



Machining of titanium, networking, industry meeting: new solutions for new challenges

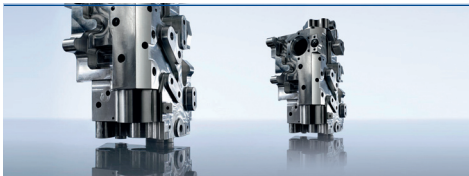
Assumption: modern design and engineering tools and alternative materials have created new challenges for the metal-cutting industry. Reason: in future products, traditional aluminium materials will increasingly be replaced by harder materials.

In many cases, these new materials are composites, usually a combination of different high-strength materials and particularly corrosion-resistant components. Advantage: contrary to aluminium - the traditional light-

weight material - they enable the production of filigree, exceptionally stiff and yet extremely lightweight parts. This throws up a number of new challenges, especially for machining experts like HELLER. Apart from having to respond to the challenge of developing innovative and efficient machine concepts, it also becomes necessary to establish new forms of co-operation in development or in opening up new fields of application. Issue 04/2010 of UsersNews illustrates what HELLER is doing in order to tackle these challenges.

Challenge No. 1:

Innovative materials in industries of the future



Materials that are challenging to machine, e.g. titanium or nickel-based alloys, have come to play an increasingly significant role in industries such as aerospace, power engineering or medical engineering. The example on page 2 illustrates how the machine concepts and process solutions offered by HELLER today can already respond to these challenges.

Challenge No. 2:

Creating synergies through networking



Is working alone or co-operating in complementary networks the best way to maintain and expand technological leadership and thus building a competitive advantage? Find out on page 3 why Klaus Winkler, Chairman of the HELLER Board of Directors is clearly in favour of the latter.

Challenge No. 3:

Unconventional ways to reach new customers

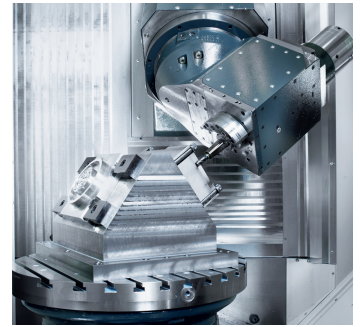


When potential buyers are not attending industry meetings of the metal-cutting industry in sufficient numbers, machining experts need to find innovative ways to present their solutions to prospective customers. Turn over and learn what new possibilities there are and what positive results they have produced in the field of aerospace.

HELLER F and MCH-C series: 5-axis solutions for hard materials used in innovative industries

There is hardly any other industry that has higher demands on development tools and the materials used than the aerospace industry. That is why today CAD/CAM systems, composite materials such as titanium and nickel-based alloys are becoming increasingly important in this sector of industry. However, the high strength of the materials, especially

of titanium, also leads to high thermal stress and wear of the cutting edge during the machining operation. Result: extensive damping at high torque and low speed becomes a pre-requisite, especially for milling operations, and HELLER solutions are practically tailor-made for these requirements.



Material: Ti-6Al-4V. Status: a future classic in aerospace. Workpiece: characterised by narrow honeycombs and grooves, lean concave webs, slightly concave inclines. Setup: three-dimensionally inclined clamping - an obviously cost-effective process requirement definitely worth improving. Tools: products from the standard product range of various manufacturers. At this year's "WerkTage" in Nürtingen, HELLER used a component with the afore-described properties to impressively demonstrate the capabilities of its 5-axis machining centre model FT 2000 PCU with HSK63 spindle taper and 242Nm torque. Result of the demonstration: in the configuration described, the machine proved its

outstanding qualities for the machining of titanium, the preferred material of the aerospace industry, producing a minimum amount of vibration during the operation and offering high efficiency at low power consumption.

Vibration-free to reduce costs

The reason why it is important to deliver a convincing proof of performance is quite obvious: suppliers to the aerospace industry are currently dealing with far-reaching changes. Therefore these suppliers are more than ever required to guarantee part quality and delivery quality at competitive prices.

Without changing the parameters of the cutting process, energy efficiency can be improved by using the HSK63 swivel spindle available for the F series instead of a typical HSK100 solution used throughout the industry so far.

Another cost advantage results from the extremely smooth running of the machine. As a result, an excellent surface finish and a significant improvement of tool life can be achieved resulting in maximum process stability. The machine bed made from epoxy resin concrete used for this machine series is one of the reasons for the smooth operation and the resulting efficient damping of machine movements.

The results of the powerful and structurally stiff machine setup are an extremely high cutting performance and at the same time an exceptionally high chip removal rate – two productivity factors that are of major importance in the aircraft industry.

Taking the high road to maximum productivity with automation

To demonstrate these productivity advantages at WerkTage 2010, a Power Cutting Universal swivel-head unit PCU 63 with 44kW was used which is the most powerful 5-axis unit with HSK63 spindle currently available on the market.

The pallet changer variant is probably the most attractive option within the F series for aerospace applications.

Why is that? It responds to the growing trend of making extensive use of automation solutions in the aircraft industry enabling spindle running times of well over 6,000h per year - a major advantage considering the significant investment costs for these machines. The integration of upgradeable tool, workpiece and pallet handling systems based on suitable standards for the process has already been taken into account in the development of the MCH, MCH-C, H and F series.

Identical cutting performance at any solid angle

Especially in terms of automation, HELLER has been providing excellent solutions and references for years with the successfully introduced 5-axis models from the MCH-C range. With their proven workpiece carrier automation, these machines provide extremely high productivity due to unmanned operation - even when machining a wide range of parts. Werner Kirsten, responsible for technology development at HELLER, explains: "The definition of productivity in the manufacture of parts for the aerospace industry differs from that used in the automotive industry: instead of producing high outputs of similar parts using special tools and fixtures, this industry requires reliable processes and high chip-removal rates at maximum flexibility using cost-optimised tools for a wide range of parts. With our MCH-C range of 5-axis machines we have accomplished this remarkable feat. These machines provide the same cutting performance horizontally, vertically and at any solid angle, whilst maintaining a high level of process dependability. From this perspective, the MCH-C with up to 1,000 Nm torque is also an excellent choice for the machining of titanium."

Machining Innovations Network: Creating synergies through networking

Things are on the move in Varel in Lower Saxony: in mid of May this year, the foundation stone laying ceremony of the Technology Centre Varel (TZV) and the roofing ceremony of the training centre AeroPark Varel (AZV) were celebrated. An important supporter and partner of both undertakings is the Machining Innovations Network (MIN) founded in February 2010. Its goals include the development and initial testing of new technologies and processes for various industries, including the aerospace industry. HELLER is one of the founding members of MIN. Klaus Winkler (Chairman of the HELLER Board of Directors) spoke to UsersNews to explain why the network is so important to HELLER.

UN: Mr Winkler, what were the reasons for HELLER to become a member of MIN?

KW: As one of the technology leaders in the metal-cutting industry, we are able to make a valuable contribution in terms of process innovations. Apart from that, HELLER attaches great importance to practice-oriented research.

„... stimuli for future requirements of the aerospace industry ...“

We are constantly in close contact



Klaus Winkler
Chairman of the HELLER
Board of Directors

with institutions such as the universities of Hamburg-Harburg, Hanover and Magdeburg. We also provide them with machines for trials. That is why it seemed only logical for us to join an initiative that will provide new stimuli for future requirements of the aerospace industry and other branches of industry.

UN: One of the goals is to shorten innovation cycles and achieve faster economic implementation. How do you plan to achieve this?

KW: To be economically successful you need to concentrate on value creation and reduce costs along the entire process chain. This means: only if we know the specific requirements and goals of our customers will we be in a position to develop economically viable solutions. The decisive factor is the interplay between machine, tool, fixture, process, logistics, strategy and cost

avoidance. To achieve this, we need to establish an open and constructive dialogue between users, suppliers and developers

UN: In how far will it be possible to transfer the knowledge HELLER has gained from aerospace applications to other fields?

KW: Well, first of all, the name of the network was chosen with a

„... reduce costs along the entire process chain.“

broader perspective. The Machining Innovations Network regards itself as a basis to advance and promote machining applications using geometrically defined and undefined cutting edges. Therefore it is not important whether a workpiece comes from the aerospace industry, automotive industry or from medical engineering. The network was founded around Premium AEROTEC GmbH, but basically focuses on the development of innovative cutting technologies. Such technologies are required throughout different industries, from machine building, wind energy plant construction and ship building through to the automotive industry or medical engineering.



Founding members of MIN

HELLER industry offensive 2010

Textbook start at Farnborough

HELLER's motto for the coming years is focusing on industries. That is why the machine specialist from Nürtingen in 2010 for the first time decided to exhibit at Farnborough Air Show in the UK, one of the top events of the aerospace industry. What was special about this was that the machine on display was used for a live demonstration of its high performance and precision in the machining of challenging materials.

Geoff Lloyd, Managing Director of HELLER UK, explains how well this concept was received by the aerospace manufacturers and suppliers attending the Farnborough air show. "Word quickly spread at the show that we were actually producing chips at our booth and that we were discussing the real challenges in manufacturing with suppliers and scientists. As a result, we were able to make connections with an unexpected large number of European, American and Asian aircraft

raised the curiosity of many visitors." We noted more than 60 intensive and in-depth discussions each day throughout the show proving the great interest taken by visitors from all over the world.

Result: while the aerospace industry presented flight demonstrations of new models from civil and military aviation in the open-air area of this huge exhibition, the 5-axis machining centre model FT 2000 at the HELLER booth was almost running non-stop. Again and again,



ded Machining Innovations Network based in Varel and scientists from the universities of Magdeburg, Hamburg-Harburg and Dortmund, we have proven that quality, flexibility, delivery reliability, low per piece costs as well as research and development are not contradictions for HELLER", explains Werner Kirsten, responsible for technology development at HELLER. "Instead of simply exhibiting a number of components, we prefer to demonstrate live what a HELLER machine

In focus: high quality and economic-efficiency

"Many visitors to the show were impressed by the masses of titanium chips produced every minute during the roughing operation and then being able to feel a fingernail through a freshly milled, smooth titanium wall with a thickness of 0.4mm. We are thrilled to be part of an important industry event and to have the opportunity to make new contacts in this sector of industry to broaden our network," Werner Kirsten sums up the turbulent days in the UK: we have already been able to prove that HELLER is capable of offering attractive solutions catering to the needs of the aerospace industry. "The market mostly perceives us as a premium supplier and solution partner for the automotive industry. We are now working on raising the market's awareness of the fact that we have also been a qualified supplier to manufacturers in the aerospace industry for more than 70 years offering economically successfully machining solutions for this sector," says Geoff Lloyd.



companies, such as Airbus (EADS), Boeing or Irkut (UAC) and their suppliers."

Crowd puller: flying chips at air show

HELLER Marketing Director, Marcus Kurringer, also expressed his satisfaction: "There were other machine tool manufacturers in the four fairground halls besides us. However, we were the only one with a machine on display. And that

visitors were eager to see the FT 2000's highly precise machining of workpieces from challenging materials such as titanium featuring highly complex, three-dimensionally inclined, lean structural elements.

Convincing: presentation of Machining Innovations Network

"In co-operation with various technology partners from industry and science, including the newly found

is capable of using real workpieces. Of course we had to investigate in the run-up to the event how to get a machine to produce in this challenging environment. But if you are capable of shrink-fitting tools and then performing on-demand wet or dry machining of aluminium, steel, cast iron and titanium parts at such a high quality level in a tent pitched in a car park, then you will also succeed in convincing users of the process know-how of an experienced machine tool builder."

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