The best way to receive musical pleasure

Small series production: Five-axis CNC milling center increases productivity in organbuilding
Success based on tactfulness and state-of-the-art technology

The organ builder Lauckhuff relies on Spinner and Siemens

As worldwide leading manufacturer of organs and organ parts, Laukhuff Corp. has earned highest prestige in the industry sector. The large success is based not only on the knowledge, musical sense and craftsmanship of the staff, but also the need for state-of-the-art technology that allows maximum precision and productivity. Highlight of the cutting production: A Spinner five-axis milling center of the new U series with state-of-the-art CNC.

For the Weikersheim company Laukhuff, tradition and modernity are combined in such a way that can not only be seen but, in particular, also heard. The family company whose history goes back almost 200 years is internationally leading in organ building – as supplier for the most well-known organ builders and as provider of its complete own developments. Although active throughout the world, Hans-Erich Laukhuff CEO places large value that he with his 150 employees is not called an industrial company but primarily a handicraft business: „We are largely a classic manufacturing company with 80% labor costs and a production depth of 90%. In particular in our joinery workshop and for the manufacture of organ pipes, we have very little use of machines because as much as 90% manual work is required. The situation, however, is different where cutting operations are required. There we use modern milling and turning machines with the innovative Sinumerik CNC family in order to achieve the maximum possible productivity."

If required, we assume all pending tasks, starting with design, including the single part production, and ending with the assembly on-site. We build even the bench and the key lighting ourselves because there are no suitable solutions available on the market. For investments that lie in the mid-six-figure euro range, our customers rightly expect a perfect arrangement, something they also get”, added Laukhuff.

The high perfection of the organ builder makes itself apparent in the optics, surface feel and, naturally, in the sound of the instruments. It also has a positive effect on its reliability. After all, other than usual for today’s fast moving time, one does not need to plan a replacement investment for a Laukhuff organ even after 100 years. If need be, just a few spare parts may be required.

Despite its high quality renowned throughout the world, the Weikersheim family business is also subject to continuous price pressure. To counter this pressure, Aug. Laukhuff GmbH & Co. KG adopts all possible measures to increase the productivity. Manual work has largely been eliminated, in particular, in machining operations. Much familiar in an industrial operation can also be found here. Five CNC turning machines and three CNC milling machines ensure high throughput – in particular with the latest acquisition: A CNC five-axis center (3+2) of the Spinner U series with the modern Sinumerik 840D sl automation system.

Above: This combination provides an excellent price-performance ratio - the 3+2-axis Spinner U5-620 equipped with the CNC Sinumerik 840D sl.

Below: The company director Hans-Erich Laukhuff states: “Neither our carpenter’s shop nor our organ pipe workshop can hardly use machines. This is different in the metalcutting shopfloor where we rely on state-of-the-art milling and turning machines equipped with the innovative Sinumerik CNC in order to maintain our high productivity.”
State-of-the-art technology opens up new possibilities

Five-axis milling center with state-of-the-art CNC creates capacities

The price/performance ratio of the CNC five-axis center convinced

„A successful combination“, agreed CEO Hans-Erich Laukhuff and production manager Walter Rhein. The organ builders have been well familiar with the Siemens controller since 2001. With the US, however, since mid-2009 for the first time they have favored the Spinner Werkzeugmaschinenfabrik based in Sauerlacher. As decisive reason, the production manager mentioned the good price/performance ratio and the low space requirement of the machine with respect to comparable concepts of other manufacturers. Although the U5-620 has just a 2000 mm x 2400 mm footprint, it permits 620 mm / 520 mm / 460 mm travel in the X, Y and Z directions.

The new Spinner machining center constructed based on the moving column principle provides as standard 32 tools and a double-arm for fast tool change. To satisfy the high technical requirements of customers such as Laukhuff, the drives and the CNC originate from the German premium supplier Siemens. In addition, the linear axes run on roller bearing guides, as Michael Schulz, Spinner sales representative at Hollenbach GmbH, emphasized: „Thanks to the high-quality individual components, we achieve rapid traverse speeds of 48 m/min in all directions. Also with regard to precision and surface quality, our U series sets a high standard with values for the Pmax positioning precisions in the X, Y and Z axes of 7 µm and in the B and C axes of 0.005°. The linear axes achieve a precision for Pmax of less than 1.5 µm and in the rotary axes 0.001° (3.6 angular seconds).“

Thanks to the achievable productivity and quality improvements, the organ builder calculates that the acquisition of the Spinner machine will amortize itself within a short time. Finally, the time-consuming reclamping can often be saved, as Walter Rhein confirmed:

„For the cutting operations on our tuners for organ pipes, previously we had to reclamp three times and needed approximately thirteen minutes of pure clamping time, without including the idle time for the reclamping. The five axes now allow us to manufacture with a single clamping in less than eight minutes. Overall, this makes us twice as fast."

Because Laukhuff with the Spinner U5-620 has a five-axis machining center in operation for the first time, the machine operators and their supervisors regularly find new usage and improvement possibilities. For example, the fan impellers of the organ pipes previously manufactured as cast part will soon be milled with new geometry and high performance characteristics on the new machine. In addition, the organ builder has found niche products of the industry as new business area and manufactures parts in small lot sizes (from one to hundred) for sausage peeling machines and for high-voltage transformers.

The graphic animated user interface helps during the workshop programming

Like many medium-sized contract manufacturing companies, the organ builder’s staff also program directly on the machine. CNC specialist Kurt Stüdlein has mastered the DIN programming perfectly and has already operated very many different controllers. He is unquestionably convinced by the Sinumerik 840D sl automation system and characterizes it as high-performance, safe, user-friendly and reliable. The last characteristic is based not least on the fact that this CNC generation can integrate a closed operating system that is largely unaffected by viruses.

Of major importance for the workshop programming is also the Shopmill user interface of the CNC. Graphically animated and with logical structure, it is a big
help, in particular for novices. Production manager Walter Rhein explained: „Even a newly trained fitter without comprehensive programming experience can perform such a task after a short familiarization. If something should be unclear, the operator only needs to press the Help key on the operator console to activate an ‘electronic helper’ that provides appropriate information.” Or he asks CNC professional Kurt who also appreciates the Shopmill capabilities: „I can create many program steps with Shopmill even for complex components of the 3+2 axis machining. If during the input of specific contours I reach limits or would be faster with DIN, I can press a button to switch between the graphic user interface and the text-oriented DIN user interface depending on what appears to me to be more appropriate.”

The „Safety Integrated“ software solution integrated in Sinumerik 840D sl also provides additional worker safety. This makes it possible for the operator to follow without danger the manufacturing process of his/her program in setup operation while the machine door is open. The data monitoring is performed using two different channels diagonally between drive and CNC and ensures that all drives stop after 1 to 2 mm at the latest. After the gained experience, CEO Hans-Erich Laukhuff is sure that he made the correct decision with the Spinner-Siemens combination. He is convinced not only by the technology but also by the fast service provided by both companies: „Should a problem occur, we are helped very quickly, although this is not obvious for all manufacturers in this industry sector”, he summarized the important reasons and added: „We sense even with the telephone hotline a high acceptance and are immediately transferred to a competent technician who can help us quickly.”

Aug. Laukhuff GmbH & Co. KG, Weikersheim, ...

...was founded in 1823 and since then as tradition-oriented family business has been committed to the organ building and organ components market. Since 1972, master organ builder Hans-Erich Laukhuff has managed the company with 150 employees characterized by its craftsmanship and musical instinct. In addition, Laukhuff makes regular investments in modern machines that achieve high productivity, in particular in the mechanical cutting. With its high-quality technical equipment, the company now also accepts subcontracting work for niche products from various industrial sectors.

Long version of the five-axis U series

Since September 2008, Spinner has new U series moving column machining centers in its program. Such machines are sold primarily as five-axis version. After the U5-620 that has established itself on the market, since the EMO 09 there are also the larger U5-1520, U5-2520 and U5-3520 machines that are particularly suitable for long workpieces. The travel of the Y and Z axes are 520 mm and 460 mm, respectively, and identical for all versions. According to Michael Schulz, Spinner sales representative at Hollenbach GmbH, Korntal-Münchingen, the difference lies in the significantly longer X axis that permits travel distances as large as 1520, 2520 or 3520 mm.