EiMa Maschinenbau GmbH, Germany

Improved Surface Quality in a Flash

The surface quality of the workpiece is the most important quality feature in tool- and mold-making because it is immediately apparent. Up to now, however, detailed optimization of the machining parameters has been the only way to achieve a perfect surface; the parameters have to be adjusted for almost every single part in accordance with the requirements of the workpiece. Adjusting the milling parameters is a critical factor in terms of production planning costs and efficiency. “If a part takes 3.5 hours to machine, the machine operator wants to be sure that the quality of the final product is exactly as required. After all, if he has to spend hours on polishing after the machining process, his previous cost calculations become void,” emphasizes Markus Eisold, Managing Director of EiMa Maschinenbau.

Perfect surface quality every time with Advanced Surface

The Sinumerik MDynamics technology package with Advanced Surface addresses these issues. The new path control feature produces excellent surface qual-
ity even at higher feed speeds – and without the need to optimize milling parameters for each individual part. Central to the success of this technology are the innovative Lookahead function and the NC data compressor, which has been revised and upgraded. Together, they ensure that neighboring milling paths have an identical speed profile, even during alternating line-by-line milling with different motion directions. The new Lookahead feature also minimizes position lag, guaranteeing high surface quality. The integrated jerk limitation feature and the COMPCAD online data compressor work together to ensure that the tool moves smoothly and fluidly. By centralizing ISO program data sets in splines, it is possible to guide the tool smoothly and continuously within the tolerance range, achieving a significant increase in contour accuracy at the edges. This all takes place without the need for the previously required expensive and time-consuming optimization.

Innovative reference machine …

A Gamma T linear machine from the German-based company EiMa was among those selected as a pilot and reference machine for testing the path control. By this time, the company had further refined many of the features of the portal milling center, which made its debut at the EMO 2007 trade fair. For example, the addition of a gear rack drive has improved the rigidity and crash resistance of the Z axis, and the rigidity of the tool guide during 3+2-axis machining has also been further improved thanks to hydro-pneumatic fixed brakes in the five-axis head. In addition, higher-performance power units are now available for Sinumerik 840D sl CNCs, opening the door to a new generation of spindles. Some 24 kilowatts of power and speeds of up to 22,000 RPM also serve to improve processing performance for high-volume cutting applications.

The new and convenient integrated Sinumerik user interface has also been installed in the machines as part of the pilot program for the new Sinumerik MDynamics technology package. The interface combines the best features of existing user interfaces in this CNC, including the integrated ShopMill functionality that has expanded to support multi-channel machining, and builds on them with key features such as setup in JOG, simplified program data handling, convenient tool management, new innovative cycle technology and 3D simulation.

… in a successful pilot program

The performance improvements of the Sinumerik MDynamics technology package with the new Advanced Surface path control system are obvious when compared with existing standard CNC functionality: A sample part was first machined using the “old” path control and without any further optimization of the milling parameters. The result demonstrated that, at critical points, there was room for improvement in terms of surface quality, contour accuracy and machining efficiency. The milling parameters were then optimized step-by-step in the CAD/CAM system, in the part program and in the CNC machine data until the required surface quality was achieved. “We then activated the new path control,” recalls Markus Eisold, “and milled the workpiece for a third time, this time using the standard settings specified at the commissioning stage with the help of a sample part; in other words, without optimizing them to the

“With Advanced Surface and the new Sinumerik user interface, it’s easier than before to apply our expertise and flexibility to tool- and mold-making when constructing special machines.”

Markus Eisold, Managing Director of EiMa Maschinenbau GmbH

individual part. The first try produced results that were better than, or at least as good as, individual optimization.” The manager of the electrical department at EiMa, Jörg Diez, summarizes the results of the pilot project as follows: “Machines like the Gamma T linear offer an increasingly interesting option for production of large-scale models and molds. The collaboration with Siemens in this area has therefore turned out to be really beneficial for us. It has allowed us as machine manufacturers to provide the best possible service to both special machine operators and tool- and mold-makers. We feel confident that with Siemens, we found the right partner, particularly in view of the new European machinery directive.”

info contact

www.siemens.com/sinumerik
peter.hofsaess@siemens.com