



Success Story

Save time tooling at PSA with OPEN MIND

A great many tools have to be created to mass produce quality vehicles, and they have to be flawless. Their quality and cost are key factors in international competition. The skill of the toolmakers and their machine-tool programming have a...

...crucial role to play in meeting these challenges.

The role of the PSA factory's tool shop in Mulhouse involves designing and producing aluminium foundry moulds, casting and stamping tools for the automotive group. The 270 on-site professionals have access to a sizable pool of CNC machines for tack welding, drilling, milling and jig grinding. The increasing performance requirements mean that methods and resources have to be continuously improved. This rule applies equally to the machines' programming. CAD/CAM programming software appeared seven years ago, bringing significant productivity gains.

In their search for a solution, Laurent Sifferlen, head of the process group at PSA (tooling, CAD/CAM, quality) and Serge Locher met with Jorge de Carvalho, application engineer at OPEN MIND and writer of the CAD/CAM software *hyperMILL*®. The management was won over by *hyperMILL*®'s functionalities, ease of handling, its ability to manage complex paths, as well as its options for recording personalised macro instructions easily, and saving them. An initial program-

Behind an aluminium mould for casting, Serge Locher (on the right) in discussion with Jorge de Carvalho about the various ways of understanding programming with *hyperMILL*®.



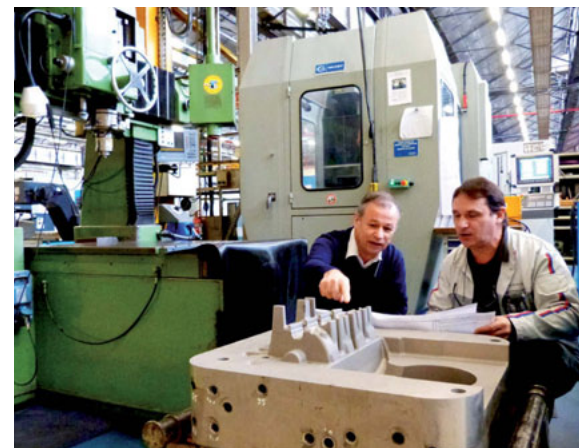
About PSA Peugeot Citroën

With its three world-renowned brands, Peugeot, Citroën and DS, PSA Peugeot Citroën sold 3 million vehicles worldwide in 2014. The second largest car maker in Europe, PSA Peugeot Citroën recorded sales and revenue of €54 billion in 2014. The Group confirms its position of European leader in terms of CO₂ emissions, with an average of 110.3 grams of CO₂/km in 2014. PSA Peugeot Citroën has sales operations in 160 countries. It is also involved in financing activities (Banque PSA Finance) and automotive equipment (Faurecia).

› www.psa-peugeot-citroen.com

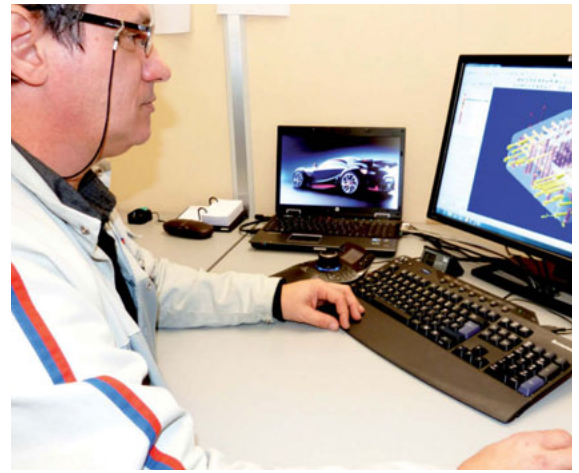
Meeting, tests and adopting software

The PSA tool shop in Mulhouse adopted CNC very early on, just as it did centralised programming of the machine tools. "To facilitate the programming of repetitive geometries, we developed the macro instructions ourselves in parallel with the application of the CAD/CAM software that we were using then, and independently of it," a programmer, Serge Locher, explains. But the versions of the software have been superseded as part of a normal development, making it more and more difficult to integrate these macros.



“We have been pleasantly surprised by the results in improving machining flexibility.”

Programmer Serge Locher



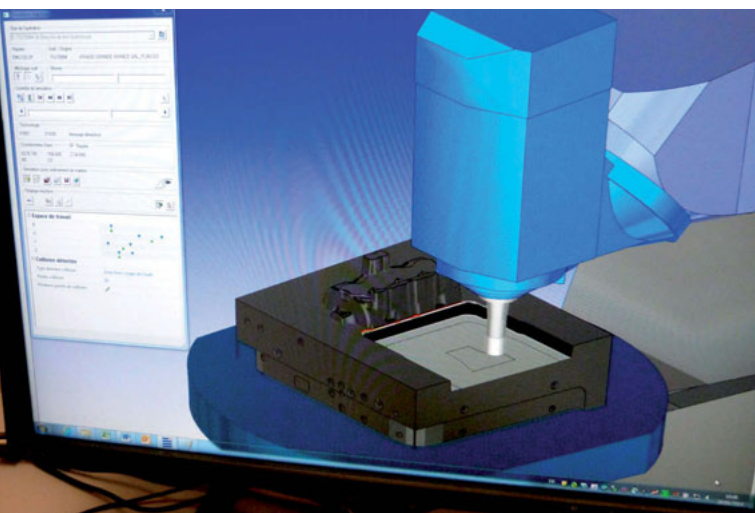
ming trial on the machining centre DMG DMU80 was carried out for a lattice work foundry mould core using *hyperMILL*®.

“We have been pleasantly surprised by the results in improving machining flexibility,” explains Serge Locher. A complete programming approach was then finalised with Jorge de Carvalho using *hyperMILL*®. “By automating the loading of CAD models from Catia, we found that we were eliminating every source of error when automating the casting operations,” says Serge Locher. Furthermore, doing away with manual introductions previously required makes it possible to achieve gains in terms of programming security, time and reliability. *hyperMILL*® was then adopted, and two software licences were bought by the programming office.

Training and services that go that extra mile

Following three days of training for programmers by OPEN MIND engineers, all of the software’s functions were proven to have been properly set up and to provide the anticipated benefits. “We were able to recover our drilling, casting and milling macro instructions and create new ones directly in the *hyperMILL*® software,” Serge Locher says enthusiastically. For programmers, this means that all their work is permanently upgraded, saving them very valuable programming time. For example, the cooling circuit of a mould of a given dimension always utilises similar drilling circuits. The macro concerned only has to be called with a single click, and it can be integrated into the mould’s program. More than 150 of this type of macro have al-

With the roughing module in *hyperMILL*® MAXX Machining, up to 30% of machining time could be saved on pocket milling and tool wear reduced thanks to trochoidal technology.



ready been created in the *hyperMILL*® software and are used daily. After these applications in 2 axes, *hyperMILL*®’s programming was quickly requested to test blank engraving capability; that is, machining complete moulds in three dimensions.

Here too, results exceeded expectations and will extend the adoption of programming using *hyperMILL*® to other machines. Programming multi-functional circuits, turning and milling makes it possible to anticipate any problem by simulating the operations. “While turning operations are programmed in ISO, the *hyperMILL*® software allows us to carry out all milling operations and check that everything is going to go ahead correctly,” explains Serge Locher. The simulation is going to be gradually extended to all 5-axis machines; OPEN MIND engineers are responsible for ensuring the kinematics of each machine in the software. In parallel, the creation of macro instructions is going to be continued in 2D and in 3D. During our visit, 547 macro instructions were contributing to programming flexibility.

Automatic development and facilitated communication

“Thanks to the use of macros, we are able to concentrate more quickly on what is essential and dedicate ourselves to improving how each tool is machined,” explains Serge Locher. In fact, the various machining options for pocket milling may be tested and chosen based on the best parameters, for example. The adoption of the roughing module in *hyperMILL*® MAXX Machining, developed on the OPEN MIND core VoluMILL™ and using the principle of trochoidal machining for deep pocket milling could soon also be part of this panel of solutions. It would achieve a time saving of around 30 % in machining, not to mention a significant reduction in tool wear.

One other of the major satisfactions of PSA Mulhouse’s tool shop programmers lies in the facility with which post processors have been implemented for each machine. As translators of the instructions programmed in the right language for each machine and based on its kinematics, the post processors form a crucial interface between the software and CNC. “With OPEN MIND, we know that what we are programming and simulating will actually be implemented in production,” emphasises Serge Locher. In addition, no matter how the software develops, the macros will always be valid since they are created directly in the software. Six *hyperMILL*® licences are used in the programming office at the Mulhouse tool shop today. This adoption is a sideways step for the Group’s purchasing policy. But does innovation not open up new avenues by examining progress from a different angle? ■

A reportage from Michel Pech, „Machine Production“ (www.machpro.fr)



Intended to create the cooling circuit around the cylinders in an automotive engine block, this 'lattice work' core benefits from *hyperMILL*® programming on a DMG centre.

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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