

Productive SolidCAM

In the fast Lane

Czech high-tech shop uses SolidCAM, the Gold-certified integrated CAM-Engine for SolidWorks, to solve the bottleneck in NC programming of modern 5-axis CNC machines

The times have passed in which the main business for contract manufacturers in Eastern Europe was the production of simple commodity parts. Frencken Brno s.r.o., headquartered in Brno in Czech Republic, today produces the most complex parts of the highest quality for demanding customers from the aeronautics and aerospace industry, for instrument and measuring instrument makers, manufacturers of medical devices and even producers of laser and radar equipment. And the progress can no longer be attributed only to advantages of location, such as lower staff costs, less labour regulations and better tax benefits. Companies such as Frencken are now playing in the big league of manufacturing, primarily due to their well-trained and motivated staff and to bold investments made in machines and software. And the Czechs are stepping on the gas. So Frencken is not just focussing on modern vertical and horizontal milling centres and milling/turning centres with up to 5 simultaneously driven axes, but through investments in SolidCAM and perfectly customized post-processors can do NC programming very efficiently and thus use their advanced CNC machines to their full economic capacity.

Global data networking, highly efficient logistic structures and the worldwide availability of modern manufacturing technology are the fuel for the development of completely new, cross-border supplier structures. Contract manufacturers can no longer hide behind national borders and the market rules are in effect everywhere. It is imperative not to lose time. Entrepreneurs, in the best meaning of the word, are now in demand, because competition for the most attractive orders will continue to become more international – and even harder. What to do about this? There is no quick and simple answer. However it seems certain that contract manufacturers who move their process chains to a consistently high level with respect to quality, on-time delivery, costs and flexibility will gain market share. In the process of achieving these goals, the use of efficient CAD/CAM systems plays a key strategic role.

It also looks this way to the founder and Managing Director of contract manufacturer Frencken s.r.o. in Brno, Pavel Sobotka: "Our customers demand the highest precision and machining quality and a high degree of flexibility as well. We are meeting the steadily rising demands through well-qualified and highly moti-



Aluminium and titanium are the preferred materials for machining. The numerous customers include demanding global enterprises such as Airbus. About 700 different parts are now being manufactured for the aircraft maker and over 200 of these are being used in the new wide-bodied A 380 airliner. (All photos: Frencken, Brno, CZ)

vated staff and, of course, through continuous investments in modern CNC machines and equipment as well as powerful and easy-to-use software."

And the previous investment strategy is bearing fruit. Frencken has thus grown beyond South Moravian borders to become a synonym for the highest level of precision and productivity. The company's manufacturing services ranges from general large-volume production parts up to very demanding workpieces such as those required, for example, by the aeronautics and aerospace industry, instrument and measuring instrument makers, manufacturers of medical devices, producers of laser and radar applications and even special machine makers. Aluminium and titanium are the preferred materials for machining. The numerous customers include demanding global enterprises such as Airbus Industries. About 700 different parts are now being manufactured for the aircraft maker and over 200 of these are being used in the new wide-bodied A380 airliner.

A sure thing: under stringent criteria, Frencken is a certified supplier of high-precision mechanical components and assemblies. In order to maintain this attained level, the Czechs are always open to adopt brand new technologies. Thus, Frencken was the first company in Europe to introduce a system for the cybernetic control of production processes (CPC). New insights and developments in the field of mechanical design and communications technology are also quickly put into practice.

A basic pillar for the high level of quality is the use of CNC production machines, which at Frencken come almost exclusively from Mazak, the Japanese machine tools manufacturer. The Mazak CPC (Cyber Production Center) manages the optimization of pro-

Founder and Managing Director of Frencken Brno s.r.o, Pavel Sobotka: "High-qualified staff and continuous investments."



duction workflow. Apart from materials, tools and CNC programs, the system also manages the efficient interplay of all other parameters for the trouble-free manufacturing of each individual workpiece.

Even though every machine operator can program directly on the control unit, external NC programming is particularly advantageous for complex machining tasks. This applies especially to the existing vertical and horizontal milling centres and the milling/turning centres with up to 5 simultaneously driven axes. The originally installed, PC-supported Camware 2D software from Yamazaki Mazak offers good performance only for the NC programming of simple geometries. A real bottleneck! With the success and growth of the business, the workpieces to be manufactured were becoming more and more complex. Some of these workpieces were impossible to machine with existing resources, or could only be programmed very inefficiently and inflexibly. For a certain period of time this competence gap was filled by cooperating with specialized, external CAD/CAM service providers. But this kind of outsourcing not only needs additional time and

money, but is also quite problematic for confidential parts in particular. And last, but not least, a lack of know-how creates dependencies that hardly any contract manufacturer can afford today.

Pavel Sobotka: "We couldn't exploit and continue to develop the full potential of our high-tech equipment and our existing know-how. Today you have to consistently use 5-axis machines to profitably manufacture demanding parts. The possibilities of indexed and simultaneous 5-axis machining gives us major competitive advantages." And so the leap to a CAM system supporting 5 axes was only a question of time. During the evaluation of a suitable solution, Frencken

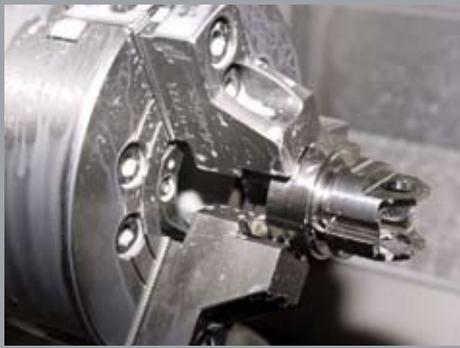
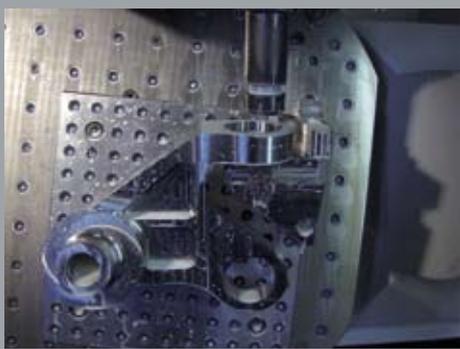


Josef Pavliš, Technical Manager of Frencken Brno s.r.o.: "Indexed and simultaneous 5-axis machining gives us major competitive advantages."



"Pacesetter"

A basic pillar for the high level of quality is the use of CNC production machines, which at Frencken come almost exclusively from Mazak, the Japanese machine tools manufacturer. The Mazak CPC (Cyber Production Center) manages the optimization of production workflow. Apart from materials, tools and CNC programs, the system also manages all other parameters for the trouble-free manufacturing of each individual workpiece.



“Advantage post-processor”

The 5-axis post-processor for the Mazak Variaxis machine is now running perfectly. And the post-processors for the other machines, such as the Mazak Integrex milling/turning centres, are now in the fine tuning stage.

casually acquired a quite reliable impression of the capabilities of different CAM systems, through cooperation with different service providers. These were then tested and evaluated with regard to the requirements specified by Frencken.

In this process, SolidVision s.r.o., the Czech distributor of SolidCAM, was particularly persuasive. Cooperation proceeded in several phases. SolidVision first set out to learn as much as possible about the machines and CNC controls being used. The CNC post-processors were optimized step by step during this time. In the next step Frencken and SolidVision specified and introduced the standards for data transfer. The background behind this was a general problem – that the customer uses a variety of file formats for data transfer. But easily digestible 3D geometries are the basis for fast further processing and the error-free creation of NC programs in particular. Because most part suppliers are limited in the file formats they can work out with the customer – the customer is king, after all – the favoured file formats at Frencken were defined as DWG, IGES and STEP.

Pavel Sobotka: “During the test phase for data import and the customization of the post-processors, cooperation between the specialists of both companies was of fundamental importance. Since then trust and mutual respect has been carried over to all levels of cooperation.” And Josef Pavliš, Technical Manager at Frencken, adds: “The excellent cooperation between our programmers and the specialists from SolidVision was an important reason for the implementation of SolidCAM in our production line. Without the professional approach and the active support of SolidVision the roll-out would certainly have not gone so smoothly.”

But this wasn't and isn't the only reason for the investment in SolidCAM. Pavliš: “The features of SolidCAM for milling with 5 axes are very practical and, above all, easily learned. How easy the software is to use was proven by the speed with which our programmers were able to implement 5-axis milling in practice. With SolidCAM we decided on a complete solution without any compromises.” The absolutely most important part of the installation, the fully functional 5-axis post-processor for the Mazak Variaxis machine, is now running perfectly. And the post-processors for the other machines, such as the Mazak Integrex milling/turning centres, are now in the fine tuning stage.

The cybernetic CPC system plays a prominent role in Frencken's manufacturing philosophy. Therefore the output of the SolidCAM NC post-processors was also customized so that all information needed about machining and tools flow directly into the CPC.

With the new possibilities opened up by the CAD/CAM system, the programming of very complex parts could be significantly accelerated. Over time SolidCAM's 2D and 3D machining strategies were also fully employed in complex machining tasks. The handling of some materials, titanium for instance, requires a specific approach. Here the features for high-speed milling, plunge-roughing strategies and special tool catalogues with pre-set cutting speeds and feeds perform valuable services. A big advantage as well for Frencken is the functionality for indexed milling with 5 axes.

SolidCAM

SolidCAM is a powerful CAM solution, gold certified by SolidWorks in 2003, that was specially developed for workshop-oriented NC programming. SolidCAM, in a single application, supports the mechanical machining processes of 2.5D milling, 3D milling, high-speed machining (HSM), indexial 4/5 multi-sided machining, 5-axis simultaneous milling, turning, turn-mill and wire-edm. SolidCAM post-processors can be customized for individual requirements and specific controls so that users can generate efficient NC programs for all CNC machines.

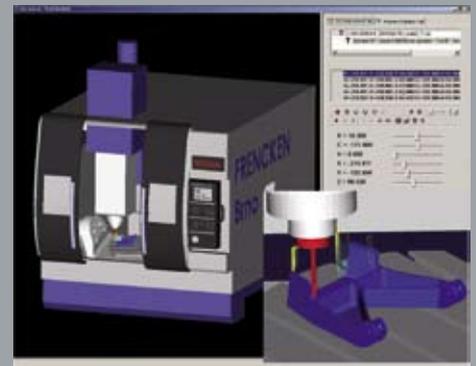
The experience of 23 years of continuous development work has gone into the current version of SolidCAM2006 R10. SolidCAM is now being profitably used at more than 10,000 workstations in industry and education.

www.solidcam.com



“Trust is good – Control is better”

For Frencken, measurement at a μ level of precision and tracking of parts on their own coordinate measurement machine is a must for many orders. At this point it should be evident if the process chain from CAD to CAM to chip removal is running perfectly.



“No experiments”

To increase the safety of 5-axis tool paths NC programmers first simulate machining completely on the computer with the virtual Mazak Variaxis machine.



“Qualitative diversity”

The company's manufacturing services range from general large-volume production parts up to very demanding workpieces such as those required, for example, by the aeronautics and aerospace industry, instrument and measuring instrument makers, manufacturers of medical devices, producers of laser and radar applications and even special machine makers.

Pavliš: “Because complex machining tasks on 5-axis milling centres can be easily defined in SolidCAM, acceptance on the part of the programmers was very high from the beginning. We can now manufacture very complex workpieces that would hardly be economical to manufacture without the most modern features for 5-axis simultaneous milling.” The productivity advantage alone is not the only justification for the use of 5-axis simultaneous machining. With the use of 5 axis, high slanted side-walls of a workpiece can be machined with the circumference of a tilted milling tool. In addition, surface quality is significantly improved by the use of the new technology.

Still, even the best 5-axis CNC program has to be verified as realistically as possible before actual milling. “The virtual simulation of tool movements with the entire machine tool in SolidCAM is an optimal solution,” praises Josef Pavliš and adds: “We check

all machining tasks before we manufacture them on the machine. This is how we can avoid downtimes and even more importantly, avoid unnecessary collisions. Our programmers have very quickly become acquainted with the system and are now enjoying the benefits of SolidCAM.” A minimum amount of training is of course needed to make CAD/CAM a pleasure. Because normal daily work at Frencken leaves hardly any freedom for proper qualification on the system, a binding training schedule was created for the programmers. At the same time, close communication with SolidVision's technical support was set up using internet-based tools.

Pavel Sobotka: “Machines and software are always only as good as the people working with them. Qualifications initially take time and money. But these investments pay off very quickly. Through the efficient use of SolidCAM we can exploit the true potential of our machines.”

Text+Images:
Dipl.-Ing. Klaus Dieter Hennecke,
Olpe, Germany
klaus@retema.de

SolidCAM Ltd.

E-Mail: info@solidcam.com
Internet: www.solidcam.com

Frencken Brno s.r.o.

Jarní 48
614 00 Brno
Czech Republic

www.frencken.cz

SolidCAM



© 2006 SolidCAM GmbH. All rights reserved.
All brand and trade names are property of their respective owners.