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Starrag Magazine | No. 01 – 2018

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Industry insiders gather in Medical Valley
Virtual and real inspiration for medical machining engineers

AECC Chengdu Engine Co., Ltd.
Interview with Zeng Nianke, Minister of blade facilities support department

An order with many extras
Dörries CONTUMAT vertical turning lathe: Use in KSB pump production

The second machine cuts (even) better
FOGS 40 68 C in toolmaking

Four Heckert machining centres for burner housing production at Weishaupt

Among the features of the Heckert 800 X5 MT machining centre that impressed Zwicker was its axis configuration with the X and Y axis in the tool and the Z axis in the rotary swivel table. A vacuum clamping table was required for thin-walled aluminium parts.

Growth through automation and flexibility

The Swiss machining firm Zwicker has geared itself up for the future with a five-axis Heckert 800 X5 MT machining centre and a supplementary linear pallet system. This fully automated production unit allows the company to be highly flexible and productive, and to use that new flexibility to tap into new markets.

When choosing the machine, the top priorities were quality, flexibility and process reliability, properties that the Heckert 800 X5 MT offers in abundance. Markus Zwicker (background, left) and Starrag Area Sales Manager Erwin Fässler were unanimous on this point.

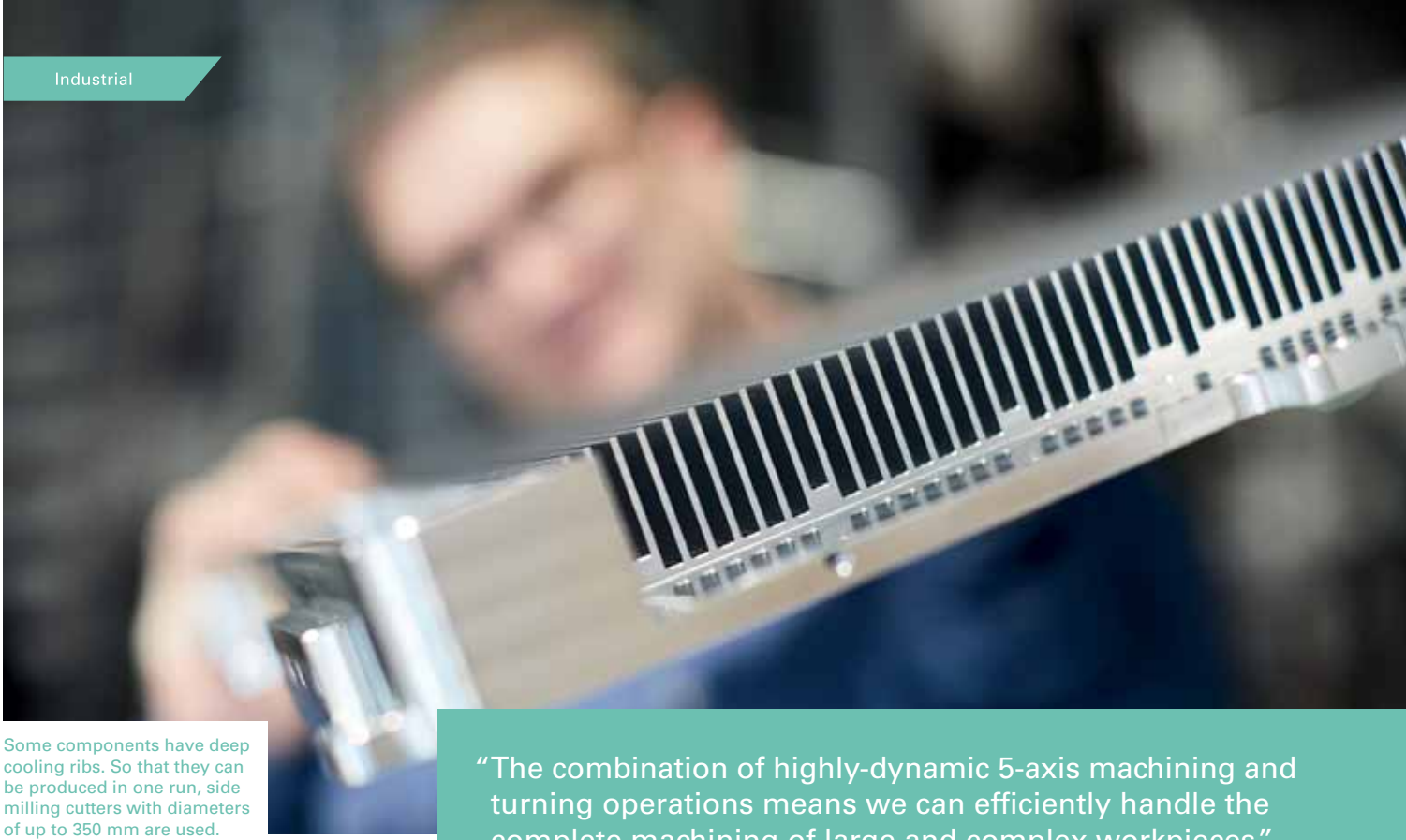
> "This plant has not only allowed us to expand our range of products, but also take profitability to a new level."

Since being founded in 1994 in Engelburg, near St. Gallen in Switzerland, Zwicker Präzisionsmechanik AG has maintained an upward curve of success. With 25 employees, the service provider focuses on machining challenging precision parts made of metallic materials, predominantly aluminium and steel. Markus Zwicker, who took over the management of the firm from his father Othmar in 2015, reveals the recipe for success: "We deliver the quality our customers demand and can be relied on to hit deadlines – all at competitive prices".

Markus Zwicker has no doubt that specialisation is required to survive in the highly competitive market in the long term: "We need to set ourselves apart from other providers with our services. We achieve this with precision machining." Around one year ago, the company added another performance feature to its services. As part of its building expansion, Zwicker invested in a large machining centre with 800-mm pallets. "This means we can now also machine large parts with a diameter and height of up to one metre cost-effectively. At our site, that's really something special", states the master mechanic.

In choosing the machine, the key factors were quality, flexibility and process reliability, with the firm eventually deciding on a horizontal Heckert 800 X5 MT machining centre. Markus Zwicker was in no way prepared to compromise on these points. He explains: "With this machining centre, we need to be able to produce high-precision results and offer very flexible services. For cost-efficiency reasons, the machine also needs to work around the clock. As such, a linear system for pallet handling and maximum reliability throughout the entire process are indispensable."

Those responsible for the machine determined that they required a horizontal, five-axis milling centre with a fast-rotating table for effective turning. A pallet storage system was also made a prerequisite so that the machining centre could be operated fully automatically during unmanned shifts. The specifications also included a large tool magazine. The machine also needed to have an angular head and a replaceable, CNC-controlled U axis to handle demanding contours such as valve seats. Another requirement was a vacuum clamping table in order to clamp thin-walled aluminium parts without warping them.



Some components have deep cooling ribs. So that they can be produced in one run, side milling cutters with diameters of up to 350 mm are used.

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The search for an all-rounder

Most of the machine manufacturers who were approached failed to meet these specifications in their entirety – but not Starrag! The Heckert 800 X5 MT impressed with its axis configuration with the X and Y axis in the tool and the Z axis in the rotary swivel table. Thanks to its thermally symmetrical design, the machining centre operates with the ultimate rigidity, resulting in excellent surface quality and reducing clamping positions. Together with the digital AC feed drives and the profile rail guides and ball screw spindles that are mounted with the highest precision, this ensures a solid basis for rotary machining and milling on all linear axes with a high level of process reliability. "These features mean that the machine is perfect for the automation processes we want to achieve", states Markus Zwicker, who also highlights the design of the work space: "The chips can fall freely into the central swarf conveyor. This prevents chips from piling up in the work space, which would also endanger process reliability".

With its 240 slots, the tool magazine also meets Zwicker's requirements. "Having this capacity allows us to be very flexible and means we don't have to constantly re-tool, even for the smallest series runs", says the CEO. The magazine can hold tools with diameters of up to 350 mm and a length of up to 800 mm and automatically change them. Markus Zwicker uses an example to explain why this is so important: "One of the things we machine is aluminium housings for communication technology, which have deep cooling ribs. To allow us to produce these in one run, we use side milling cutters with diameters of up to 350 mm. If these couldn't be changed automatically, an unmanned night shift would be impossible."

Economic benefits

These thin-walled aluminium housing parts with dimensions measuring 600 × 600 × 100 mm impressively demonstrate the increased cost-effectiveness achieved thanks to the Heckert 800 X5 MT. In the past, Zwicker had to re-clamp the workpiece five times on the old machines during the machining process (totalling 90 % of its volume), whereas the housings can now be processed on the Heckert using just two clamping operations.

And it's not just with the aluminium parts that Zwicker has seen good results. The precision manufacturer processes steel cylinders with a diameter of 750 mm and length of 800 mm for another customer. Spinning at speeds of up to 500 rpm, the rotary table reveals its strengths during turning processes (inside and out). The connecting holes are milled. All the required precision qualities regarding position, diameter and angularity are easily achieved by the machine. The surface quality with a roughness class of N6 is also achieved without any problems.

Markus Zwicker concludes: "The combination of highly-dynamic 5-axis machining and turning operations means we can efficiently handle the complete machining of large and complex workpieces."

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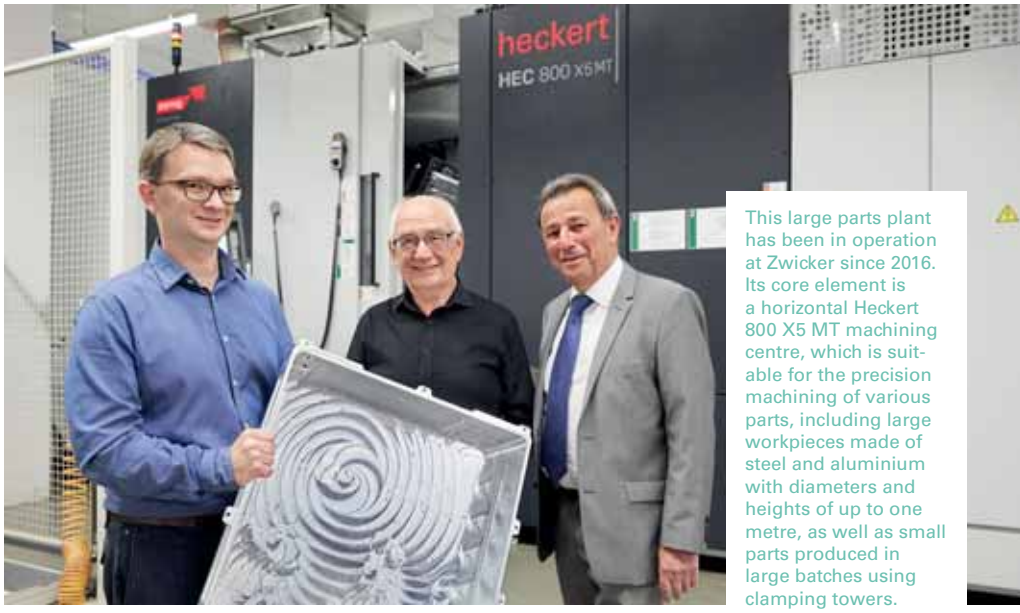
Reducing the required clamping positions and eliminating additional machining work on other machines saves time while also improving manufacturing precision.



This large parts plant has been in operation at Zwicker since 2016. Its core element is a horizontal Heckert 800 X5 MT machining centre, which is suitable for the precision machining of various parts, including large workpieces made of steel and aluminium with diameters and heights of up to one metre, as well as small parts produced in large batches using clamping towers.

Linear pallet system for automated 24-hour operation

For Zwicker, there is no doubt that such a high-end machining centre must be able to deliver three-shift operation, which is why it was stipulated from the outset that it should be equipped with an automated pallet system. Erwin Fässler, Starrag Area Sales Manager for Switzerland and Austria, recommended the Schuler Loadmaster loading system, which adapted very flexibly to demanding installation requirements.

It did not take long for the customer to decide on this system. Schuler developed a suitable system layout for the narrow space conditions restricted by columns. To make the best possible use of the available space, 15 storage slots were installed over a total of three levels. If necessary, another machine can even be connected.

Flexible, even for workpiece clamping

The level of detail that the Zwicker project managers put into their investment is also revealed by the workpiece clamping devices. Their long-standing partner for such components is Triag AG, whose clamping systems are suitable for a variety of clamping situations thanks to their modular design. Zwicker also uses Triag clamping towers with Power Clamp elements, which are suitable for multiple clamping of small parts. "We use these for large-scale machining on the Heckert 800, which preferably takes place on overnight shifts", says Markus Zwicker. To reduce the load on the rotary swivel table, he decided to use new Triag Tripoxy clamping towers. These are made of mineral casting, which reduces the weight compared to previous models. The vibration damping is also so high that it is possible to work very precisely even in the upper range of the towers, meaning excellent surface results can be achieved. The slow heat cycle and the minimal expansion of the Triag clamping towers are also key aspects of reliable production.

Markus Zwicker sums up: "The new large parts plant has been running for a year now, and we are very satisfied with it. The Starrag machining centre has proven itself capable of the precision machining of a wide variety of parts, for large workpieces made of steel and aluminium, as well as for small parts that we produce in large batches using clamping towers. The pallet system supplies the 5-axis machining centre reliably, even during completely unmanned shifts. This plant has not only allowed us to expand our range of products, but also take profitability to a new level".