Performance Enhancing Solutions

Feedrate Optimizer

FEEDRATE OPTIMIZER ADVANTAGES:

INCREASE PRODUCTIVITY

Grinding times and machine running costs are significantly reduced by setting optimal feedrates

CONTROL WHEEL WEAR

Use wheels at their optimum feedrates to extend wheel life and reduce dressing intervals.

FAVOURABLE GRIND DIRECTION

Recommendation to grind backwards or forwards will minimise wheel load and distribute it evenly

AVOID COLLISION WITH NON-BOND SECTION OF THE WHEEL

Progressive simulation detects dangerous grinding condition

This new extension to ToolStudio provides the ultimate means to manage feedrates and control wheel and machine loads.

Feedrate optimization uses ToolStudio's intricate knowledge of grinding moves, wheel model and the tool simulation model to calculate the instantaneous wheel load and machine load, to precisely set the optimum feedrate at a given point in time. At every point, the feedrates are set based on user specified wheel load and the actual wheel load. Moves with low wheel load are sped up and, importantly, moves that exceed the desired wheel load are slowed down.

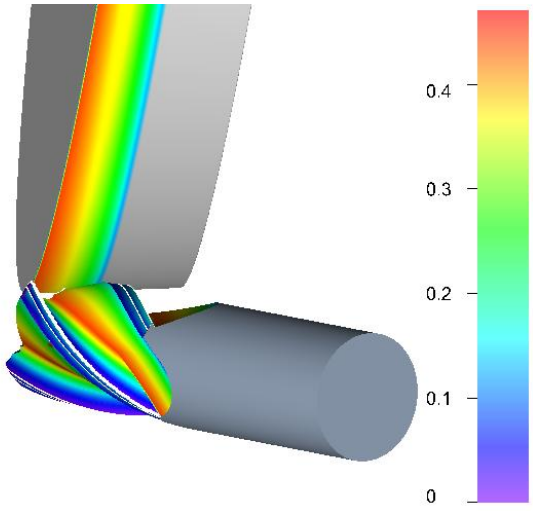
Wheels are designed for use at certain feedrate, too fast or too slow causes wheels to not perform at optimum condition.

With feedrate optimization, the wheel is guaranteed to perform within a specified load.

-An existing standard 10mm Square End Endmill can be optimised with a single click to save 13% grinding time.
-More careful analysis will yield a saving of 19%.
-For complicated tools, savings of 40% and more are possible

Wheel Load Management

- Load that each wheel is subjected to can be analysed and visually examined in a 3D simulation model or a 2D plot
- Inspect which parts of the tool are being ground under heavy load, spotting problems in surface quality before grinding the tool
- Examine and eliminate dangerous spikes in grinding load. The spikes in grinding load result in sudden wearing of wheel, leading to more dressing and inaccurate tools
- Estimate the pattern of wheel wear



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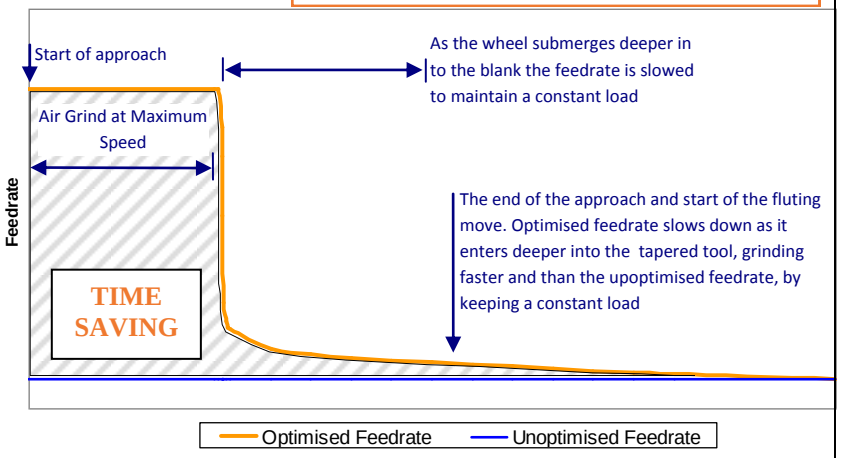
Time Saving

Detailed wheel load analysis at sampled points allows feedrate to be increased and decreased to according to a desired value.

The geometry of the tool is preserved as the axes positions remain untouched and only the feedrates are modified

Time saving is achieved through
-eliminating air grind conditions and
- setting optimum feedrates for grinding moves.
That delivers a significant advantage over unoptimized feedrate where the point with the greatest wheel load governs the slowest feedrate, applying it to the entire move



An example of a feedrate profiles that are generated for a fluting move in a tapered tool

DETERMINE OPTIMUM SEQUENCE OF OPERATIONS

This advanced feature will rearrange operations order to minimises wheel load and optimises grinding time

SEAMLESS INTERGRATION

With addition of few extra buttons, feedrate optimisation feature works with the existing installation of ToolStudio and for existing tools

SIMPLE TO USE

One click approach for existing IDNs

Simple to Use

Existing IDNs can be optimized with the ease of one click. Firstly, progressive simulation analysis determines the profile of the wheel load.
After that, the feedrate is optimized to maintain constant wheel load throughout the move.

Using this simplified approach, a standard 10mm square end mill, with a grinding time of 5:21 min can be reduced to 4:39 min, a SAVING of 13%.
A slightly more careful analysis which takes into account wheels shared between operations results in a grinding time 4:20 min – SAVING of 19%

Grind	OK	M	C	Clr	Operation	R-P	Appr	ΣNc...	ΣN...	L-O	R-R	Time
☑	✔	☑			End Of Tool Probing							00:05
☑	✔	☑			Fluting			0	0			02:28
☑	✔	☑			Gash			0	0			00:30
☑	✔	☑			Notch			0	0			00:08
☑	✔	☑			2. Od Clearance			0	0			00:46
☑	✔	☑			1. Od Clearance			0	0			00:47
☑	✔	☑			2. Ef Clearance			0	0			00:17
☑	✔	☑			1. Ef Clearance			0	0			00:16
☑												05:21

Time
00:05
02:07
00:21
00:05
00:40
00:32
00:14
00:13
04:20

Grinding time saving for a standard 10mm 4 flutes Square End Endmill