



: nc optimizer

fast and intelligent toolpaths

Cutting milling costs and machining times in die and mold production.

The production of complex dies and molds is part of your daily routine. To stay ahead of the competition, fast and cost-effective machining is essential. This requires a close and efficient interaction between all elements of the process chain – CAM system, milling machine, control system and cutting tools. By automatically adapting the feed rate to changing machining conditions, NC Optimizer helps you tap the unused potential of your operating resources. This optimizes the performance of both machine and tool to cut actual milling times by up to 20 percent.

Optimizing feed rates to cut costs.

NC Optimizer analyses and then optimizes your NC programs. Based on a simulation of the machining sequence, NC Optimizer calculates the volume of material to be removed for any tool position as well as the resulting tool loads. In areas with low cutting volume and favorable milling conditions, NC Optimizer increases the feed rate. In critical areas the feed rate is not changed. With the modified NC program, the machine tool works with a higher average feed rate to cut machining times and optimize the utilization of your available machines.

Fast, reliable milling.

In a simulation of the machining process, NC Optimizer determines the loads that would be generated in the actual process and compares these values with the tool's user-

specified load limit. NC Optimiser then automatically detects any critical areas and reduces the feed rate to prevent costly tool damage and potential scrapped workpieces.

Process chain integration.

The NC programs generated with your CAM system are automatically processed by milling machines and controllers. NC Optimizer integrates seamlessly into the process chain, fitting neatly between CAM system and machine controller. Highly customizable, it interfaces with your CAM system, from which it receives the information it needs to optimize the NC program. NC Optimizer runs almost fully automatically with minimal user input.

feed rate adaptation reduces machining times and tooling costs

direct cost savings through reduction of machining time by up to 20%

state-of-the-art information technology for fast, reliable production

seamless integration in the CAD-CAM process chain – no added costs

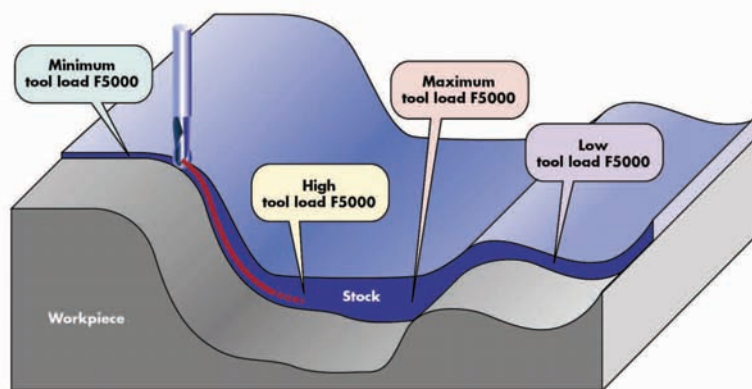
no need for expensive add-on machine hardware

enhanced process reliability through peak tool load monitoring

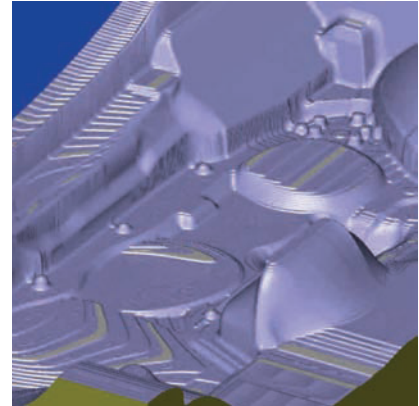
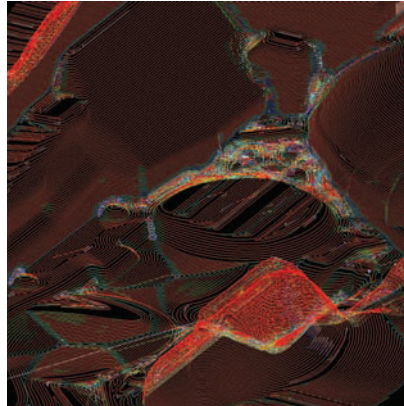
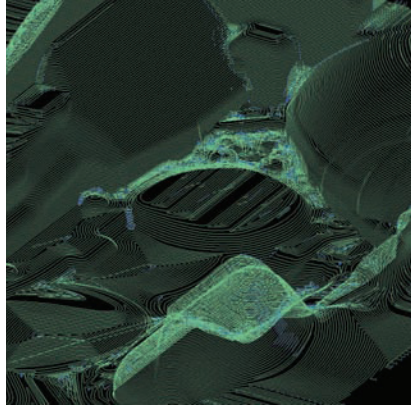
close detail inspection of workpiece surface before production

Fast simulation

To make an optimization viable for one-off production, the software must – in addition to integrating seamlessly – be fast so as to minimize processing times: A fast optimization process cuts the total production times, reducing the process's overall efficiency. NC Optimizer is capable of rapidly processing even very large NC programs. Customers include manufacturers of large sheet metal forming tools with NC programs exceeding 100 MB in size.

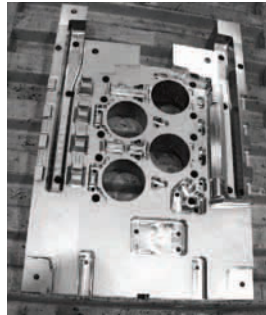


By automatically adapting the feed rate to changing machining conditions, NC Optimizer helps you tap into the unused potential of your operating resources.



Reducing tool costs.

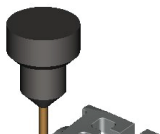
One might assume that the feed rate adjustment works purely on the principle "less material = faster the feed rate". This is far from the truth: Often, machining conditions can be unfavorable even if only a small amount of material is removed. In roughing on a constant Z-plane, for example, the cutting tool may encounter raised workpiece sections located centrally within its path. Approaching these with a cutting insert tool at high speed can cause tool vibration, which would dramatically reduce the tool inserts' service life. NC Optimizer's adaptive feed rate control detects such situations and reduces the feed rate accordingly to increase tool life.



NC-Program	Tool Diameter / Corner Radius	Feedrate		Machining Time			
		Min.	Max.	Original	Optimized	Saving	Portion
01	20.0 / 5.0	2500	4000	0:53:20	0:38:39	0:14:41	27.3%
02	20.0 / 5.0	2500	4000	3:27:40	2:38:07	0:49:33	23.9%
03	10.0 / 5.0	2750	3750	2:01:21	1:17:10	0:44:11	36.4%
04	12.0 / 6.0	2750	4000	2:27:01	2:01:20	0:25:41	11.2%
05	12.0 / 6.0	2500	4000	3:03:36	3:02:36	0:01:00	0.3%
06	8.0 / 4.0	2000	3200	1:44:31	1:30:51	0:13:40	13.1%
07	6.0 / 0.5	1500	2500	1:37:16	1:17:03	0:20:13	20.8%
Sum:				17:14:44	14:25:46	2:48:58	16.3%



NC-Program	Tool Diameter / Corner Radius	Feedrate		Machining Time			
		Min.	Max.	Original	Optimized	Saving	Portion
01	66.0 / 8.0	800	1200	0:19:42	0:07:54	0:11:47	60%
02	66.0 / 8.0	800	1200	0:41:49	0:16:44	0:25:04	60%
03	66.0 / 8.0	800	1200	5:14:53	4:06:28	1:08:25	22%
04	66.0 / 8.0	800	1200	0:06:37	0:05:19	0:01:18	20%
05	66.0 / 8.0	800	1200	1:57:25	1:13:28	0:43:56	37%
06	32.0 / 5.0	600	1000	3:31:00	2:54:24	0:36:36	17%
07	32.0 / 5.0	600	1000	4:35:29	4:16:40	0:18:48	7%
08	32.0 / 5.0	600	1000	6:29:11	5:22:41	1:06:29	17%
09	16.0 / 1.3	600	1000	0:45:50	0:26:00	0:19:49	43%
10	16.0 / 1.3	600	1000	0:39:27	0:35:24	0:24:03	40%
11	16.0 / 1.3	600	1000	0:09:04	0:07:03	0:02:01	22%
12	10.0 / 1.3	600	1000	0:22:27	0:14:30	0:07:56	35%
13	16.0 / 1.3	600	1000	0:16:33	0:08:13	0:08:20	22%
14	12.0 / 1.0	600	1000	0:22:28	0:22:21	0:00:06	-0%
Sum:				25:46:01	20:17:16	5:28:44	21%



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