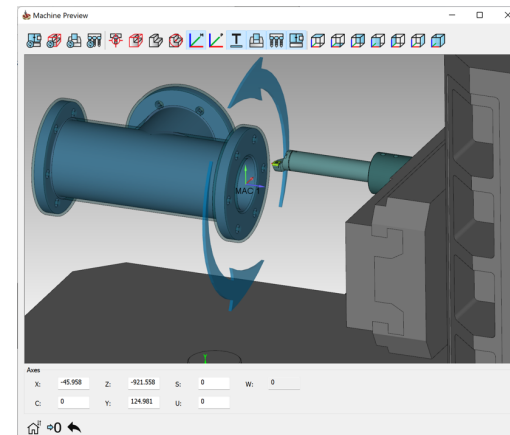


- Filtering to a specific angle allows for choosing only edges that have a specific angle
- This is very helpful for edges that already have a chamfer on the model

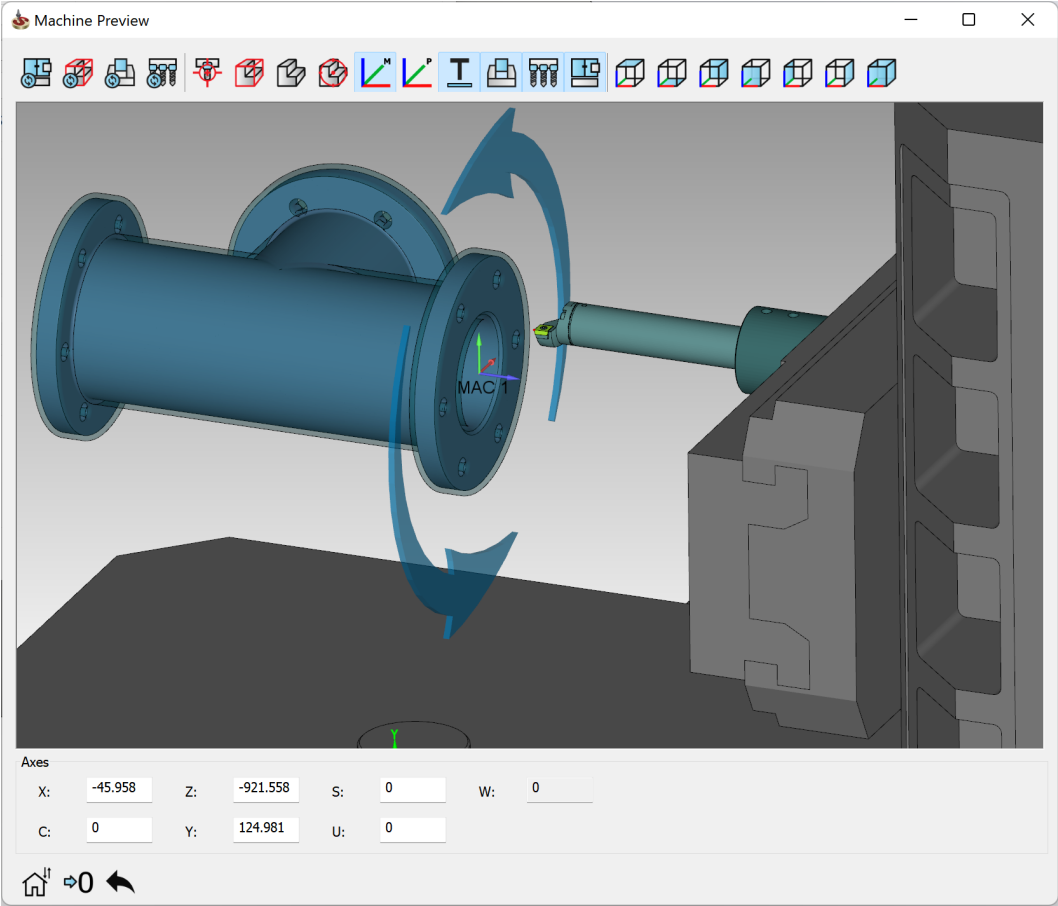


SolidCAM 2023 – U-Axis support

- ❑ **New axis type** “Sub Linear Axis” can be Simultaneous or Indexial
- ❑ **Tool vector** for kinematic calculations is the Drive Unit Axis vector as normal to plane vector.
- ❑ The **tool tip point** for positioning is the projection of the Cutting Point to the Turning Axis.

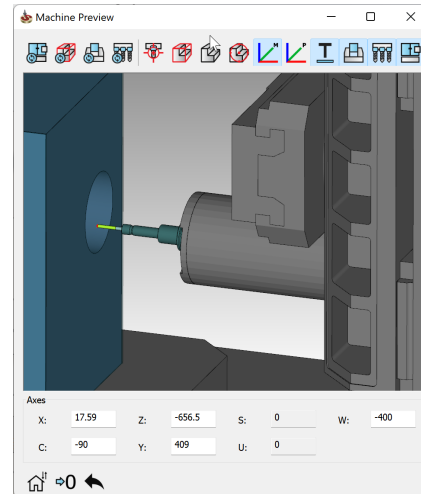
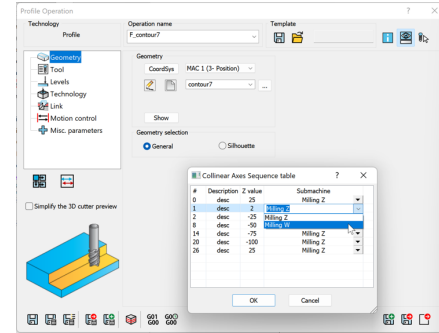


SolidCAM 2023 - U-axis machining Support



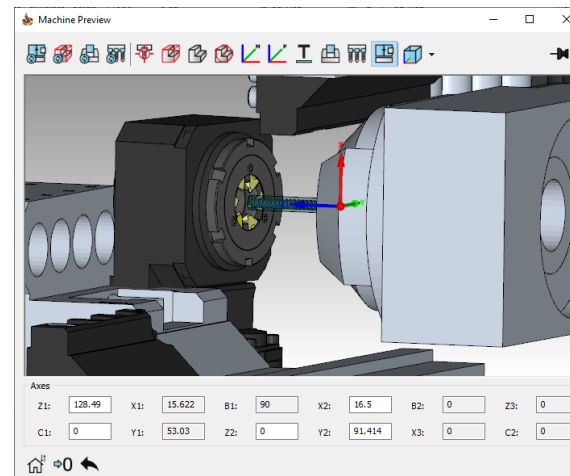
SolidCAM 2023 – Collinear axes support

- ❑ In order to support the **CNC machines for heavy and gas & oil industries**, we are implementing support of machines with **collinear axes**.
- ❑ Those CNC machines are designed to hold **heavy parts** and make **deep holes machining**



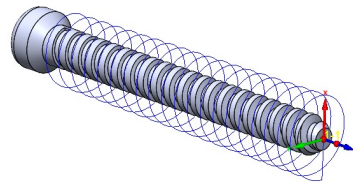
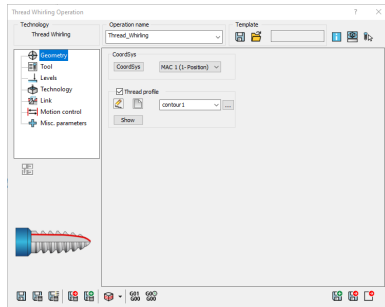
SolidCAM 2023 – Thread Whirling for SWISS type

- ❑ **Thread Whirling** is a form of the thread milling process. Inserts are mounted on the inside of a cutting ring that rotates around a cylindrical component to cut a thread.
- ❑ It is a productive method often used on Swiss-type CNC machines for thread parts that need to be **produced quickly** and at **tight tolerances** or for threads with a **high length-to-diameter ratio**.
- ❑ Typical parts for thread whirling are **medical bone screws, implants, feed screws and other microcomponents**.

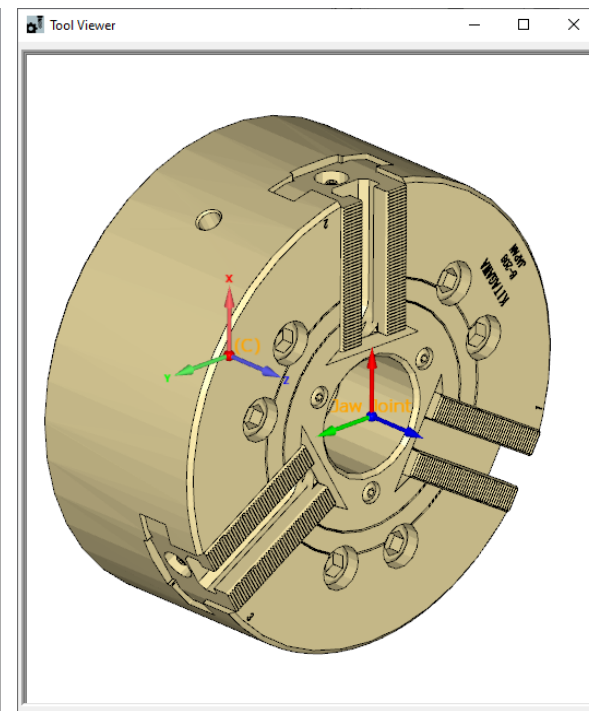
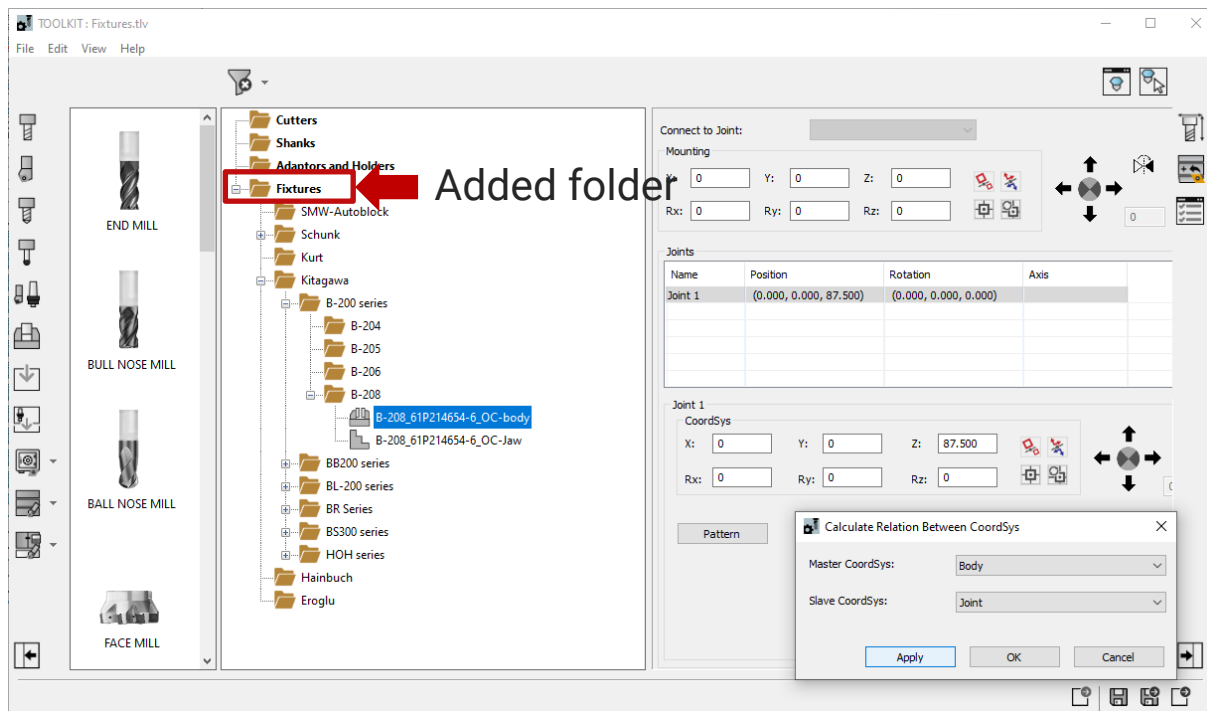


SolidCAM 2023 – Thread Whirling for SWISS type

- ❑ Newly supported threading technology that allows the machining of high-quality threads without the risk of bending or vibrations.
- ❑ In combination with a swiss type machine, it is a very suitable technology for parts with a high length-to-diameter ratio such as bone screws, implants, feed screws, and other microcomponents.
- ❑ The operation is based on the thread milling module with additional features such as thread with custom profile, machining the thread in Z-axis segments, simplified G-code structure and more.



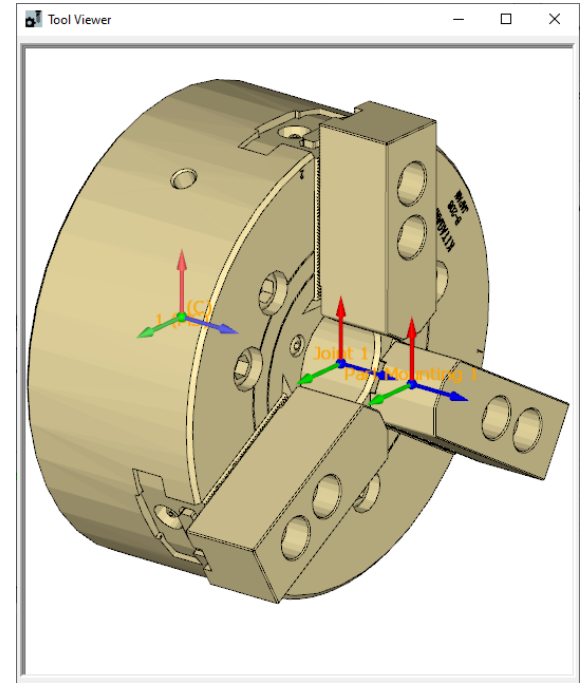
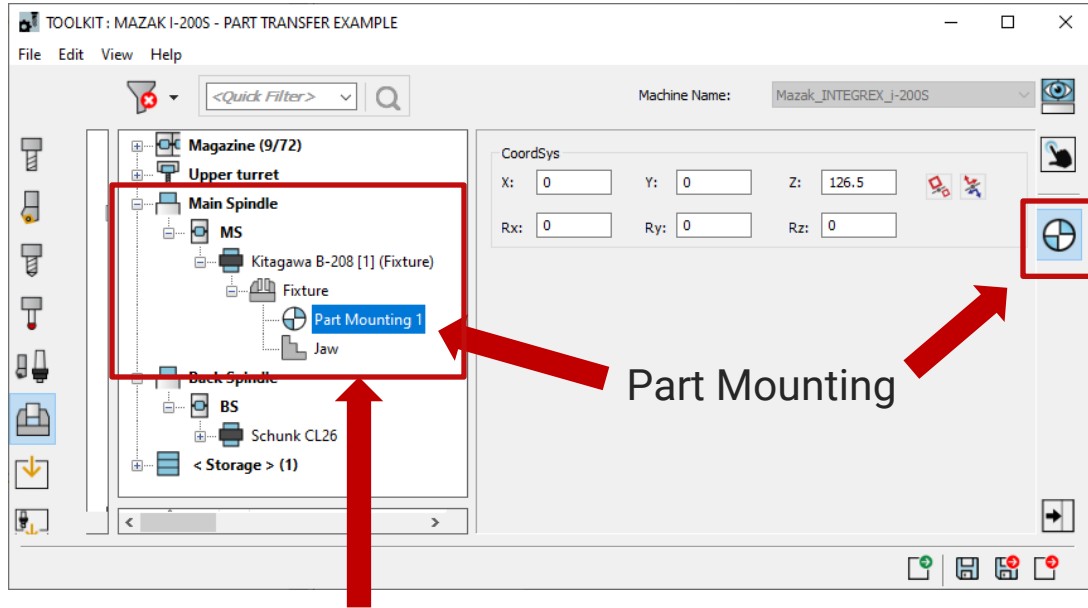
SolidCAM 2023 – Added Fixtures in ToolKit



- ❑ In **SolidCAM2023** added a possibility to define, manage and store fixture components into a vault (.tlv), assemblies (.tls) or machine assembly (.tlm) library.



SolidCAM 2023 – Added Fixtures in ToolKit



Structure of standard
lathe chuck



SolidCAM 2023 – Added Fixtures in ToolKit

The screenshot displays the SolidCAM 2023 ToolKit interface for a 'MAZAK I-2005 - PART TRANSFER EXAMPLE'. The interface includes a menu bar (File, Edit, View, Help), a toolbar, and a main workspace. The workspace is divided into two main sections: a left panel for fixture selection and a right panel for a tree view of the fixture configuration.

The left panel shows a vertical toolbar on the far left with various tool icons. A red arrow points to a specific icon in this toolbar labeled 'Added fixture icon'. The main area of the left panel contains a grid of fixture options, each with a 3D model and a text label. A red box highlights the top two options: 'Fixture' and 'Jaw'. Another red box highlights the bottom three options: 'Vise', 'Chuck', and 'Collet Chuck'. A red arrow points to this entire grid area labeled 'The main fixture items'.

The right panel shows a tree view of the fixture configuration. A red box highlights the 'Main Spindle' section, which includes 'MS' (Main Spindle), 'Kitagawa B-208', 'Back Spindle', 'BS', and 'Schunk CL26'. A red arrow points to this section labeled 'Added option to define fixture on Table'. Below the tree view, the text 'Pre-defined fixture templates' is displayed.

Added option to define fixture on Table



SolidCAM 2023 – Added Fixtures in ToolKit

The screenshot displays the SolidCAM 2023 software interface, specifically the ToolKit and Machine Preview windows.

ToolKit: C87969 REV1 - HERMLEX PRIZMA LANG

File Edit View Help

<Quick Filter>

Fixtures

- Cutters
- Shanks
- Adaptors and Holders
- Fixtures
 - SMW-Autoblock
 - Schunk
 - Kurt
 - Kitagawa
 - Hainbuch
 - Eroglu
 - 5-axis 3 sided
 - Table
 - Fixture
 - Vise
 - Jaw

Magazine (7/120)

- Spindle
- Magazine_Table (0/9999)
- Table
- Target
- Fixture [1]
- < Storage > (0)

Tool Data

Tool number: 1 Tool ID:

Cutting Point Data

Tool offset number: Tool offset index:

Mounting on Station

Table: Target

X: 0 Y: 0 Z: 0

Rx: 0 Ry: 0 Rz: 0

Tool Numb...	T.	Description	Diam...
Mag...			
1		GL Ø40	4
2		GL Ø8	8
3		BUR ...	1
4		RAZ ...	2
5		BUR ...	2
6		RAZ ...	2
7		BUR ...	3
8		ZAB Ø4	4

Machine Preview

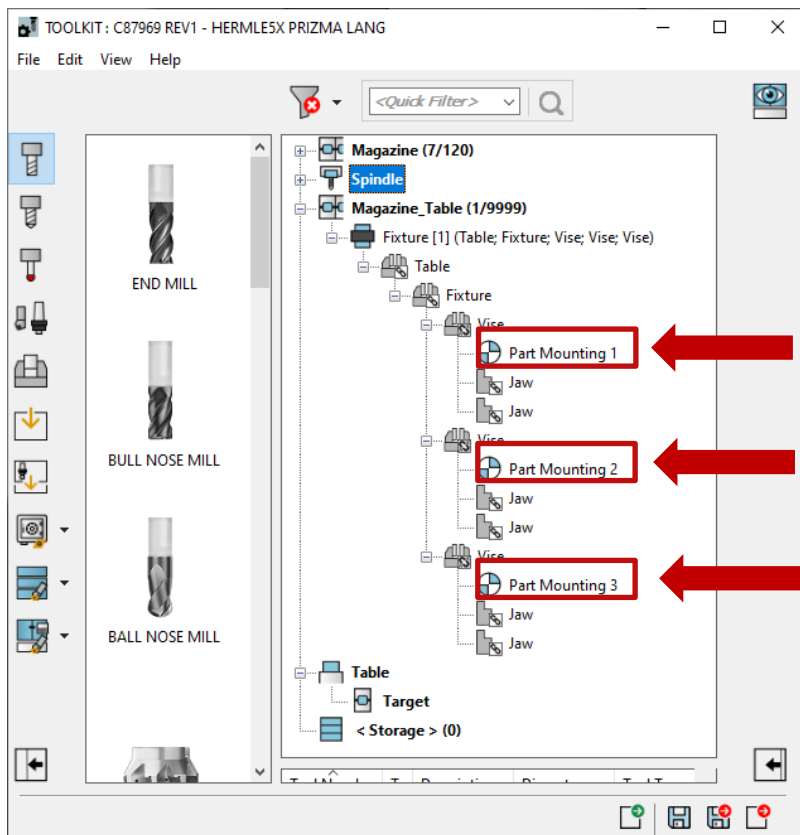
Machine Preview window showing a 3D model of a machine tool setup. The tool is mounted on a table, and the cutting point is visible. The axes (X, Y, Z) are shown in the preview.

Axes

X: 0 Y: 0 C: 0

Z: 0 A: 0

SolidCAM 2023 – Added Fixtures in ToolKit



Supporting multi-part
mounting positions

SolidCAM 2023 – Added Fixtures in ToolKit

Catalog number:

Shape type: 3D Model

Swap Units Data
 mm inch

Import from CAD:

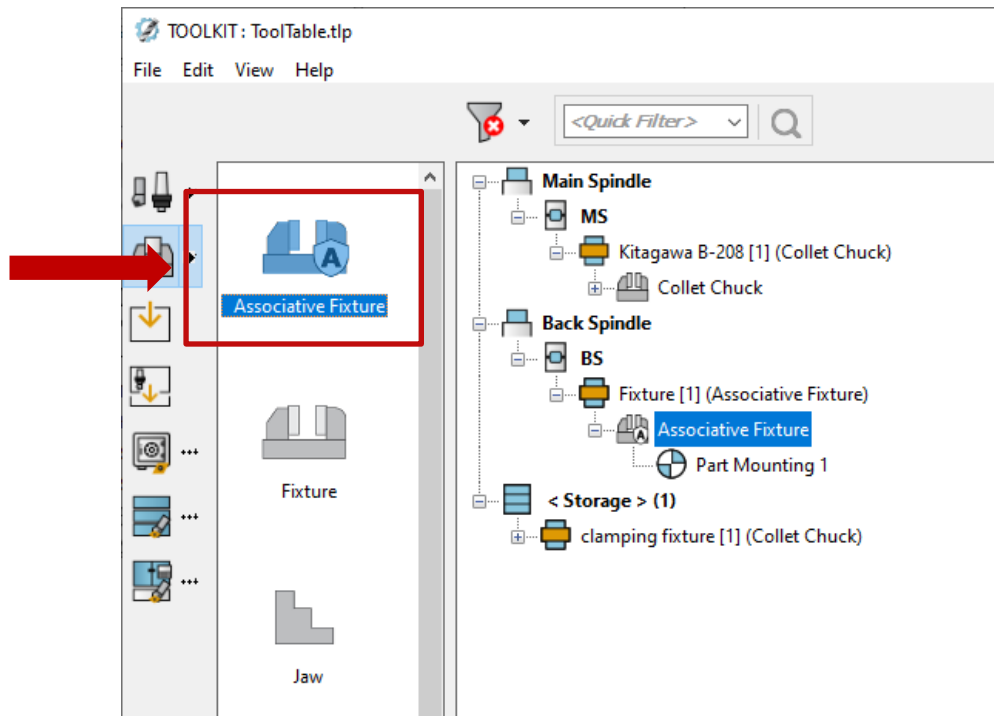
STL Files:

No.	File Name		
1	Fixtures\Kitagawa\B-200 series\B-208\B-208_61P...	...	
2		...	

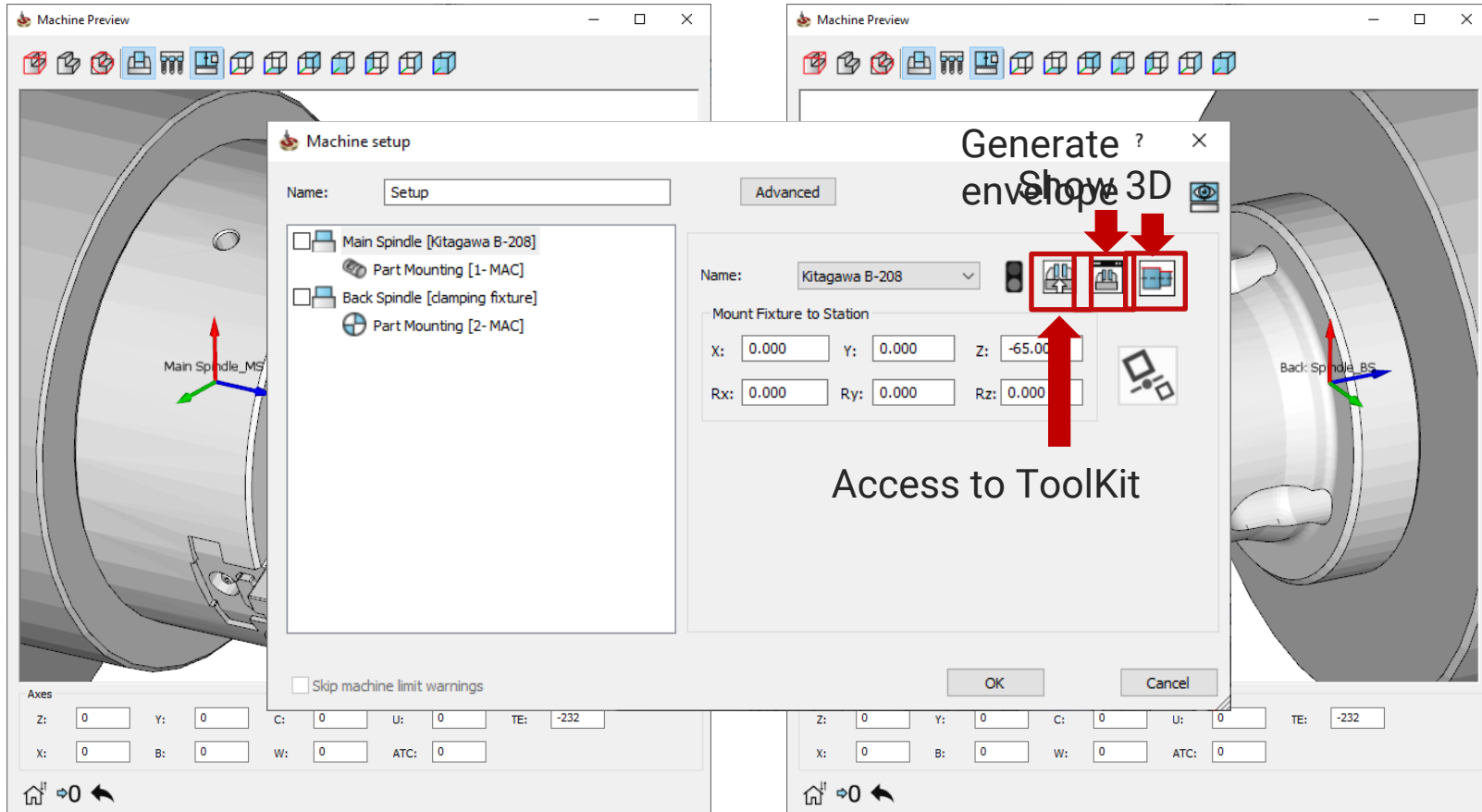
Import from CAD is supported!

SolidCAM 2023 – Fixtures Associativity

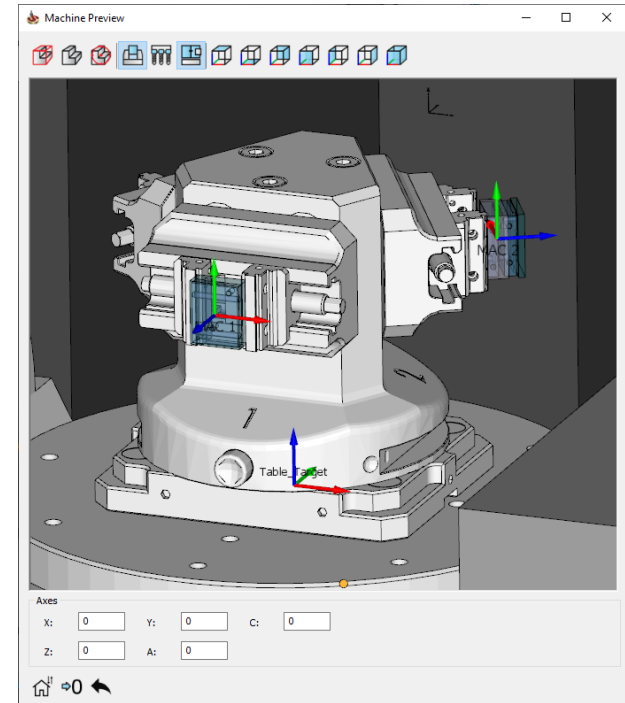
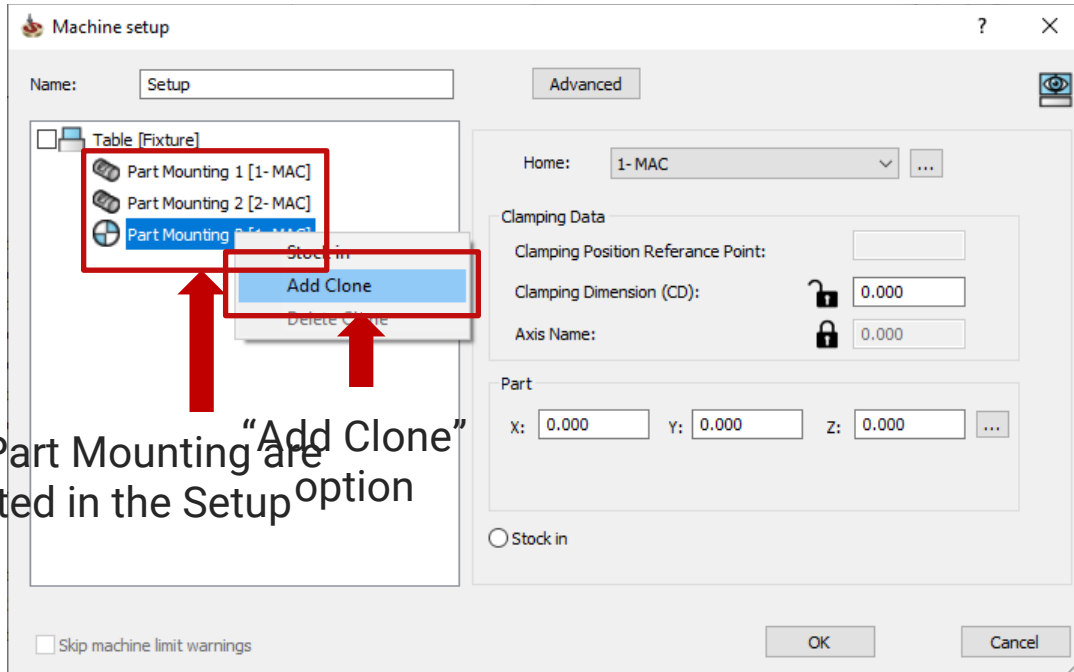
Fixtures Associativity to
CAD is **supported!**



SolidCAM 2023 – New machine setup

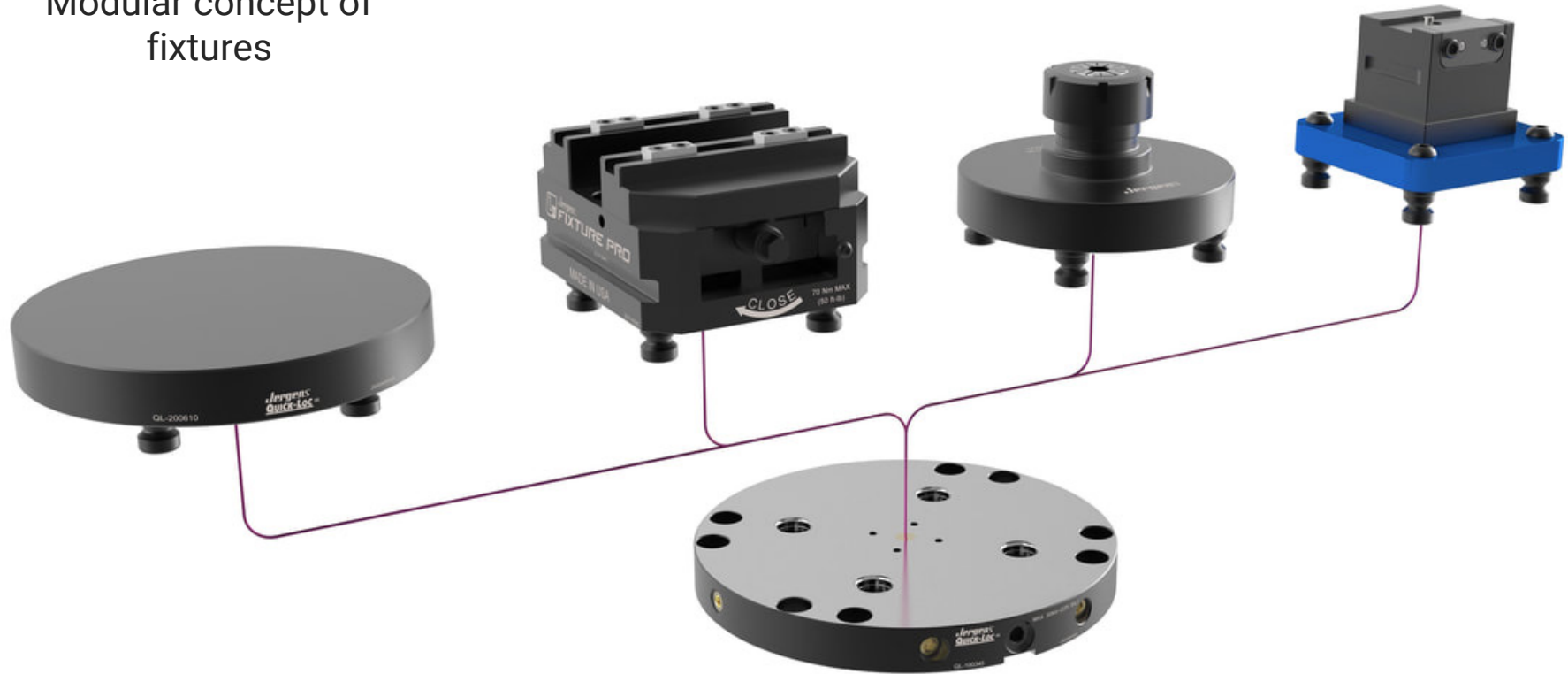


SolidCAM 2023 – New machine setup



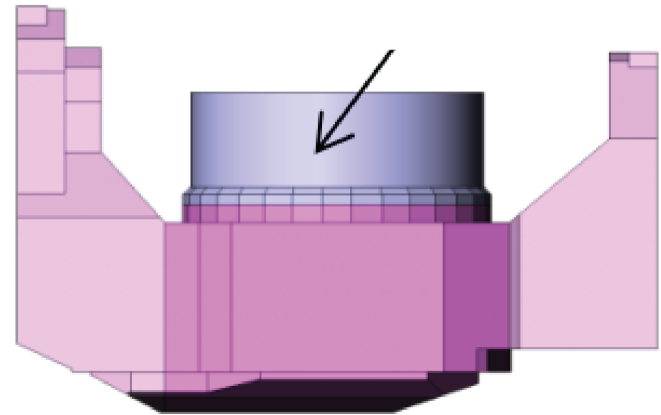
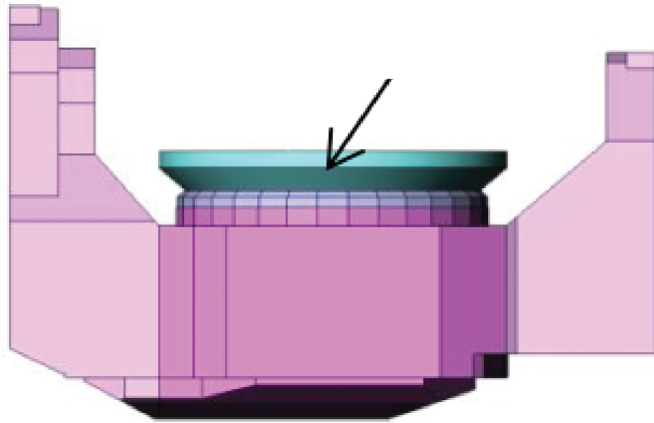
NEW Fixture and Setup will support....

Modular concept of fixtures



NEW Fixture and Setup will support....

Replacable tables



NEW Fixture and Setup will support....

Replacable tables - Tombstones



NEW Fixture and Setup will support....

Pyramidal fixtures

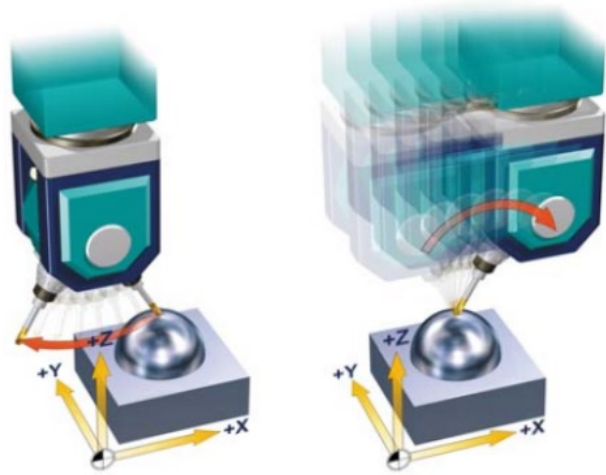


NEW Fixture and Setup will support...

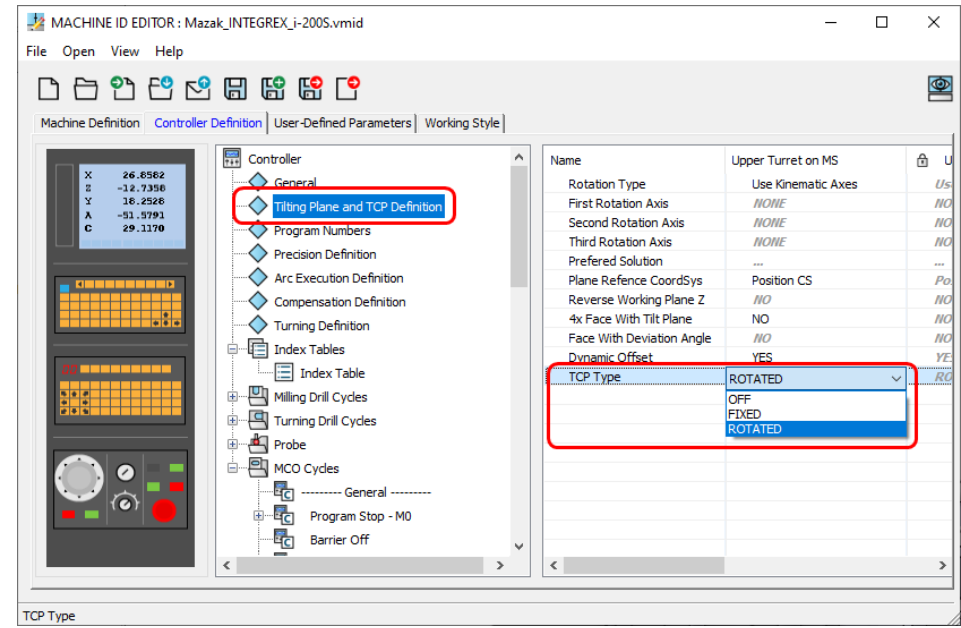
Standard lathe and collet chucks
and vises



MCO: Control the movements with or without the TCP option



The example when TCP is OFF (left) and when TCP is ON (right)



MCO: Control the movements with or without the TCP option

Machine Control Operation

Technology: General

Operation name: MACHINE_CTRL_1

Template: []

Cycle: []

Action on ...

- Machine
- Spindle
- Table
- Submachine
- Misc

Process

- Start definition
- Submachine
- Message
- Movement

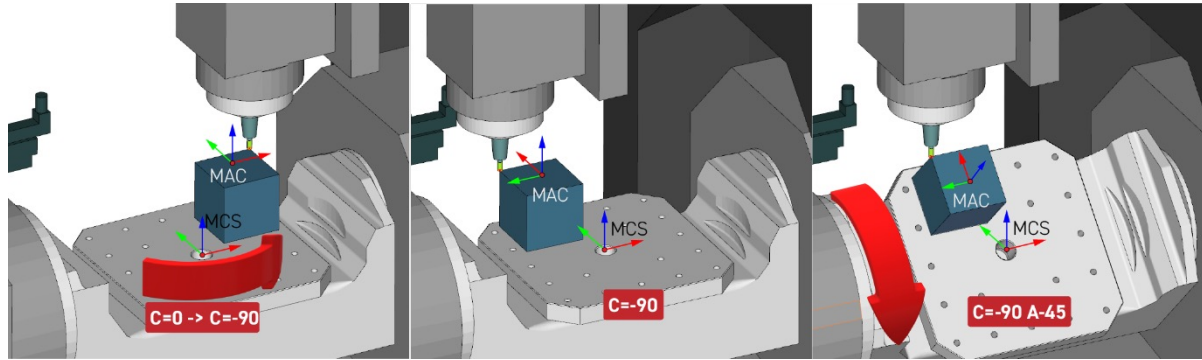
Properties

Name	Value
Submachine	5X - AC (-120,0)
TCP Mode	ON/OFF
Working Mode	Milling/Turning

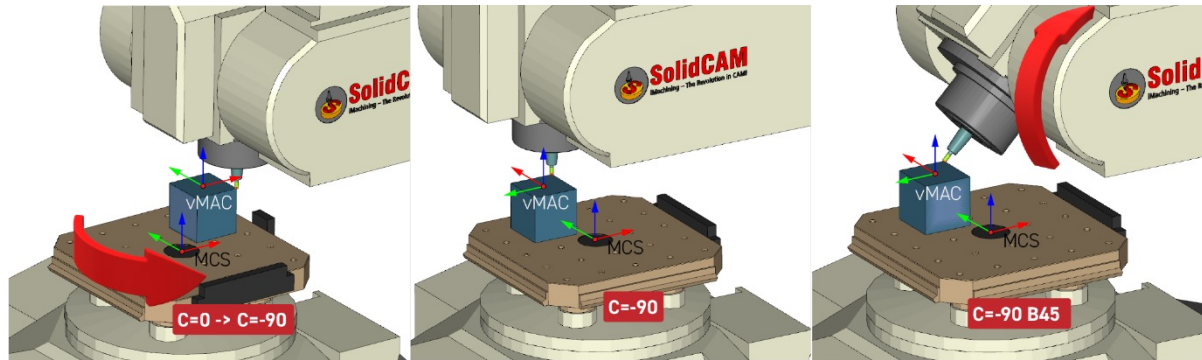
Machine Control Diagram

Icons: [Save] [List] [Layers] G01 G00 [Add] [Remove] [Refresh]

MCO: Control the movements with or without the TCP option



“Rotated” type TCP on Table-Table



“Rotated” type TCP on Head-Table

MCO: Control the movements with or without the TCP option

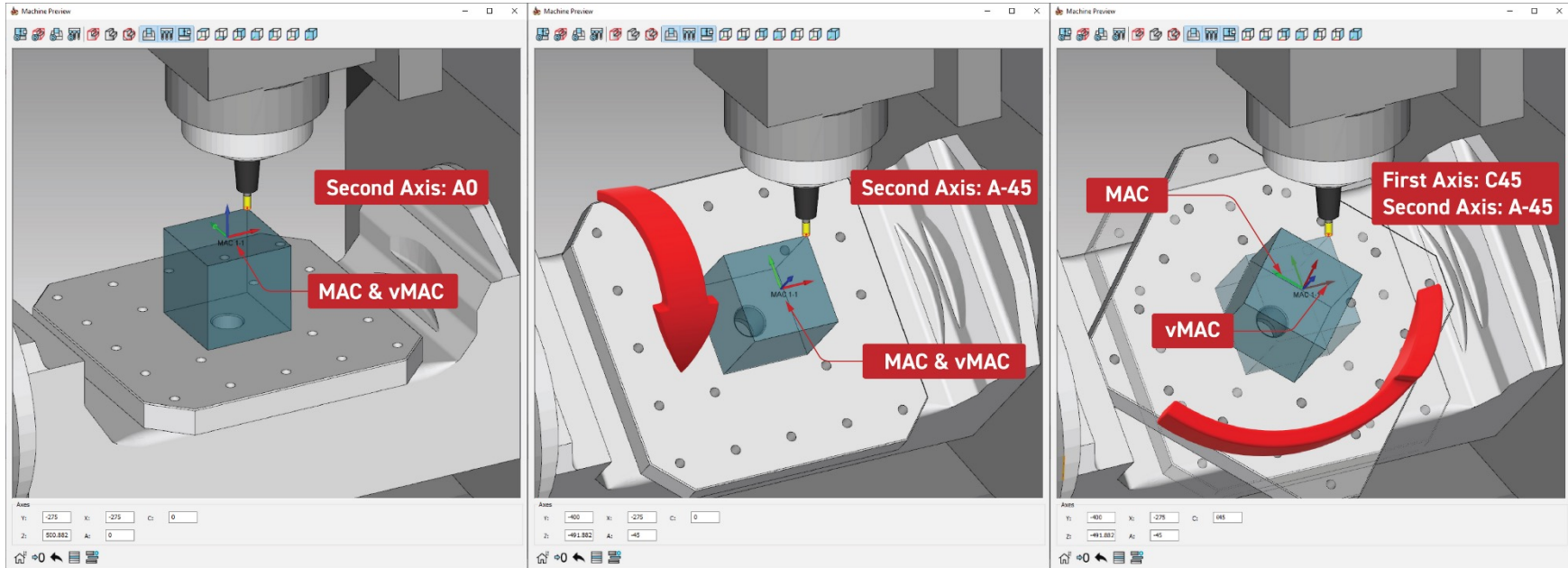


Table-centered part with the Fixed TCP on Table-Table

Support Turning in Position

Turning Operation

Technology: Turning

Operation name: TR_turn_on_solid1

Template: [Save] [Open]

Geometry: **CoordSys: MAC 2 (2- Position)**

turn_on_solid1

Show Generate Envelope

Wireframe Solid

Edit geometry

Modify Geometry

Partial machining

Partial machining Data

Geometry Limits

Limit by the cutter angle

Simplify the 3D cutter preview

G01 G00 G00

Machine Preview

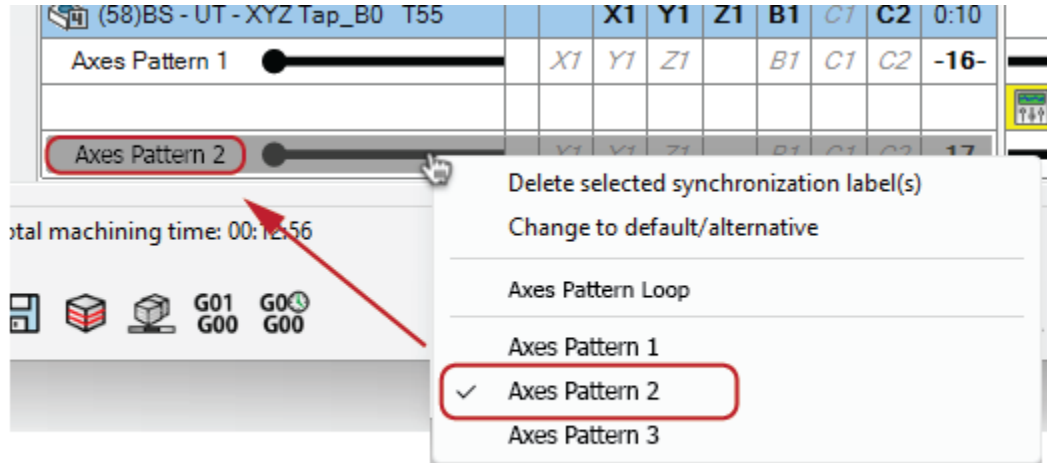
MAC 2 POS 2

Axes

X:	344.378	Z:	-286.558	S:	0	W:	0
C:	0	Y:	130.632	U:	0		

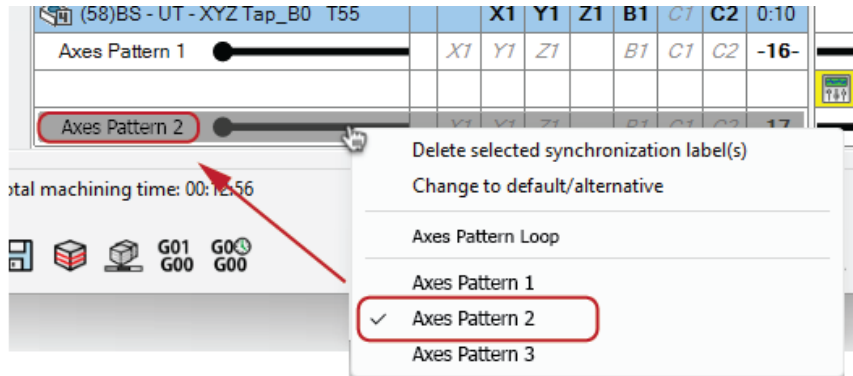
Home → 0 ↶

Channel Synchronization: Complete Control over the first and last Axes Pattern



- ❑ When **Axes Pattern Loop** is active (default), the **first** and **last** Axes Pattern are the same, however, the user can change to them.

Operation Sequence Manager: Complete Control over the first and last Axes Pattern



- ❑ When **Axes Pattern Loop** is active (default), the **first** and **last** Axes Pattern are the same, however, the user can change to any

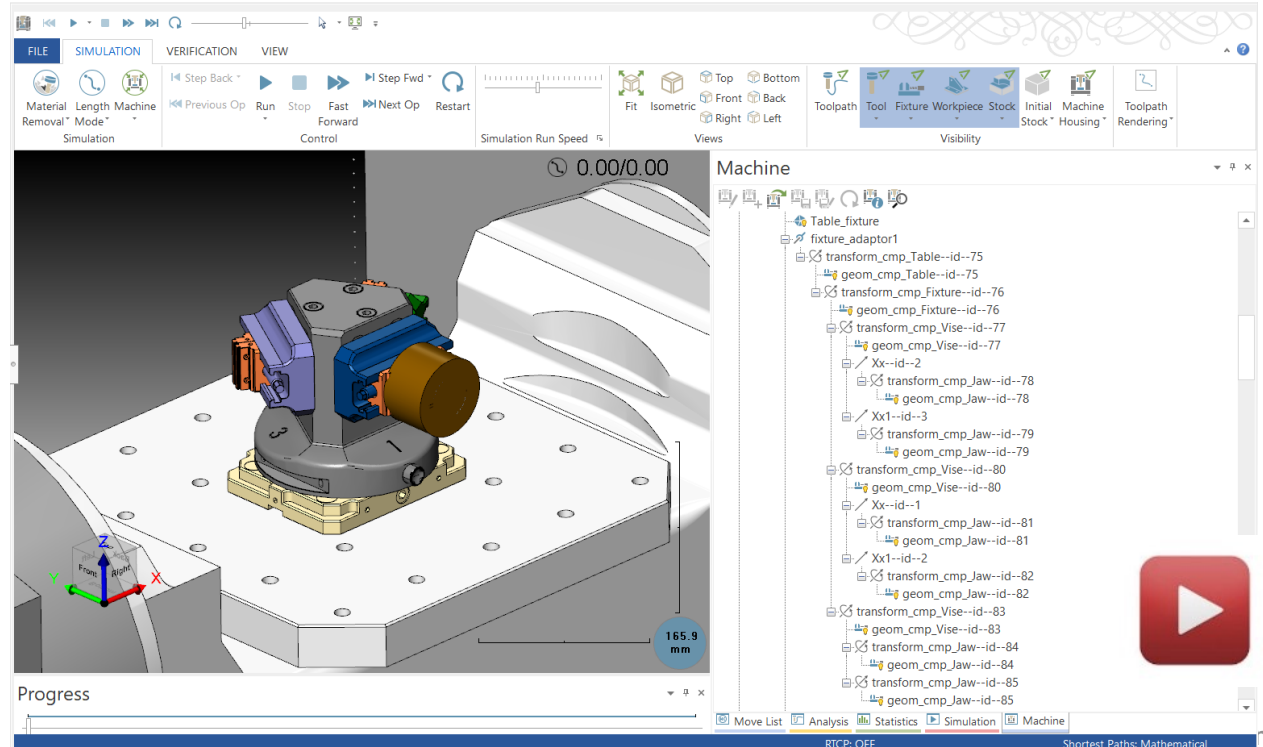
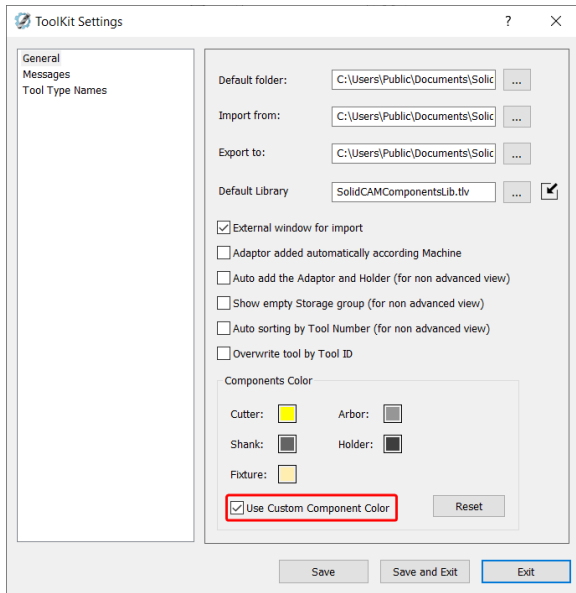


Channel Synchronization -> Operation Sequence Manager



SolidCAM 2023 – Machine Simulation

- ❑ All tools and fixtures defined in the ToolKit are fully supported in Machine Simulation
- ❑ Tools and fixtures will be colored with the same colors as defined in the ToolKit



SolidCAM 2023 – Machine Simulation

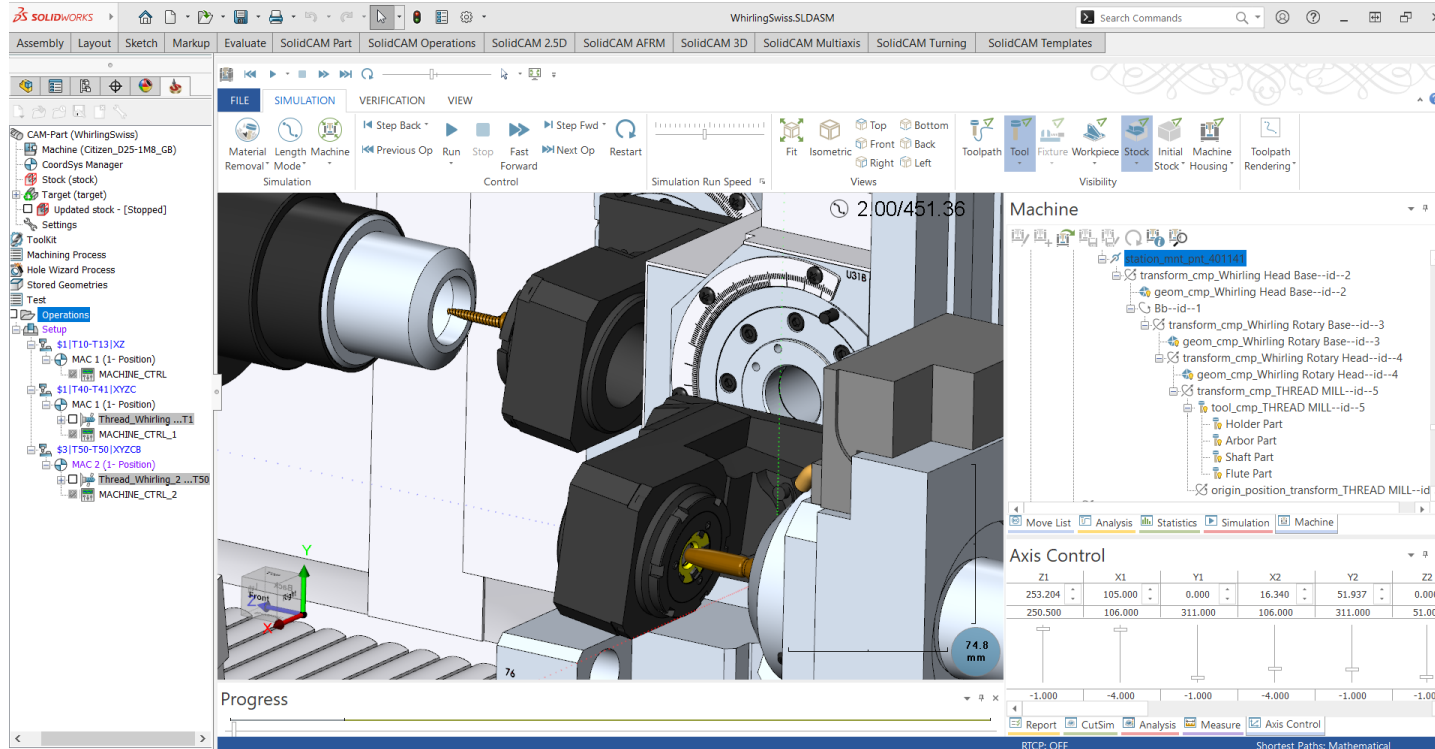
- ❑ Component axes defined in the ToolKit are now supported in Machine Simulation and the client has the option to display the axes in the Axis Control window

The screenshot displays the SolidCAM 2023 Machine Simulation interface. On the left, the 'SolidCAM Settings' dialog is open, with the 'Miscellaneous' tab selected. The 'Axis Control Window' section has the checkbox 'Show Component Axis from Toolkit' checked. The main simulation area shows a 3D model of a machine tool cutting a part, with a progress bar at the bottom indicating 0.00/1195.81. On the right, the 'Machine' tree lists various components, with 'C-id--1' and 'Bb--id--1' highlighted. Below the tree is the 'Axis Control' window, which includes a table of coordinates for the highlighted axes.

X	Y	Z	Bb--id--1	C-id--1
-65.011	-334.403	-313.500	90.000	-135.000
0.	0.000	90.000	90.000	360.000

SolidCAM 2023 – Machine Simulation

Using Machine Simulation, new Thread Whirling operation can be simulated



SolidCAM 2023 – Machine Simulation

Movements defined with the Collinear Axes Sequence table are supported in Machine Simulation

#	Description	Z value	Submachine
0	appr. re...	25	Milling Z
1	appr. fin...	2	Milling W
2	appr. fin...	-25	Milling W
8	appr. fin...	-50	Milling Z
14	appr. fin...	-75	Milling Z
20	appr. fin...	-100	Milling Z
26	appr. re...	25	Milling Z

450.00/2 785.32

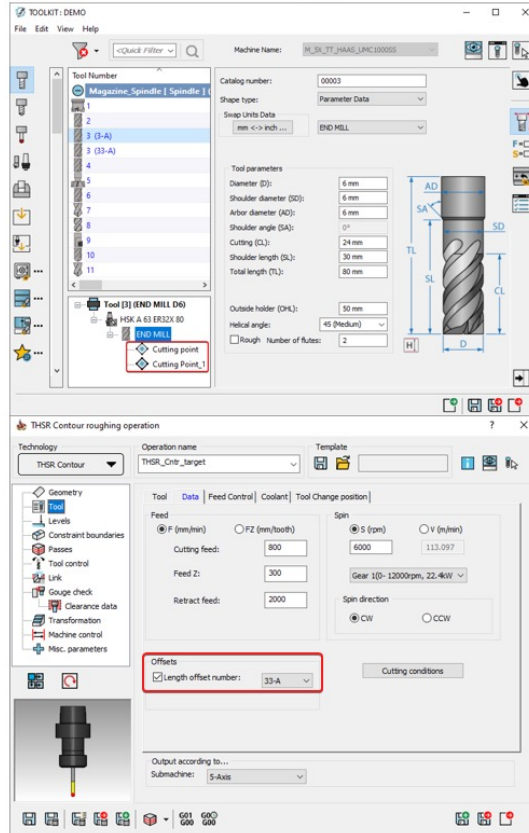
Block	Pos	X	Y	Z	C	W
5	0	-275.00000	400.00000	17.59000	-90.00000	-400.00000
6	1	-255.00000	400.00000	17.59000	-90.00000	-423.00000
7	2	-225.00000	400.00000	17.59000	-90.00000	-450.00000
8	3	-225.00000	404.13598	17.59000	-90.00000	-450.00000
9	4	-225.00000	404.11731	17.15725	-90.00000	-450.00000
10	5	-225.00000	404.04953	16.72924	-90.00000	-450.00000
11	6	-225.00000	403.93738	16.31067	-90.00000	-450.00000
12	7	-225.00000	403.78267	15.90611	-90.00000	-450.00000
13	8	-225.00000	403.58536	15.52000	-90.00000	-450.00000
14	9	-225.00000	403.34933	15.15657	-90.00000	-450.00000

Axis Control

U	W	X	Y	Z
0.000 -	-450.000 -	17.590 -	409.000 -	-656.500 -
1000000.000	1000000.000	9999.000	9999.000	9999.000

SolidCAM 2023 – Setup Sheet Tool Offset Section

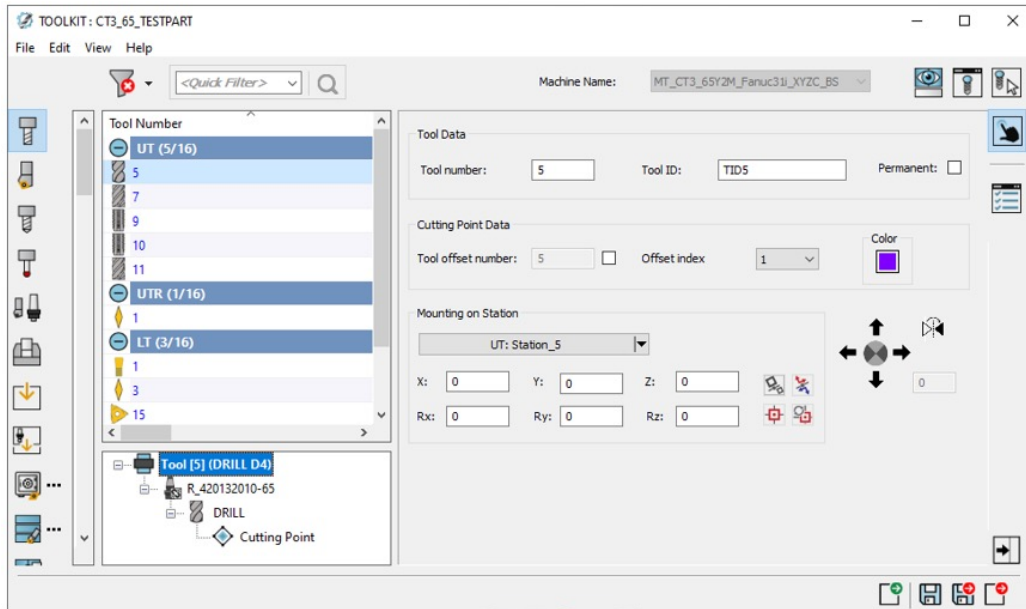
- ❑ Tool Offsets are now fully supported within Tools Section Data
- ❑ It can be also supported as a separate Section
- ❑ Tool Offsets are updated and fully supported also within Operations Section



TOOL LIST									
T-1	T_ID-TOOL_1 (Spindle 1)	T1 - Description (00001-1)	mm						
			D	60	AD	32	Tool Offsets		
			N	4	SD	/	D offsets	H offsets	
			CL	20	SL	40	D offsets	H offsets	
			R	0	Tool Type		D1(A)	H1(A)	
			OHL	30	FACE MILL				
			TL	60	Minimum Z				
			A	90	Minimum Z				
			Pitch	/	-4				
		C8 ER40X100 (C00001) (CHL1) (Comp 1 - Description) (1) (11) ↳ FACE MILL (00001) (HL1) (T1 - Description) (11) (111)							
T-2	T_ID-TOOL_2 (Spindle 1)	T2 - Description (00002-2)	mm						
			D	16	AD	16	Tool Offsets		
			N	6	SD	16	D offsets	H offsets	
			CL	30	SL	30	D offsets	H offsets	
			R	/	Tool Type		D2(A)	H2(A)	
			OHL	40	END MILL				
			TL	80	Minimum Z				
			A	/	Minimum Z				
			Pitch	/	-182,348				
		HSK A 63 ER32X 80 (C00002) (CHL2) (Comp 2 - Description) (2) (22) ↳ END MILL (00002) (HL2) (T2 - Description) (22) (222)							
T-3	T_ID-TOOL_3 (Spindle 1)	T3 - Description (00003-3)	mm						
			D	6	AD	6	Tool Offsets		
			N	2	SD	6	D offsets	H offsets	
			CL	24	SL	30	D offsets	H offsets	
			R	/	Tool Type		D3(A)	H3(A)	
			OHL	50	END MILL				
			TL	80	Minimum Z				
			A	/	Minimum Z				
			Pitch	/	-64				
		HSK A 63 ER32X 80 (C00003) (CHL3) (Comp 3 - Description) (3) (33) ↳ END MILL (00003) (HL3) (T3 - Description) (33) (333)							

SolidCAM 2023 – Setup Sheet Tools Section divided by Channels

Tools Section can now be divided and the output can be per Channel



TOOL LIST

Channel 1 - Upper Left Rotary Turret

T5	T_ID-TID5 (UT 1)	T5 - Description (05-5)	mm
D4	DRILL	TL(80 mm)	Catalog No: 05 Item Cat. No: 05-5
T7 <th>T_ID-TID7 (UT 1)</th> <th>T7 - Description (07-7)</th> <th>mm</th>	T_ID-TID7 (UT 1)	T7 - Description (07-7)	mm
D5.5	END MILL	TL(80 mm)	Catalog No: 07 Item Cat. No: 07-7
T9 <th>T_ID-TID9 (UT 1)</th> <th>T9 - Description (09-9)</th> <th>mm</th>	T_ID-TID9 (UT 1)	T9 - Description (09-9)	mm
D5	TAP	TL(60 mm)	Catalog No: 09 Item Cat. No: 09-9
T10 <th>T_ID-TID10 (UT 1)</th> <th>T10 - Description (010-10)</th> <th>mm</th>	T_ID-TID10 (UT 1)	T10 - Description (010-10)	mm
D5	TAP	TL(60 mm)	Catalog No: 10 Item Cat. No: 010-10
T11 <th>T_ID-TID11 (UT 1)</th> <th>T11 - Description (011-11)</th> <th>mm</th>	T_ID-TID11 (UT 1)	T11 - Description (011-11)	mm
D5.5	END MILL	TL(80 mm)	Catalog No: 11 Item Cat. No: 011-11

Channel 2 - Upper Right Rotary Turret

T1	T_ID-TID1 (UT 2)	T1 - Description (11-1)	mm
VBMT 160404	Ext. Turning	TLM (150.00 mm)	Catalog No: 11 Item Cat. No: 11-1

Channel 3 - Lower Rotary Turret

T1	T_ID-TID1 (LT 10)	T1 - Description (21-1)	mm
Ra0.2	Ext. Grooving	TL (150.00 mm)	Catalog No: 21 Item Cat. No: 21-1
T3 <th>T_ID-TID3 (LT 10)</th> <th>T3 - Description (23-3)</th> <th>mm</th>	T_ID-TID3 (LT 10)	T3 - Description (23-3)	mm
VBMT 160404	Ext. Turning	TLM (150.00 mm)	Catalog No: 23 Item Cat. No: 23-3
T15 <th>T_ID-TID15 (LT 10)</th> <th>T15 - Description (215-15)</th> <th>mm</th>	T_ID-TID15 (LT 10)	T15 - Description (215-15)	mm
Ra0.16	Ext. Threading	TL (150.00 mm)	Catalog No: 215 Item Cat. No: 215-15

Support Partial Envelope – Region Of Interest

CoordSys Data ?

✓ ✗

Coordsys ^

MAC Number:

Position: ←

Create planar surface at Part Lower level

Levels: Planar ∨

Levels: Radial ∨

Translation Data ^

Shift:

Rotation:

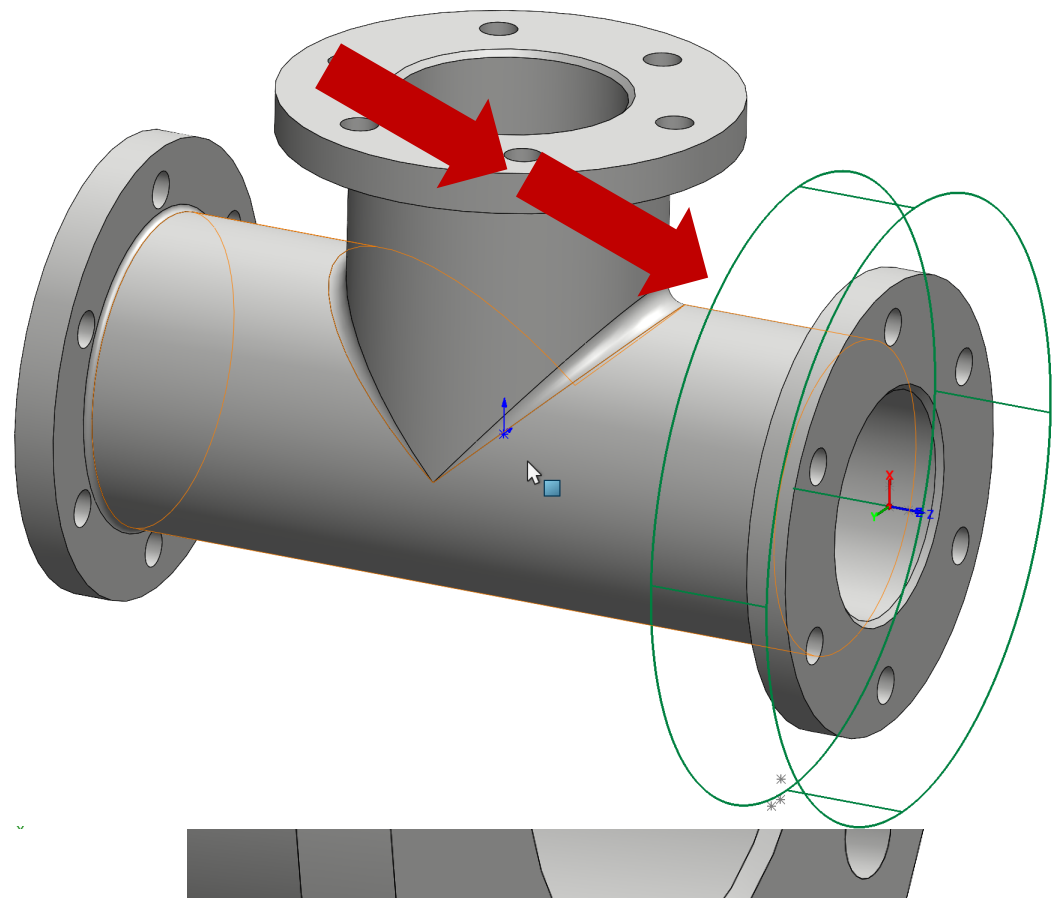
Region of interest ^

Z-:

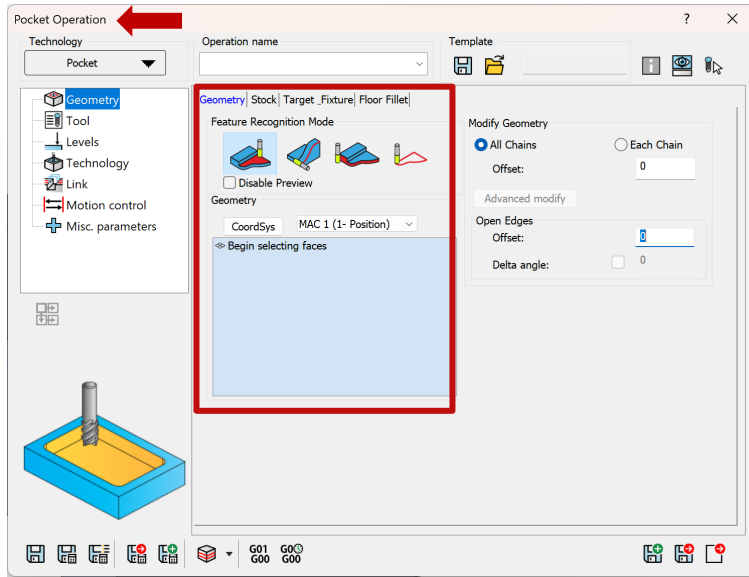
Z+:

Radius :

Preview



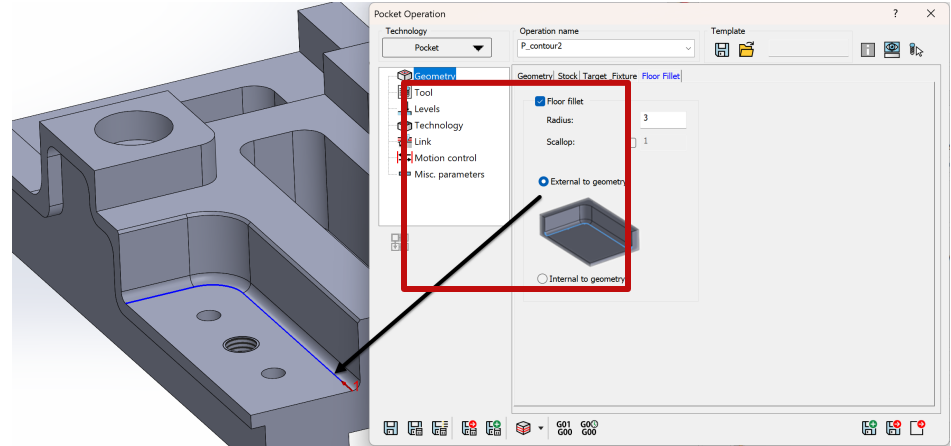
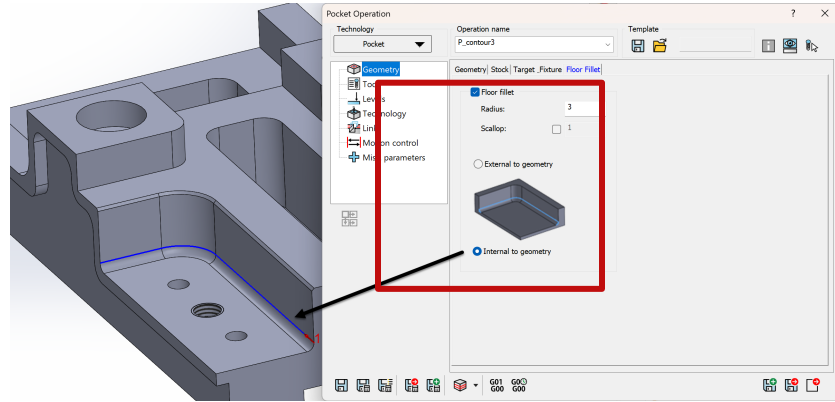
Pocket Geometry Feature recognition as in iMachining



- ❑ Automatically recognizes stock boundaries compared to the target
- ❑ Levels are automatically recognized
- ❑ Fixtures, Target and Holders are completely recognized and protected
- ❑ Profile like geometries can be defined with all the protection benefits offered in Pocket



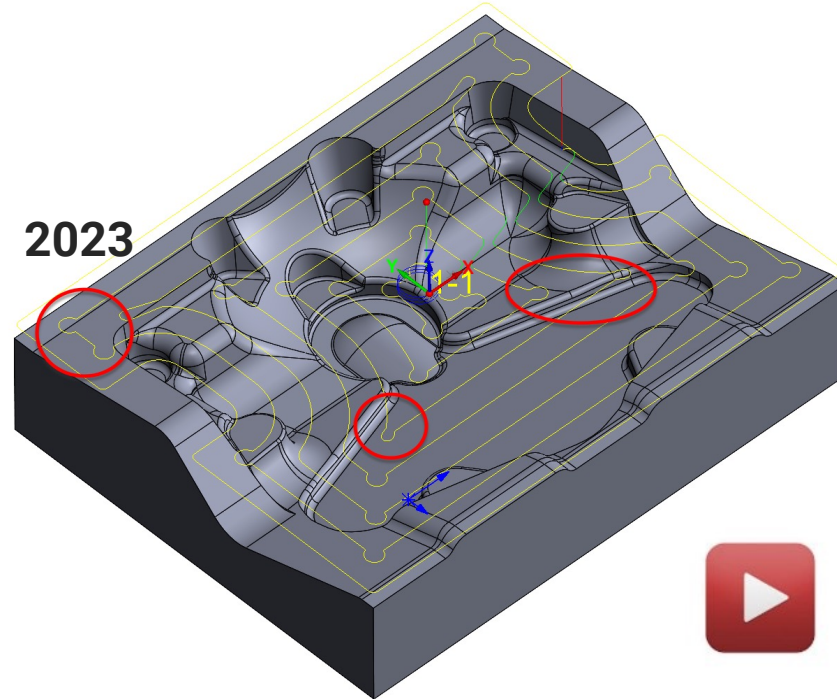
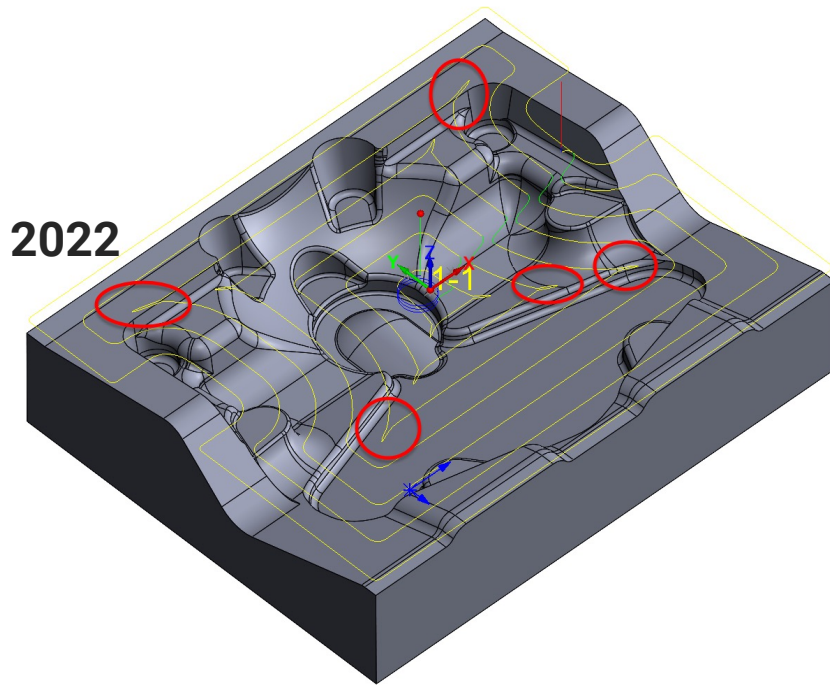
Pocket Operation – Floor Fillet Machining



- ❑ Floor Fillets can now be roughed out in the Pocket operation.
- ❑ Geometry can be either internal or external to the fillet.

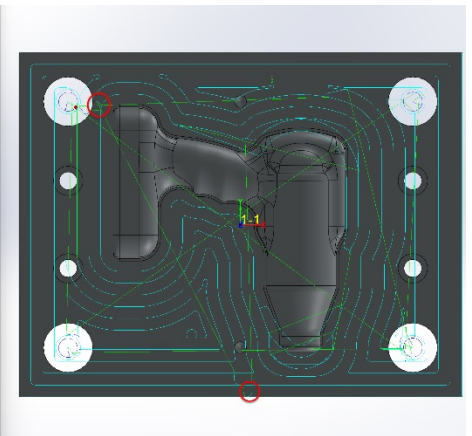
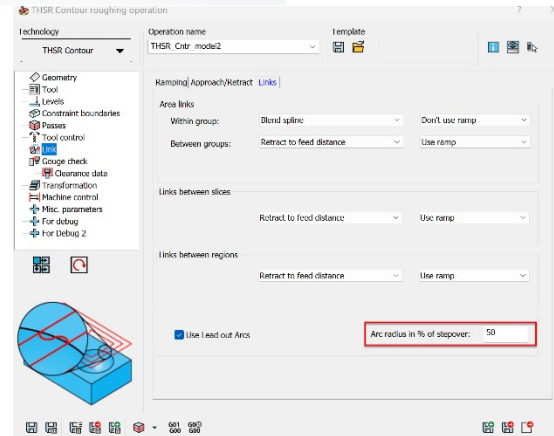
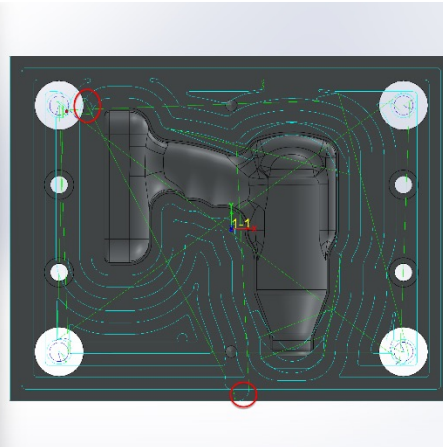
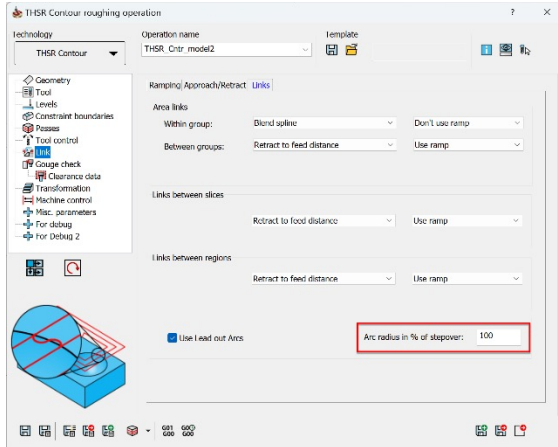


Turbo 3D HSR – Improved Corner Pegs



- ❑ The toolpath at the corners is now smoother, which eliminates the peak load on the tool during cutting.

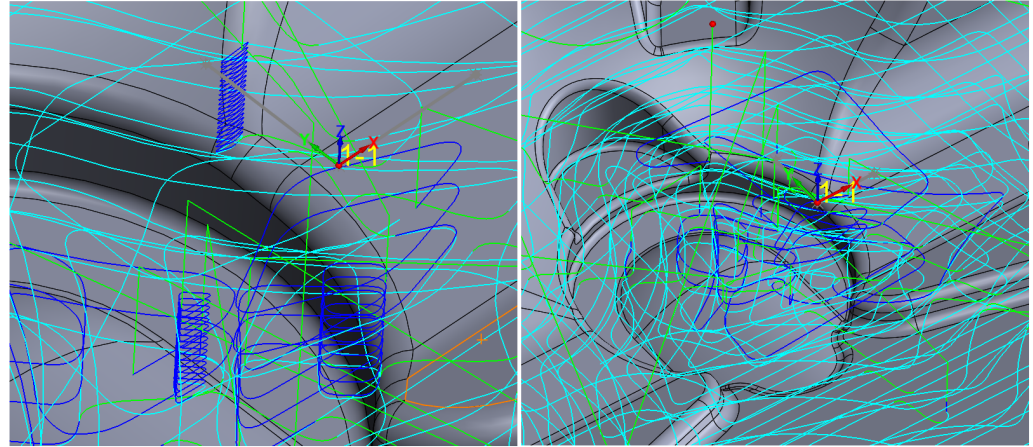
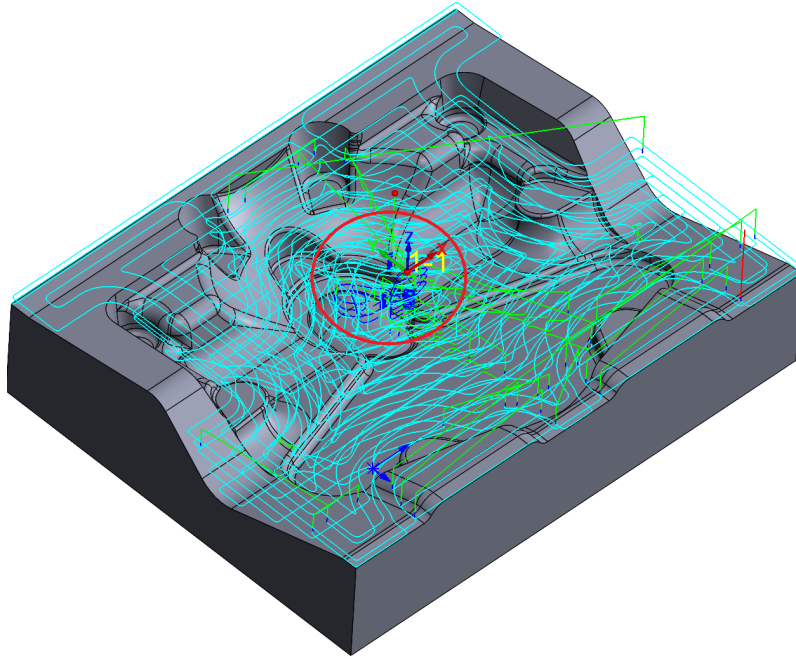
Turbo 3D HSR – Lead Out Control



Lead Out Parameter is now User Controlled.



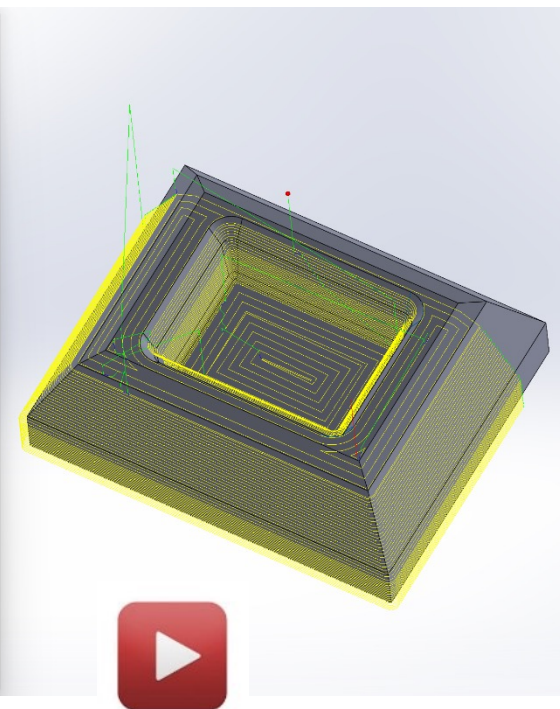
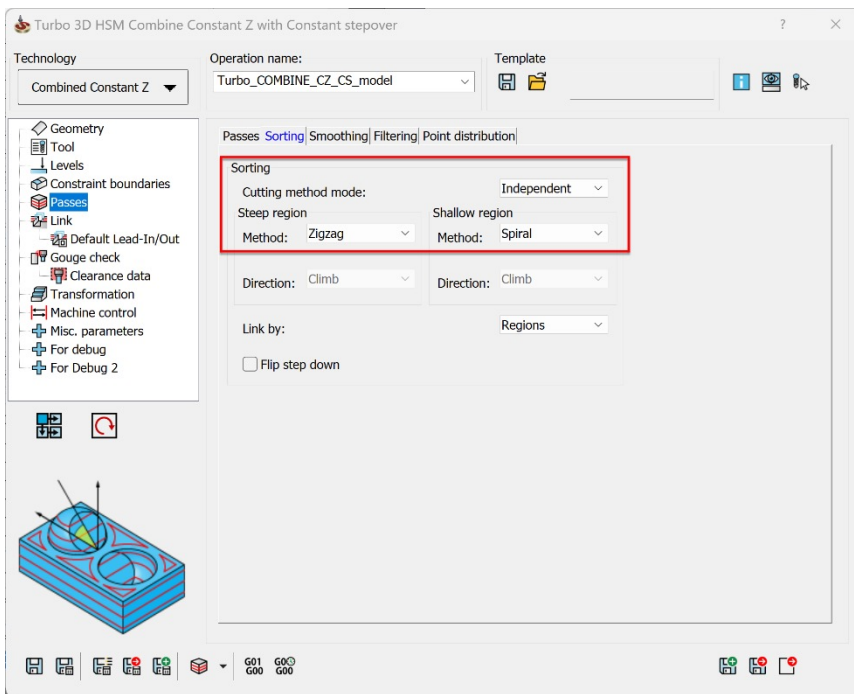
Turbo 3D HSR - Profile ramp/Min. Ramp diameter



- ❑ The logic for Profile ramps creation has been improved - when creating small profile ramps, the template is shifted to the next pass of the tool, which avoids the creation of tiny ramps that are close to the plunge moves.

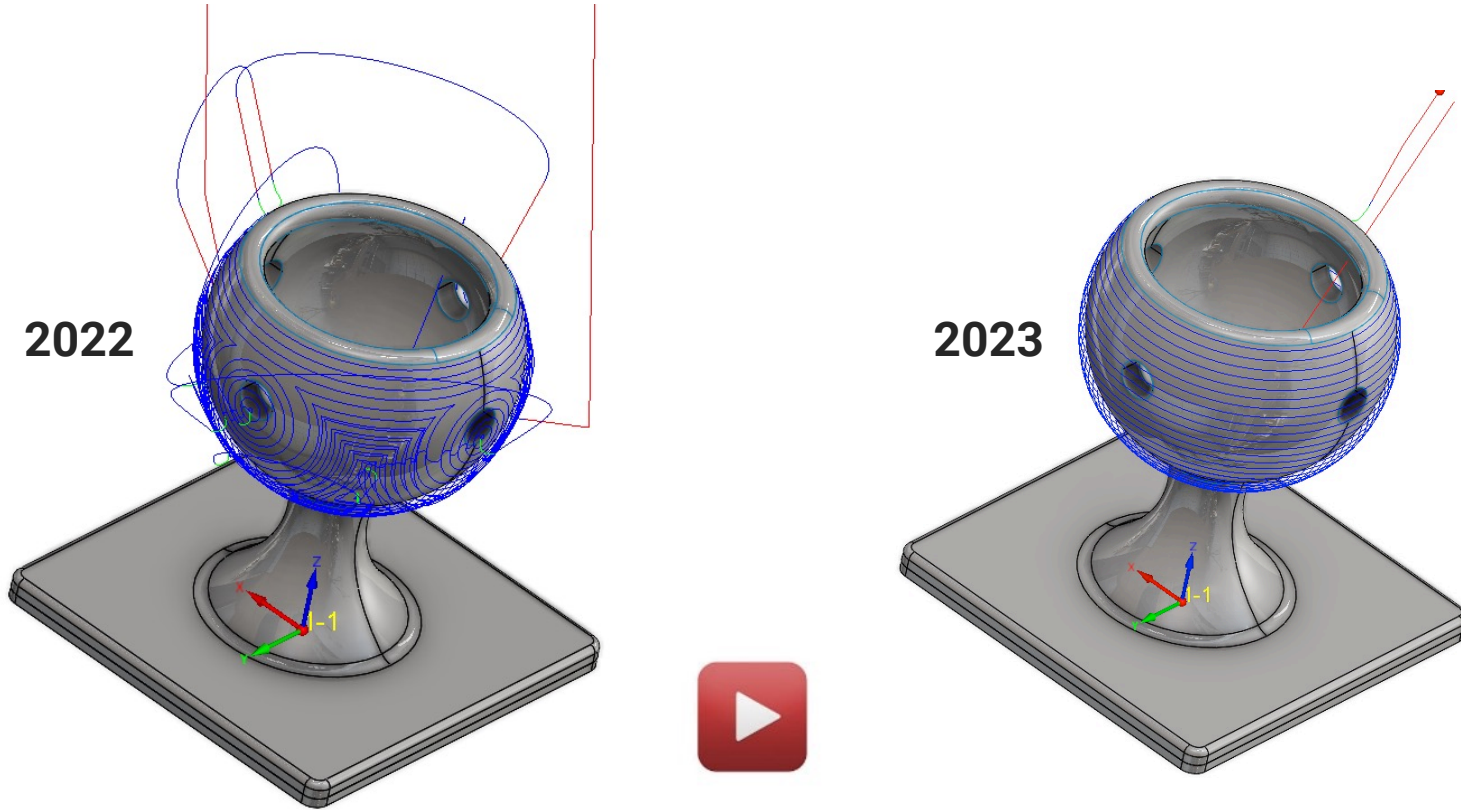


Turbo HSM – Independent Cutting Method



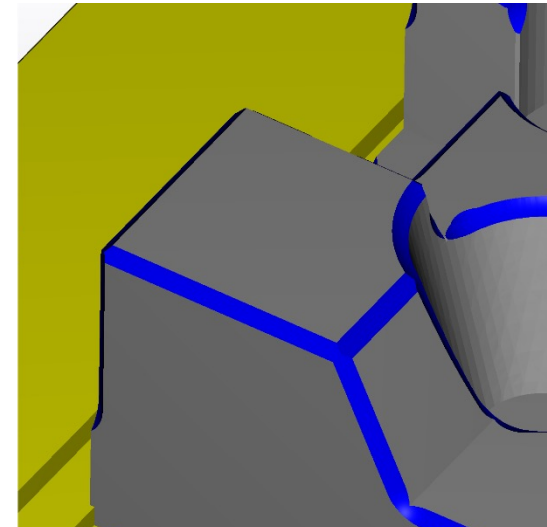
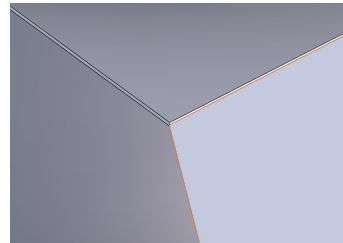
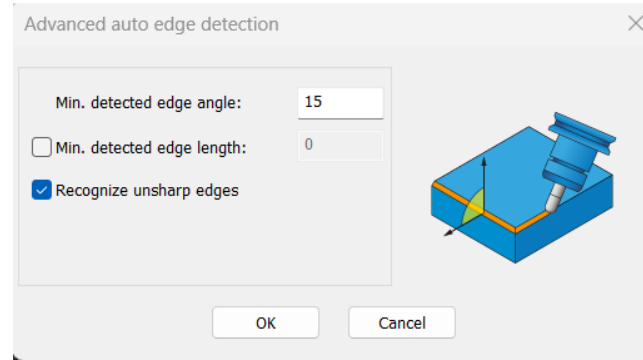
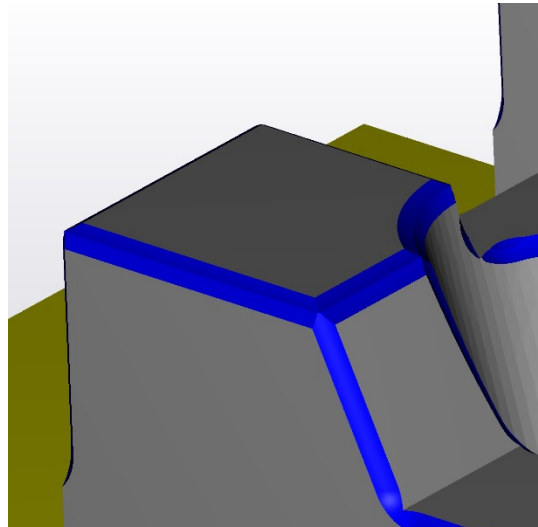
- ❑ The new option enables the user to apply independent cutting methods for the steep and shallow areas.

SIM 5X: Geodesic Machining – Fill Holes Behaviour



- ❑ Fill Holes has been enhanced in SolidCAM 2023 –the toolpath has less pattern distribution & more intuitive drive curve selection

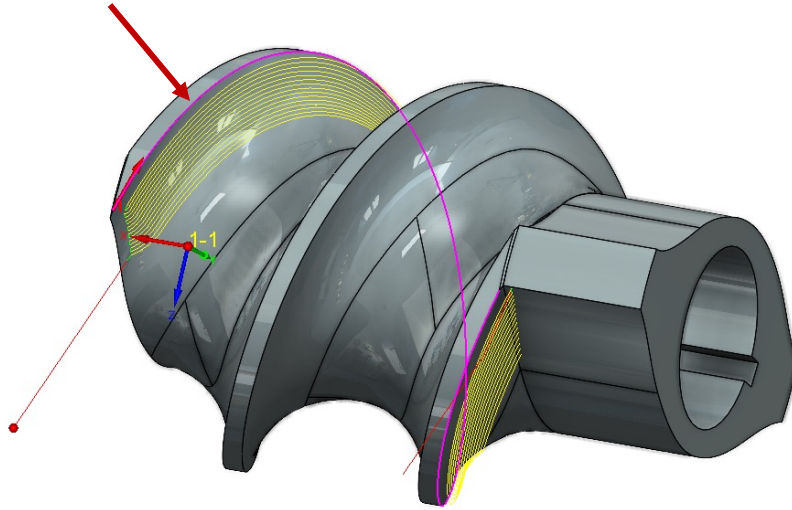
SIM 5X: Edge Breaking – Recognise not sharp Edges



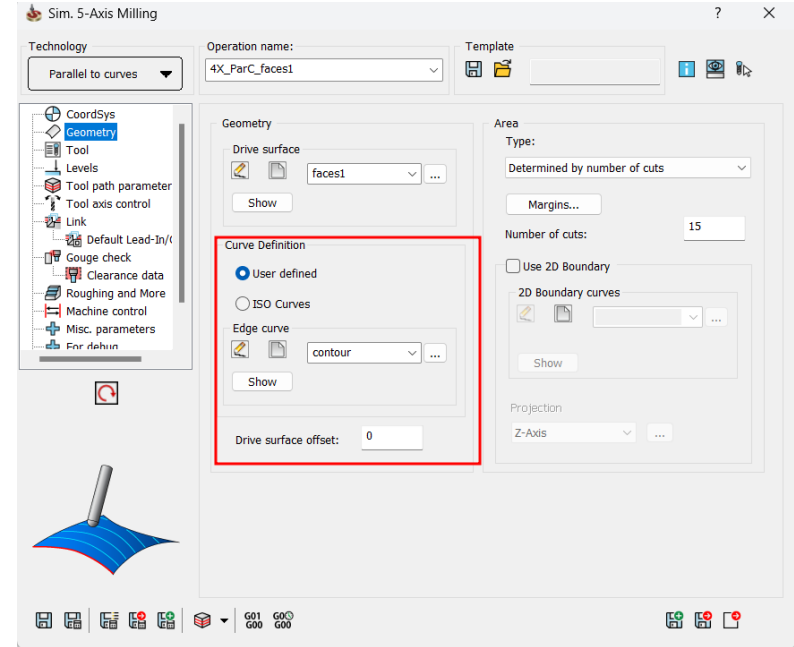
- ❑ This feature deburrs the edges that cannot be identified from the input mesh, using the "Min. detected edge angle" threshold.



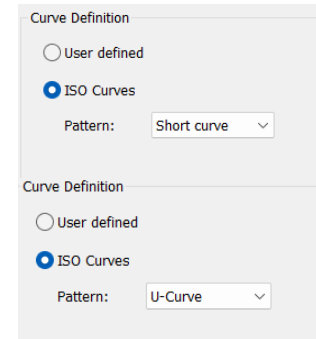
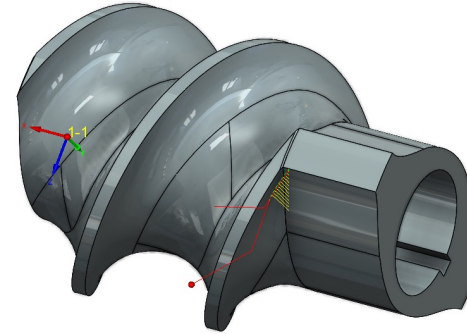
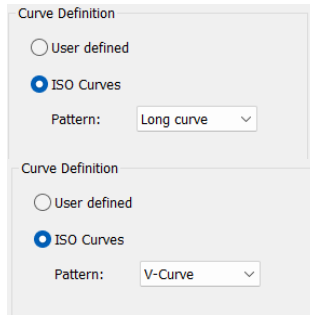
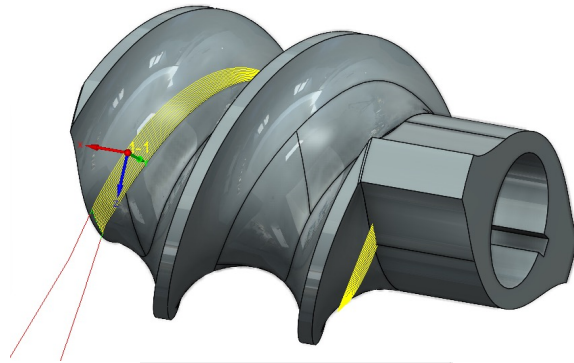
SIM 5X – Curve Definition



User Defined Curve Method



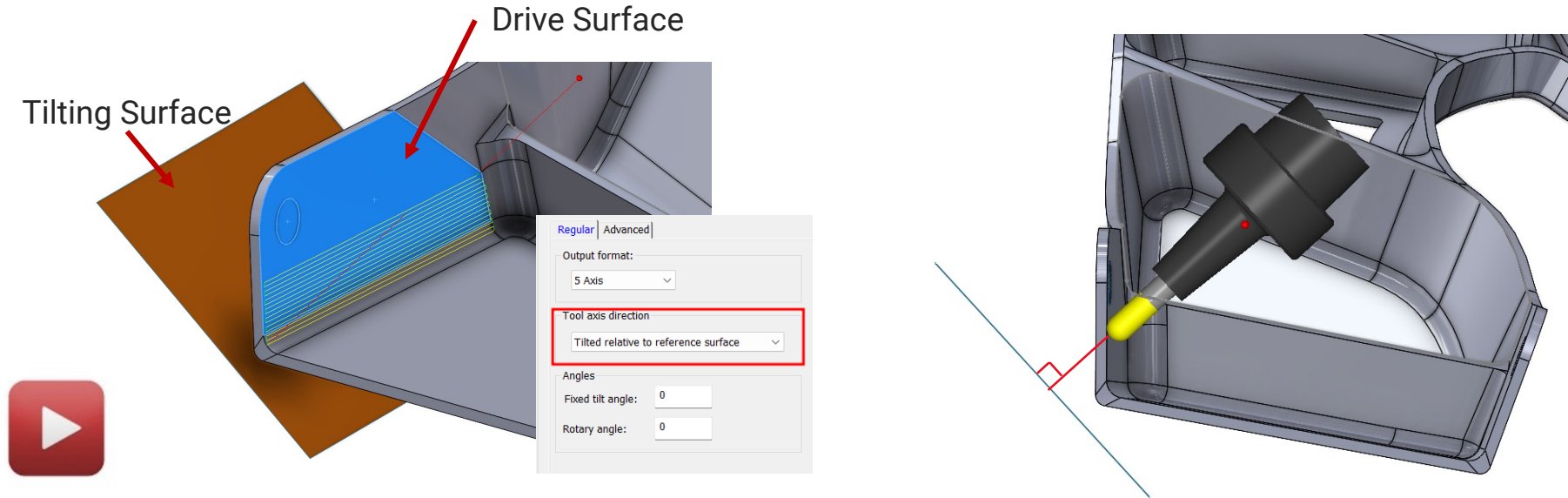
SIM 5X – Curve Definition



❑ Pattern can follow Long Curve / Short Curve / U Direction & V Direction of Surface.

❑ No need to define any curves - curve selection is done Automatically.

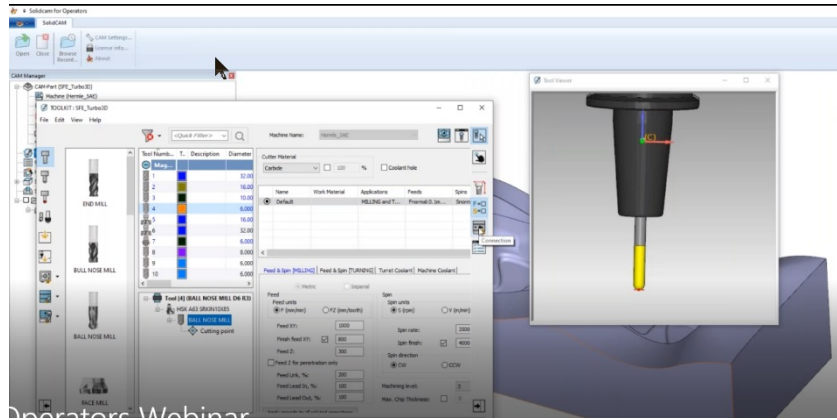
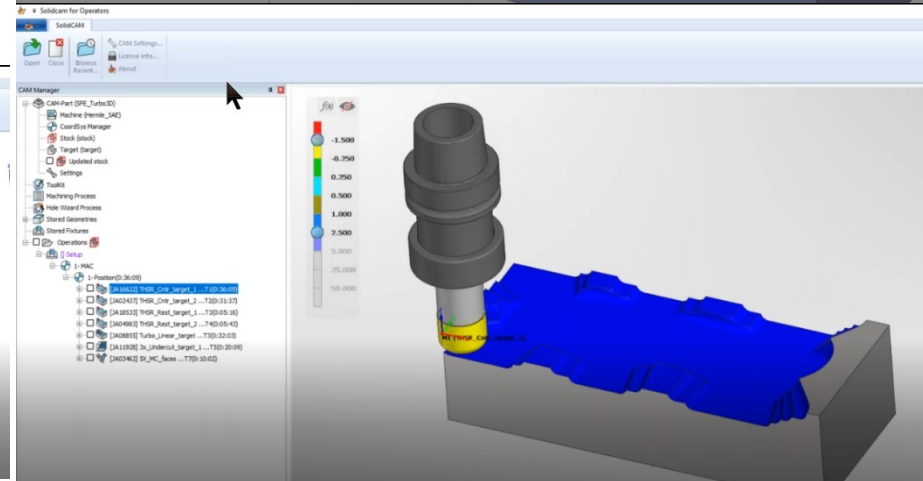
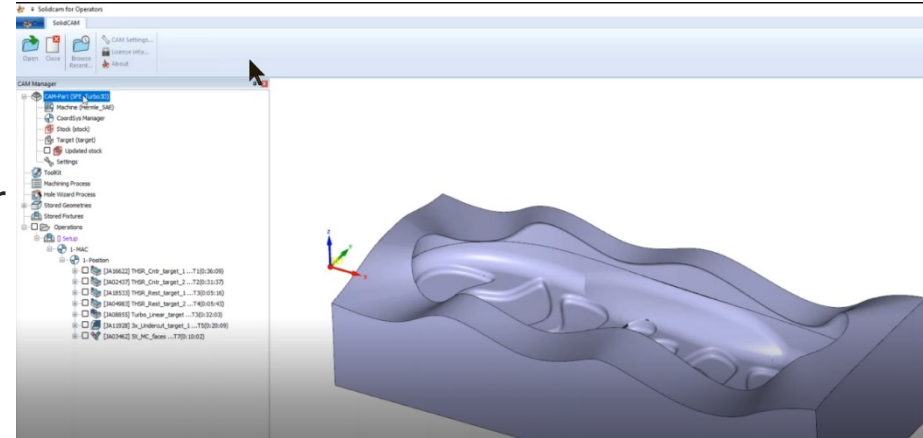
SIM 5X – New Tilting



- ❑ Tool Axis Tilting can now be performed with a reference surface.
- ❑ User Selects a reference surface & the Tool uses the tilt angle in reference to the tilt surface & not Drive Surface.

SolidCAM for Operators

- Upgrade of the **Shop Floor Editor/Simulator**
- Essential tool** for the CNC machine Operator
- Bridges the work of **CAM Programmers** and **CNC machine Operators**, and thus assists greatly to streamline the Machine Shop process.



CNC Machine Shop/ Department Hierarchy

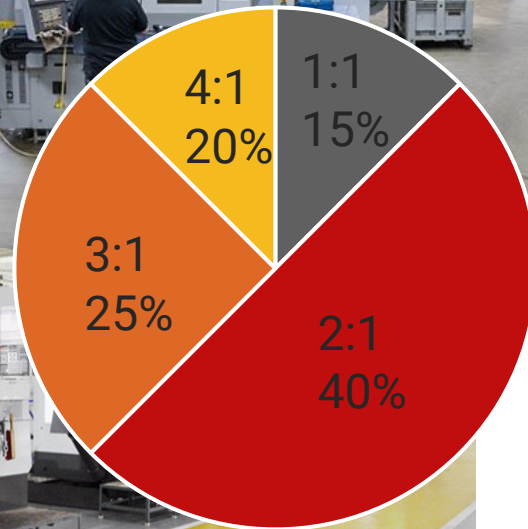
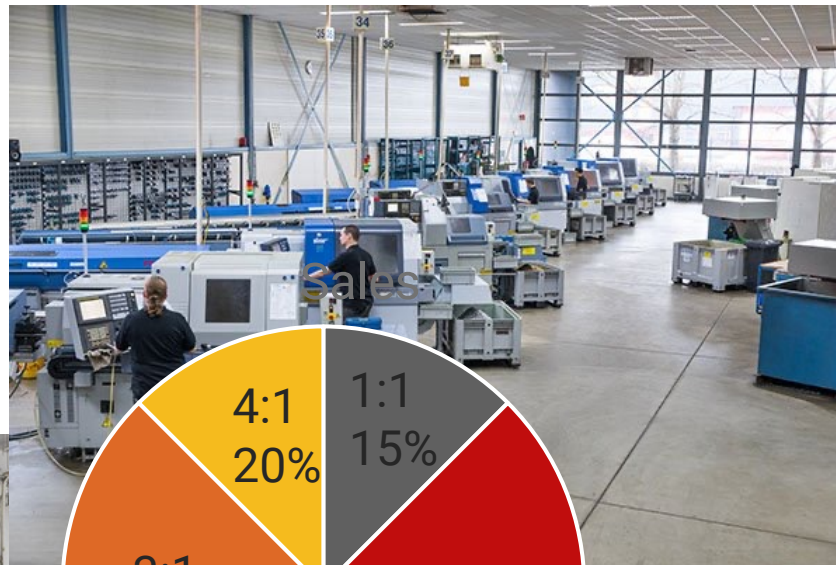
Programmers



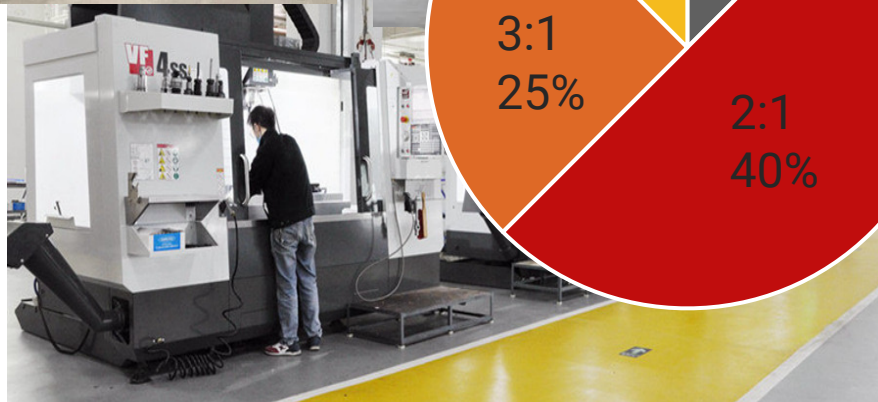
Operators



CNC Operators:CAM Programmers – Typical Ratio

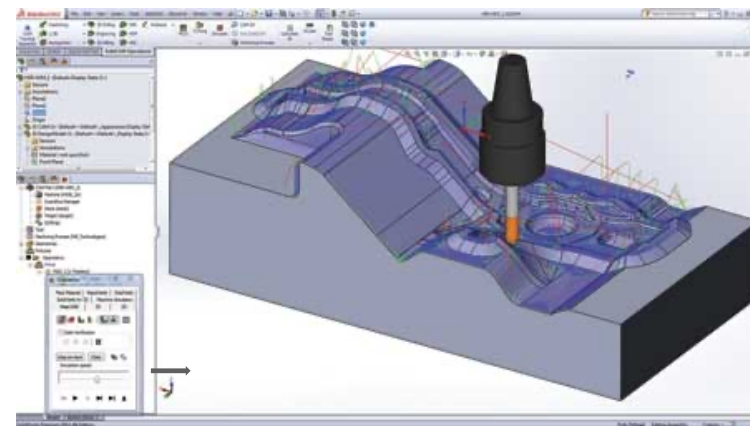
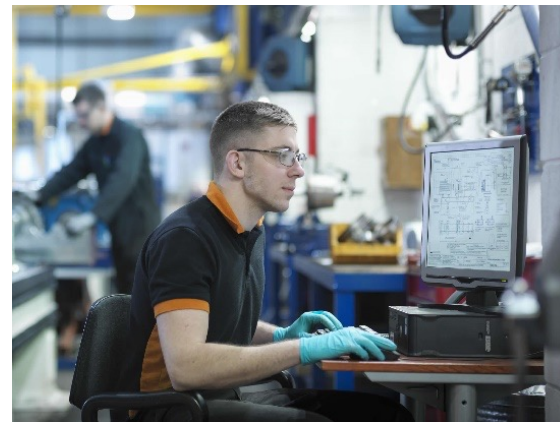


- 1 -3 CNC
- 4 -10 CNC
- 10 -30 CNC
- > 30 CNC



SolidCAM for Operators: The Goal

- To bridge the work of CAM Programmers & CNC machine Operators
- Assists greatly to streamline the Machine Shop process.



Why CNC Operator needs SolidCAM For Operators?

01

Clearer Picture for setup and prove outs

02

Change Minor Gcode Parameters

03

Preventing Crashes, broken tools, scrap parts

04

Stronger relationship between Shop and programming

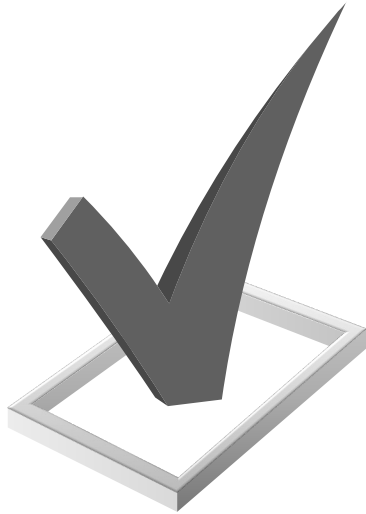
05

Improve skills, help transition to Programming

SolidCAM for Operators: 3 Different Licensing Modes



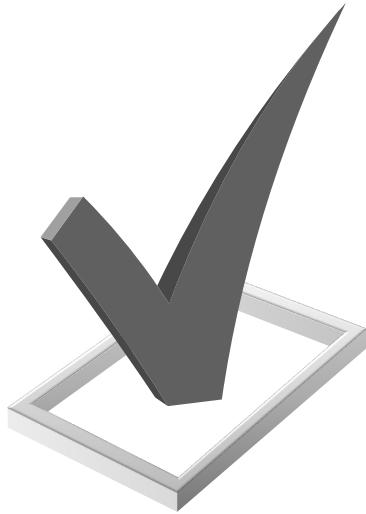
SolidCAM for Operators Mode 1: Editor



- Modify and edit** operations
- Change** tool kit
- Change** Part Setup
- Full Simulation**
- Generate G-Code**



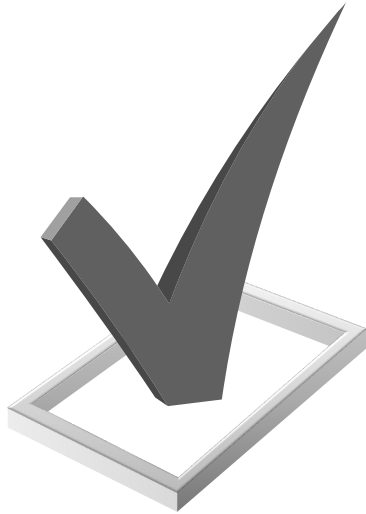
SolidCAM for Operators Mode 2: Editor LT



- View all operations**
- Change** tool kit
- View Part Setup**
- Full Simulation**
- Generate G-Code**



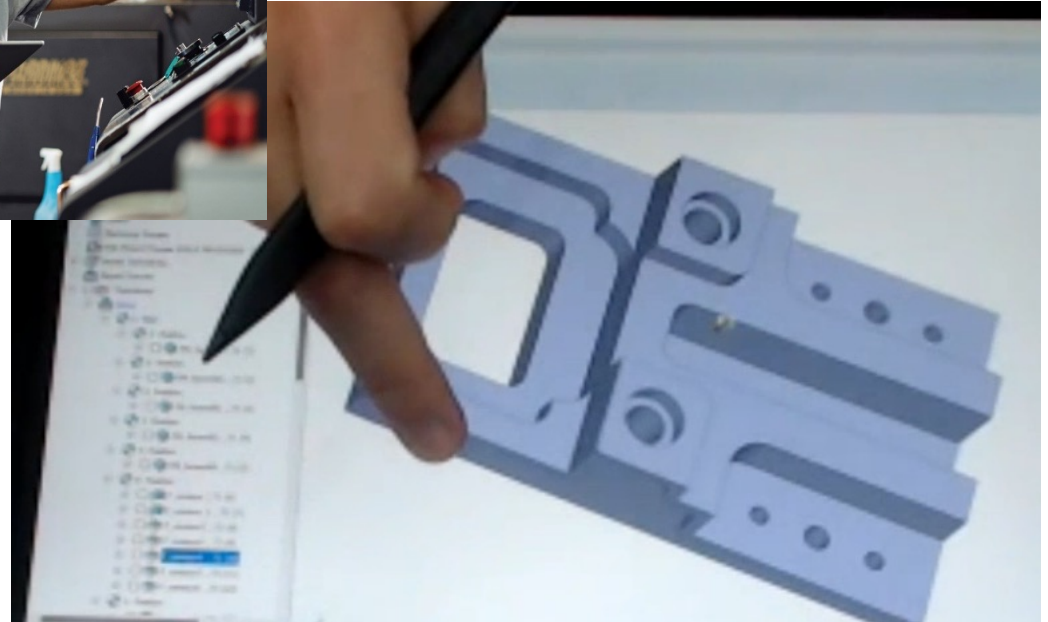
SolidCAM for Operators Mode 3: Simulator



- View all operations**
- View tool kit**
- View Part Setup**
- Full Simulation**
- Generate G-Code**



SolidCAM for Operators: right by the CNC machine!



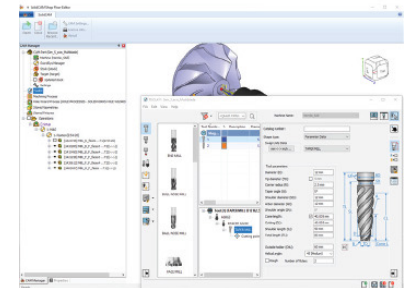
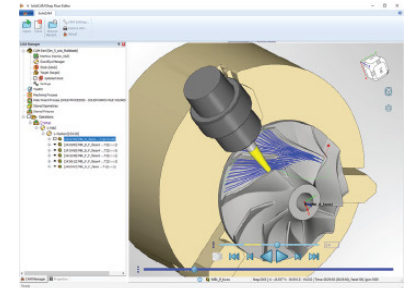
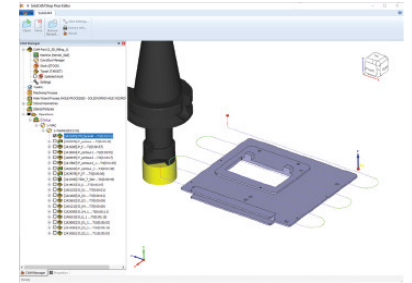
SolidCAM for Operators: Benefits summary

Preventing Machine and Cutting Tool Damage:
Operators see full solid and machine simulations

Working Efficiently: Operators can make minor adjustments, without need to rely on the CAM Programmer

Full Setup Picture: Operator can see all details of each operation including Tools, Setup Definition, Stock Clamping, Home Positions, and full simulation of the process.

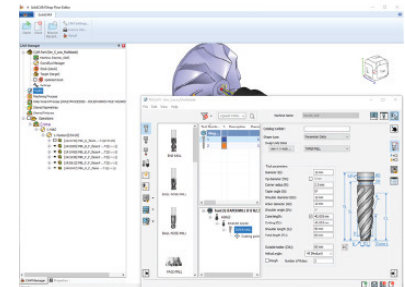
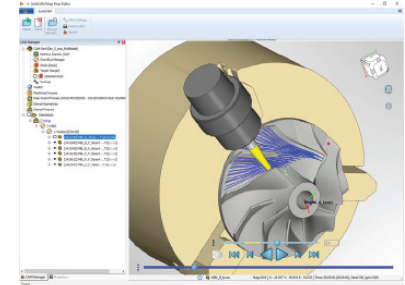
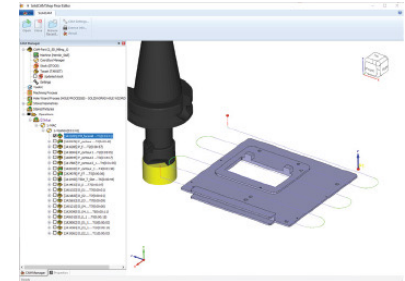
Eliminate 'Dry-Runs': SolidCAM for Operators enables the user to step-through each move in program, reducing setup time & eliminating the need to dry-run programs on the CNC.



In summary..

SolidCAM for Operators is a great tool for all Operators at CNC Machine Shops using SolidCAM.

SolidCAM for Operators bridges the work of CAM Programmers and CNC machine Operators, assisting greatly to streamline the Machine Shop process.

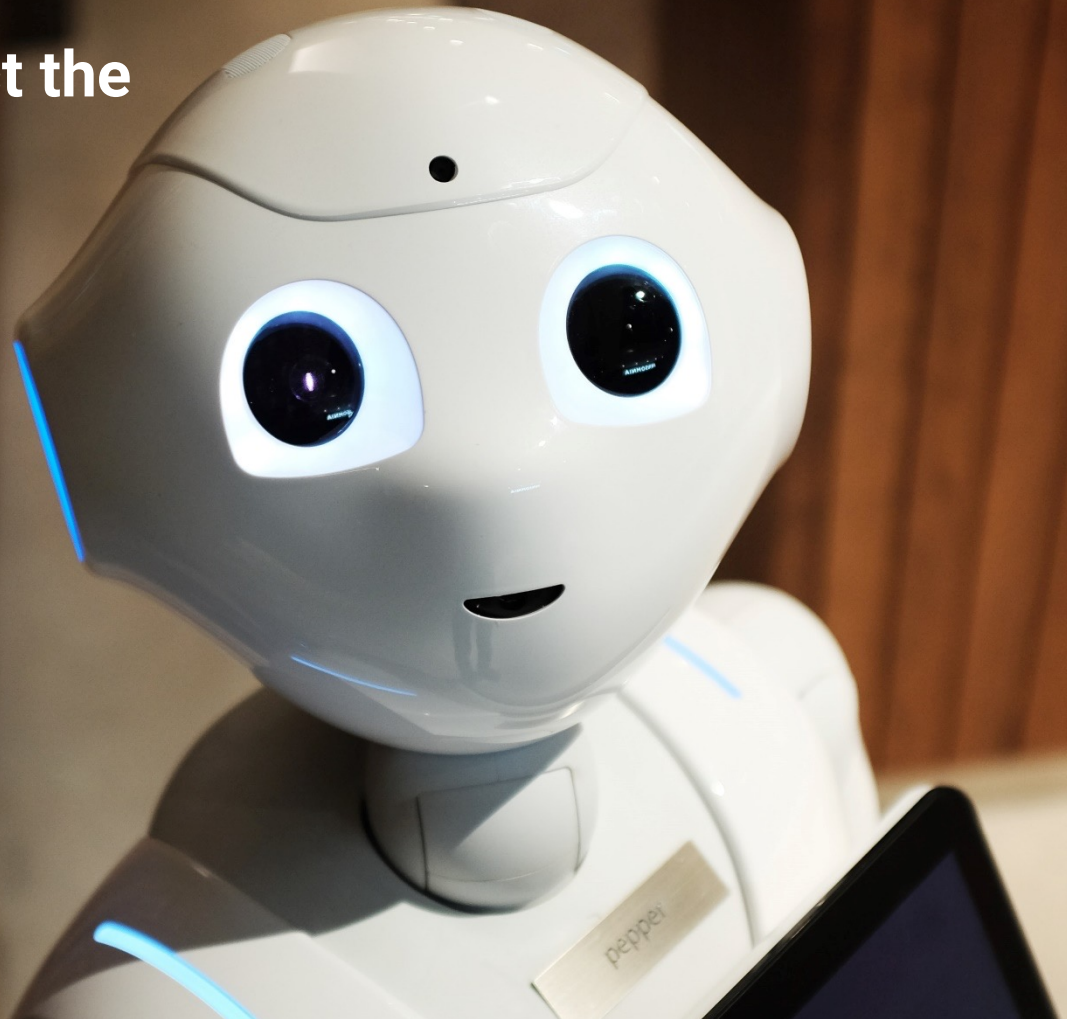


"The best way to predict the future is to create it."

– Peter Drucker

SolidCAM

THE FUTURE OF CAM



THANKS FOR WATCHING

