

Success Story

Knowledge with a system

Top performance in tool engineering: Alongside automating CAM processes, providing manufacturing knowledge to all employees is one of the greatest challenges in tool engineering. Volkswagen works together with...

...CAD/CAM provider OPEN MIND in Braunschweig. This relieves NC programmers of work and enables fast, efficient processes.

and tools reach the machine. On the other hand, standardisation and automation should be promoted continuously.

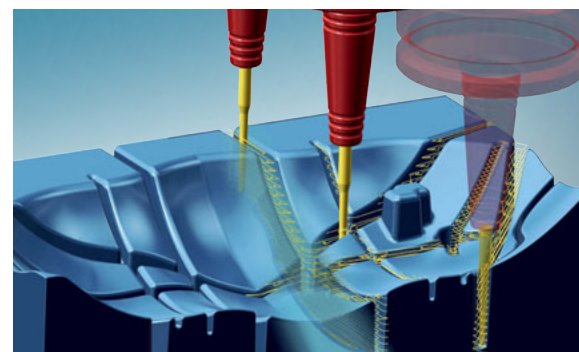
Moulds for cylinder heads and chassis, die cast moulds for gearboxes, coupling housing and steering boxes and compression tools for reshaping the thick sheet metal of the chassis and injection moulds, for example, for bumpers or instrument panels made from plastic: Component tool engineering at Volkswagen's Braunschweig plant is impressive thanks to the production portfolio and effectiveness and efficiency in the CAD/CAM processes. For the past 13 years, it has used the *hyperMILL*® CAM/CAD solution from OPEN MIND, which supports 2D, 3D, HSC, mill turning and 5-axis machining, among others. Rebuilding the production hall in 1986 and integration into the component strategy of the brand as component tool engineering in 2007 were key initiatives in the current competence centre.

With over 75 years of experience in tool engineering in Braunschweig, the manufacturing expertise of the specialist workers has proven to be a key success factor again and again. A proprietary method was developed in component tool engineering to systematically collect and further develop this knowledge and provide it in automated processes.

Thesis as a basis

An important basis is provided by the thesis developed in component tool engineering:

Knowledge management makes it possible to describe optimal rib machining.



Maximum efficiency is the ultimate goal

For Jörg Wenserski, Head of Engineering at the Machine Centre, two premises apply in order to achieve maximum efficiency in planning and manufacturing processes: On the one hand, company-specific manufacturing expertise should be used in planning so that only secured NC programs, equipment



About Volkswagen Braunschweig

The Volkswagenwerk Braunschweig plant manufactures axles, steering mechanisms, plastic parts, battery systems, vehicle components as well as the required tools and machines. Innovative products place great demands on the manufacturing process and, as a result, on the development and manufacturing of resources that meet these requirements. In light of this, component tool engineering in Braunschweig, which occupies around 700 employees, holds a decisive position in the early phase of the product development process.

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“Thanks to the automation options *hyperMILL*® offers, we have been able to reduce programming times for combustion chamber cores from two hours per component to just a few minutes.”

Jörg Wenserski, Head of Engineering at the Machine Centre at the Volkswagen plant in Braunschweig.



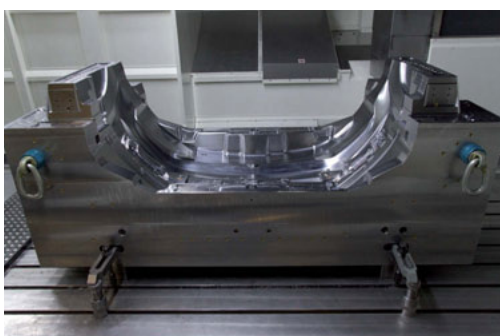
‘Automated acquisition of experience-based manufacturing expertise in tool and mould engineering’. Using the methods developed, Volkswagen now examines and evaluates relevant CAM data in order to define measures regarding specified improvement objectives.

This is an approach to finding knowledge in databases that dissects and interprets the CAM data using statistical methods. “Due to the precise data, we are now in a position to implement targeted improvements in NC programming and machining,” explains Wenserski. Behind all of this, there is the analysis of tool sequences, tools and machining values.

This analysis supplies rules for tool selection, for example. It is also possible to promote standardisation projects in this way: Based on the determined frequency of specific tool configurations per machining task, it is possible to derive standard tools that are highly likely to be suitable for the majority of machining tasks. “We have been able to use the results of the development partnership with OPEN MIND for automation and standardisation,” says Wenserski and adds: “*hyperMILL*® is being developed into a knowledge-based CAM/CAD system that significantly improves our machining technologies.”



Injection mould of a bumper, manufactured at the Volkswagen Braunschweig plant.



Specialist group work substantially supports knowledge management in order to ensure that the results of existing manufacturing knowledge are actually reproduced and perceived by employees as being profitable and making work easier.

Cycle of creating and using

The cycle of collection, concentration and distribution of knowledge data has already proved to be of value in multiple project cycles. It includes the identification of part families for standardised processes such as rib milling and electrode machining as well as the standardisation of the strategies for finishing of moulded parts for moulds. “Standardisation alone made it possible to reduce the primary processing time in this area by an average of 35 per cent,” says a delighted Wenserski. “The specialist knowledge management group saved more than 40 per cent of the primary processing time in manufacturing standard pockets by using alternative tools and machining cycles.”

Automatically to the NC program

Another project of the development partnership involves the milling of combustion chamber cores for cylinder heads. “When we notice that we frequently need similar programmes, we work together with OPEN MIND to find a suitable solution in order to reduce the level of effort required,” explains Wenserski. “In the case of milling combustion chamber cores, we used one of these automations to reduce programming times from two hours per component to just a few minutes.”

This automation is based on the *hyperMILL*® API programming interface, or in other words, an open interface to the outside over which it is possible to define processes. When it comes to combustion chamber cores, the add-on program identifies an edge and calculates and generates a guide surface in the CAD model. All that’s left is for the *hyperMILL*® user to select the relevant component family and check the calculation results. The milling program is subsequently automatically generated. In this way, it is possible to generate programs for other recurring components at the push of a button.

Reduce pointless routines

CAM programmers also appreciate the new possibilities. If, in the past, you had numerous secondary tasks to complete before you could even create a single line of code for a new tool, automations now eliminate time-consuming and error-prone routine tasks, such as: loading native models from the creating CAD system, allocating file and program names in accordance with prevailing conventions, creating the required directories for CAM projects, Viewer data, DNC data and the corresponding documentation.

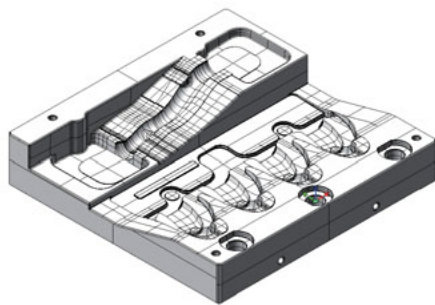
There are then only a few tasks required and the automation passes file names to stored parameters, creates paths and provides models. Relieving programmers of this kind of work has many positive effects. As a result, NC programs arrive in the workshop faster, it is possible to better utilise machine capacity and to comply with tight delivery deadlines.

“Working together with OPEN MIND, we automated all of the preparatory work in a project lasting two weeks,” emphasises Wenserski. Dr Josef Koch, Executive Director of Technology at OPEN MIND, believes that this success is based not least on

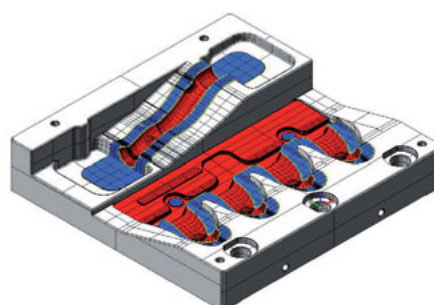
the precise and comprehensive preparation of projects, also on the part of Volkswagen: “This highly intense development partnership benefits from the comprehensive system knowledge and detailed specification sheets of the customer, and the enthusiasm of component tool engineering team gave us the motivation time after time.” ■

Literature

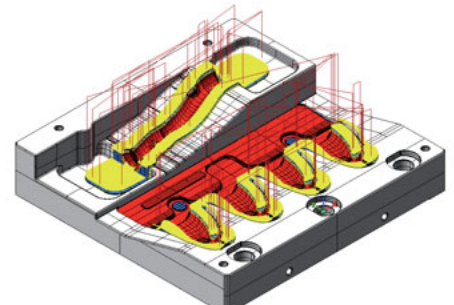
[1] Schneider, Thomas: *Automated acquisition of experience-based manufacturing expertise in tool and mould engineering*, thesis, 2011, Logos Verlag.



Automatic generation of the elements



Linking the elements with a standardised job list using the customised process feature (CPF) – a function in *hyperMILL*® that helps specify individual standards for automated programming



Project can be calculated

About OPEN MIND Technologies AG

OPEN MIND is one of the world’s most sought-after developers of powerful CAM solutions for machine and controller-independent programming.

OPEN MIND designs optimized CAM solutions that include a high number of innovative features not available elsewhere to deliver significantly higher performance in both programming and machining. Strategies such as 2D, 3D as well as 5-axis milling/mill turning, and machining operations like HSC and HPC are efficiently built into the *hyperMILL*® CAM system. *hyperMILL*® provides the maximum possible benefits to customers thanks to its full compatibility with all current CAD solutions and extensive programming automation.

OPEN MIND strives to be the best and most innovative CAM/CAD manufacturer in the world, helping it become one of the top five in the CAM/CAD industry according to the NC Market Analysis Report 2015 compiled by CIMdata. The CAM/CAD solutions of OPEN MIND fulfil the highest demands in the automotive, tool and mould manufacturing, production machining, medical, job shops, energy and aerospace industries. OPEN MIND is represented in all key markets in Asia, Europe and America, and is a Mensch und Maschine company.



We push machining to the limit

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