



■ Daimler AG, Germany

Perfectly Smooth

Innovative High-Speed Cutting (HSC) functions on the Sinumerik 840D sl ensure high surface quality and improved economic efficiency.

All Mercedes-Benz models are developed, tested and prepared for serial production at Daimler AG in Sindelfingen, Germany. The molds, models, dummies, prototypes, functional samples and wind tunnel models needed for this work are all produced on the shopfloor belonging to the “Technical Molds, Rapid Prototyping, Rapid Tooling” department. In order to meet the range of different requirements, such as the size of parts produced, the shopfloor operates several different machining centers. In a particularly challenging pilot project, Daimler used a five-axis Handtmann

Gantry RS for HSC machining. The highlight of the machine is a Sinumerik 840D sl CNC equipped with the new Sinumerik MDynamics technology package for milling applications.

Intelligent path control improves economic efficiency

A key element of Sinumerik MDynamics is the new Advanced Surface path control feature. Achieving a good surface often depends on very precise coordination of all the production parameters in the

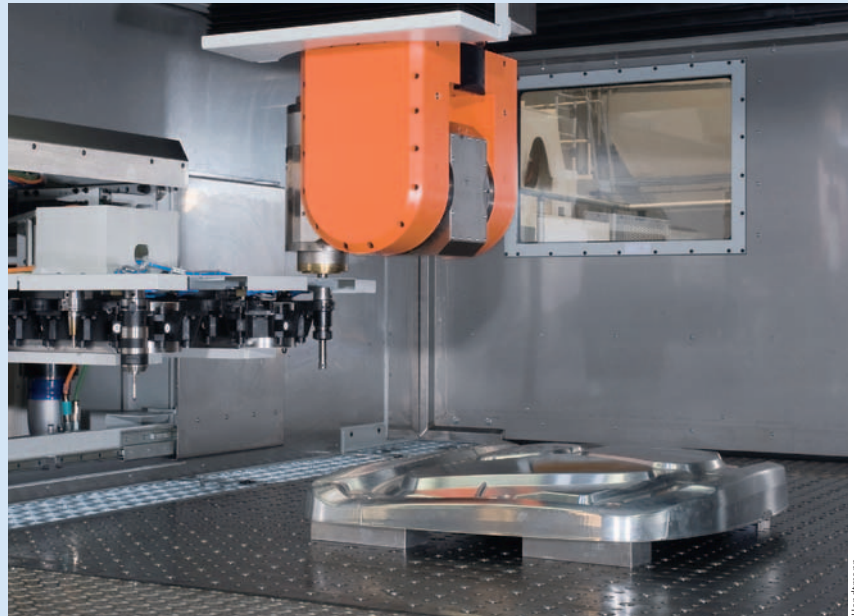
CAD/CAM system, the parts program and the machine data of the CNC. In the production of models and molds, the expenditure incurred by this coordination is fully included in unit costs. With Advanced Surface, this expenditure is completely eliminated as an innovative look-ahead capability, a new online compressor for NC data and harmonization of the speed profiles of adjacent milling paths, which works reliably even in line-by-line milling with alternating machining directions, all guarantee excellent surface quality even at high feed rates. According to the model and mold builders in Sindelfingen, these settings that are optimized just once in the post-processor. The CNC works fine with plastics, aluminum and CFRP, i.e. the machining quality is the same for all materials. This means that the machine dynamics is enhanced overall and can be focused on achieving maximum roughing-down performance, high-precision contour machining or optimum surface quality by activating the Cycle832 high-speed setting in the parts program. The efficiency of the business processes on the shopfloor is measured and monitored using the work orders stored in SAP and the number of parts delivered.

Familiar operation

In addition to this innovative functionality, operation of the new portal milling center also helps boost productivity. The machine operators confirm that the Handtmann machine and the Sinumerik CNC are very simple to operate: machine tool setup is supported by graphical tools with practical functions for measuring the tool and workpiece. In addition, the measuring cycles, such as “Align Cavity, Bore and Level”, speed up the process for setting or monitoring the zero point, thereby saving on setup time. The same measuring cycles can also be used to monitor the workpiece during the machining process.

Versatile technological functions support the operator

The Sinumerik 840D sl with its new technology package offers a particularly wide range of support tools for model and tool and mold making, for example in the form of simple data transfer via Ethernet, Compact Flash (CF) card or the USB port on the front panel – from three-axis to five-axis machining. This means that even large-scale NC programs can be easily imported and processed directly by external data carriers. The machine operator is also supported by innovative cycles and milling strategies from the field of CAD/CAM, such as trochoidal milling of hard materials, plunge milling at high chip volumes (high-performance cutting or HPC), special cycles for multi-axis and/or multilateral machining and frames for implementing turned and swiveled coordinate systems. For the most accurate milling results, the cycle Measure Kinematics Cycle996 is used to control machine accuracy with this CNC. Cycle996 uses a mea-



In the Mercedes-Benz plant in Sindelfingen, models are milled for a broad range of body parts

asuring probe and measuring sphere to measure the entire kinematics of the rotational axes and, where applicable, to correct any erroneous axial vectors. The new machine also demonstrated that efficient production of models and molds is virtually unthinkable today without an integrated process chain from CAD-CAM level to CNC level. A CNC such as the Sinumerik 840D sl with Sinumerik MDynamics, which uses a single optimization procedure for all machining types and production tasks, offers decisive advantages in this respect. It ensures stable conditions at the end of the process chain, which greatly simplifies the work carried out in the CAM system, makes the results more reliable and maintains manufacturing productivity at a consistently high level.

On the right path with the new Sinumerik

After about six months of use in a full production environment, the Sindelfingen-based operators working with the Handtmann Gantry RS and the innovative functionality of the Sinumerik 840D sl feel very confident about the new technology. The standard CNC fulfills the requirements of the demanding model and mold-making process, and it offers the openness and flexibility required by modular tool making and special machinery construction. Together with Totally Integrated Automation, Safety Integrated and an integrated process chain, the solution yields very high benefits for machine tool makers and manufacturing companies alike. ■

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