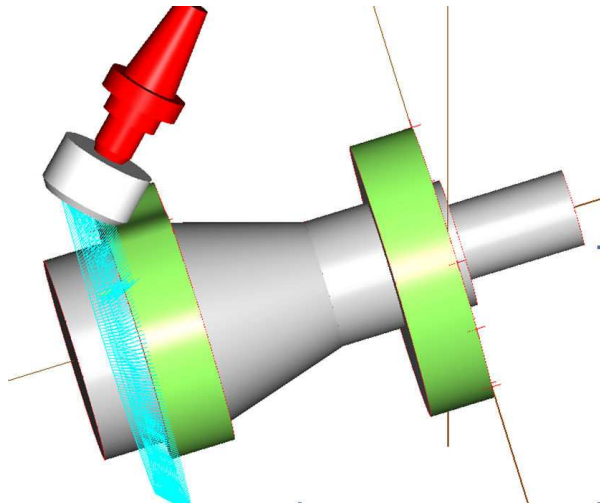


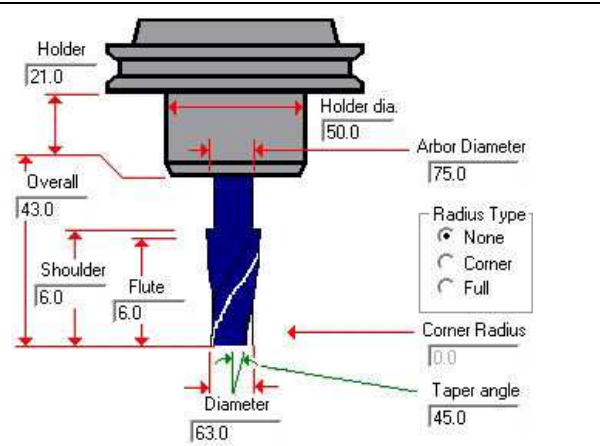
## Finishing a CAM form on a Mill/Turn machine

This example looks at machining techniques for finishing a CAM type component on a Mill/Turn lathe. Mill/Turn machines are becoming more popular providing manufacturers with the benefits of single set up machining.



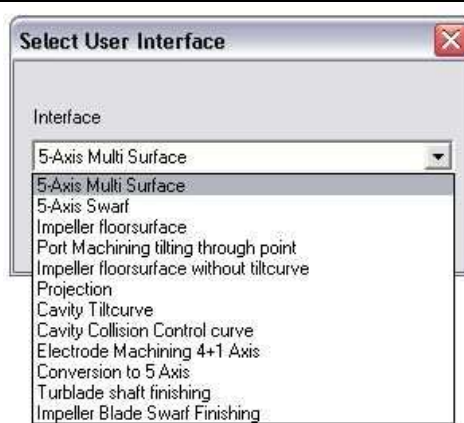
Screenshots and graphical images are taken directly from the extensive ModuleWorks test harness application supplied to all of customers. Depending on implementation the target application may use different user interfaces and graphical display methods.

This example uses large diameter (63mm), 45° tapered tool as shown.

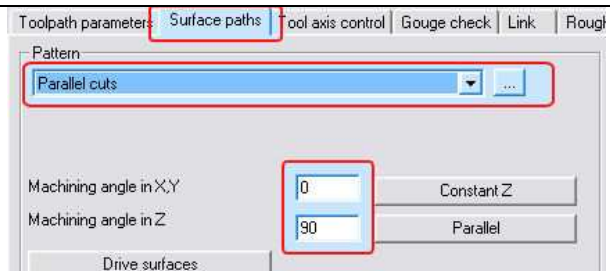


The next stage is to open the native geometry file, in this case “camshaft\_5ax\_lathe” and select the 5-Axis Multi Surface interface.

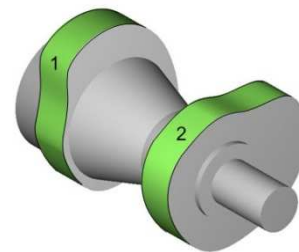
As can be seen in the dropdown options, ModuleWorks has a number of strategies each tuned to specific applications.



Having selected the user interface, the next step is to select machining strategy. Select *Parallel Cuts* strategy with a 0° angle in the XY and 90° in the Z plane.



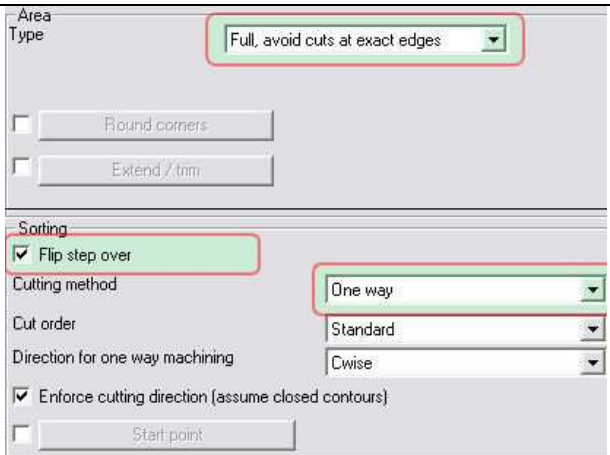
Specify the *Drive Surface* by clicking the button and selecting surface No.1 as shown in the illustration.



Set the area type to *Full, avoid cuts at exact edges*. With this setting the tool path will be generated on the whole surface but will avoid the surface edges, useful when the boundary of the drive surfaces is not smooth

Activate *Flip step over* to allow machining to start from the opposite side, in this case the left side of the component.

Select the cutting method to *One Way* to allow the tool to move along its tool path in one direction. A *Zig Zag* method would alternate direction with each cut.



In the surface quality settings select a *Cut Tolerance* to 0.05 to control the accuracy of the tool path.

Activate *Distance* and set to 3 mm. This will generate more points and better surface finish on the flat surfaces.

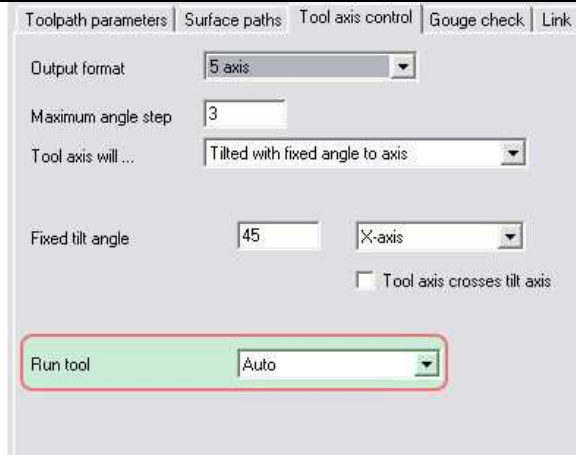
The *Maximum stepover* is 5 mm, this value controls the distance between two neighboring cuts.



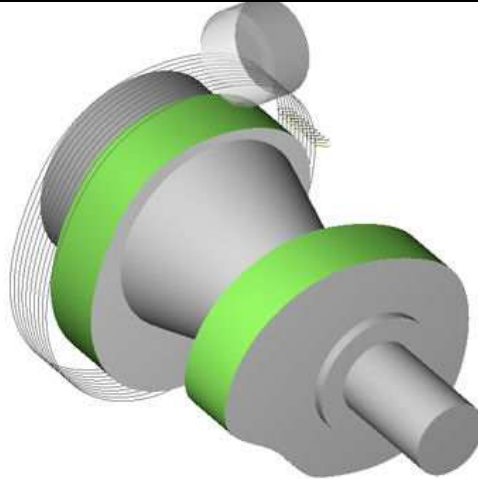
On the Tool axis control page select *Tilted with fix angle to axis* strategy so the tool axis is will be tilted from the tilt axis towards the surface normal. The tilt axis can be the X, Y and Z axis or any line created in the geometry.

Specify a *Fixed tile angle* of 45°. This value describes the tilt from the defined tilt axis direction. In this case we set 45° to the X axis.

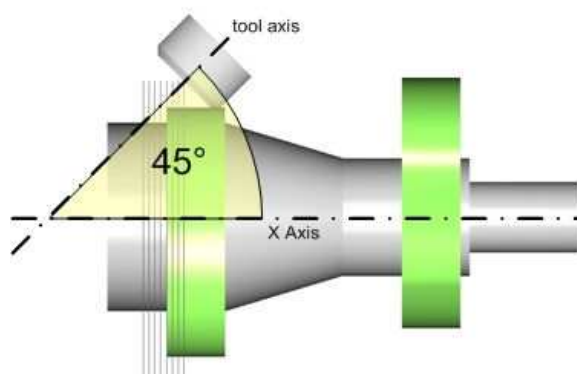
Let the system control the contact point between tool and surface by setting '*Run tool*' to "Auto"



Complete the operation and view the results.



As can be seen, the tool axis tilts 45° to the X axis and the toolpath movement is from left side to right.



Next machine the other CAM by tilting the tool in the other direction to avoid collision with the tail stock.

To create the tool path on the other side first copy the previous operation and edit the new dialog.

Change the tool *Fixed tilt angle* from 45° to 135° (around the X-axis).

Toolpath parameters	Surface paths	Tool axis control	Gouge check	Link
Output format:	5 axis			
Maximum angle step:	3			
Tool axis will ...	Tilted with fixed angle to axis			
Fixed tilt angle:	135	X-axis		
<input type="checkbox"/> Tool axis crosses tilt axis				

Select the green surface no. 2 as drive surface.

Deactivate the 'Flip step over' to generate the machining right to the left.

Complete the operation and view the results. The tool axis tilts 135° to the X axis during machining.

