New CNC generation for mold and die construction

Fit for the future

Improved milling technology, higher surface quality, higher computing power, and easier operation increase profitability in tool and die construction.

Siemens AG

Enhanced numerical control and HMI functionality and even more powerful CPUs increase the productivity of High-Speed Setting Cycle832 machining with Sinumerik

The productivity of machine tools depends largely on the functionality and performance of their control systems. The new generation of the Sinumerik system now offers various extra performance enhancements for tool and die construction. Both operation and programming have also become even easier, meaning Sinumerik-controlled machines and their operators can now be deployed even more flexibly.

NC functions improved for three- and five-axis milling

In the case of NC functions, further improvements have been made to the Advanced Surface intelligent path control and to some components of the Sinumerik MDynamics milling technology package. Look Ahead level II harmonizes not only the speed profiles but also the acceleration and jerk profiles of adjacent milling paths. The overall more homogeneous machining of adjacent milling paths thus achieved leads to higher surface quality and increases the average feed rate due to better utilization of the machine dynamics. The result is a reduction of cutting times by 5%–10%.

The new Orison (Orientation Smoothing On) NC function for five-axis simultaneous milling also enhances speed and quality. It smooths the rotary axis movements for workpiece orientation. During five-axis milling of curved contours, the machine dynamics

are highly stressed by the orientation movements of the rotary axes that align the workpiece with the relevant contour. These irregularities in the machining cause visible marks on the workpiece surface and noticeable losses in machining time. With Orison, the orientation movement is continuously and predictably interpolated and executed within the specified production tolerances. The result is more harmonious movement of the tool tips.

Even if the tool comes to a sudden stop in the middle of the machining process and remains stuck in a drilling hole or a thread – for example, due to a power failure – it is possible to resume production quickly thanks to the new generation of Sinumerik software. The Retract function has been expanded so that all the axes involved also perform coordinated interpolation in JOG, thus enabling easy retraction of the tool – not only in the three-axis but also in the 3+2-axis and five-axis range with the swivel cycle active (Cycle800) or via the Traori TCP function.

Significantly easier operating and programming with Sinumerik Operate

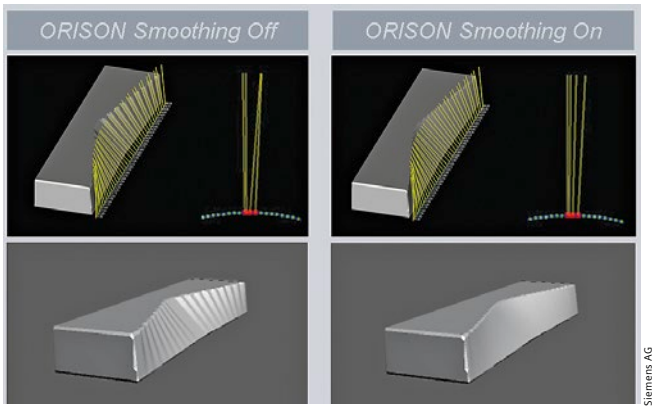
The current version of the Sinumerik Operate user interface consequently reflects the enhancements made in the NC core. For example, in High-Speed Setting Cycle832 (HSC) it is now possible in five-axis operation to immediately specify the orientation tolerance for the rotary axes when roughing and finishing. Those familiar with HSC can therefore use the new orientation tolerance for the five-axis Orison function directly via the cycle screen and data entry support. In line with the Retract function, which has been expanded on the NC side, it is now even easier to deal with unexpected faults via the operator interface, thus speeding up the resumption of machining.

Simulation of the measuring cycles and the five-axis programs is also easier and more convenient now – thanks to expanded control options via mouse and shortcut keys in the simulation view. This feature particularly benefits the operators of machines fitted with the new, more powerful NCUs of Sinumerik 840D sl type 1B. These use multicore processors, have continuous access to Profinet, and are thus more efficient. For the operator, this means considerably smoother operation and significantly higher simulation speeds. The die construction quick view, for speedy visualizing of complex part programs, has also been expanded.

Besides working with the well-known pdf, png, bitmap, and jpeg formats, the new system version is also capable of displaying html files from drives or data-storage media such as a CF card or USB or net drive. The measuring cycle features of Sinumerik CNCs have also been expanded. All measuring cycles have animated graphical elements that intuitively highlight their precise function and parameter assignment in programGuide or in ShopMill work-step programming. As a result, it is considerably easier to use even the more complex functions of the measuring cycles. Furthermore, the machine geometry itself can be measured with a touch-trigger probe and calibration sphere. With Cycle995 and Cycle996 it is possible, for example, to detect angular deviations of the spindle in relation to the machine axes and compensate for errors while the process is running.

Integrated added value

The CNCs have been perfectly suited to mold and die construction applications since the introduction of the Advanced Surface intelligent path control and the clever combination of all functions and cycles relevant to demanding milling operations in the Sinumerik MDynamics milling technology package. With the latest generation of the Sinumerik Operate user interface and the high-processing-power CPUs of Sinumerik 840D sl type 1B, this line of CNCs now delivers additional competitive advantages – for both the manufacturers of milling machines and the construction of machine tools and dies. ■



The new Orison function delivers higher surface quality and exploits machine dynamics better

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