

# Motion

01.2023  
The UNITED GRINDING Group's  
customer magazine

**INTERVIEW**

How are we increasing the resilience of the supply chain?

**INDEPTH**

Technology for battery production in electromobility

**INTERNATIONAL**

Japanese customers have high demands for quality and service



## JOINT RESEARCH

Investments in research and development benefit customers, but they ultimately also benefit the entire industry. The future of grinding is being developed by UNITED GRINDING Group teams in cooperation with universities and research institutions, among others

*Visiting the STUDER TechCenter:  
From the right Thomas Engelfried,  
Frank Fiebelkorn and Christian Josi.  
Applications developed here  
can have multiplier effects for  
the entire industry*





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### IMPRINT

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## “INNOVATION MUST NEVER BE AN END IN ITSELF”

DEAR READERS,

Our “Motion” magazine is a **showcase of the innovations in the tool and grinding machine sector** that come from the UNITED GRINDING Group. In this issue, we provide insight into our activities aimed at constantly developing and implementing new ideas.

Research and development must come together on the right platforms. Cooperation with universities is just as important as well-established internal teams. The “Motion” report on page 8 focuses on the **“Technology & Applications” team**, a group of employees from all companies of the UNITED GRINDING Group from the areas of research, development, testing, and technology.

The photos were taken at a meeting of the team in the TechCenter at STUDER in Thun, Switzerland. Similar facilities are located in other companies in the Group and show the importance we attach to innovation and how closely development aligns with the requirements and needs of our customers.

“The **development of new machines and processes** is extremely important for the success of our customers and thus also for our own success,” said our colleague Frank Fiebelkorn, Head of Research and Technology at STUDER, in the “Motion” report. What we learn about **digitalization** also applies to innovations: Both must never be an end in themselves but must follow clearly defined goals and needs.

Of course, the aim is also to use **overarching research and development** to generate useful insights for the entire industry and thus contribute to its further development. The innovations created in this way ultimately help to find better solutions for the users and in the end, make our customers even more successful. This is what we want to be measured by.



*Stephan Nell,  
CEO, UNITED GRINDING Group*

**Stephan Nell**  
CEO, UNITED GRINDING Group



Photo: Shutterstock / Enguerrand Cales

## THE WORLD OF SILICON

Wafers are the basis for electronic circuits and computer chips: roughly one-millimeter-thin disks made of semiconductor material. Due to their optimal properties, they are usually made from the metalloid silicon that can be seen here. The name comes from Latin and means "pebble". It is the second most common element on Earth after oxygen. The industry grows high-purity silicon crystals in reactors and initially produces ingots from them. These metallic, shiny cylinders are then cut into slices with high-precision diamond saws. For high wafer quality, the ingots must be precisely ground with the correct crystal orientation. STUDER has equipped the S41 external cylindrical grinding machine with a built-in X-ray measuring head for precisely this purpose, thereby supporting UNITED GRINDING Group customers in an environment of increasing wafer demand.

CANADA

## GIL BEUTLER WINS BRONZE AT WORLDSKILLS



**POLYMECHANIC GIL BEUTLER, TRAINED AT STUDER**, took third place in the WorldSkills vocational world championships. The competition in the category of Industrial Mechanics took place in October 2022 in Brampton, Canada. "By winning the bronze medal, I was able to successfully complete a long training period, which is a very successful conclusion for me and everyone else who was part of this success," says the 20-year-old. He had already won the gold medal at SwissSkills in 2020, and one year later he won silver at EuroSkills. Beutler would now like to begin a work-study program parallel to continuing his career at STUDER.

SWITZERLAND, GERMANY, CZECH REPUBLIC

## INVESTMENT IN PHOTOVOLTAICS

**THE UNITED GRINDING GROUP** is making more investments in clean energy supply for its own operations. By 2024, four photovoltaic systems will be commissioned at the Fehrltorf (MÄGERLE), Hamburg (BLOHM JUNG), and Tübingen and Kuřim (WALTER) sites. "On the one hand, we want to use sustainable energy without carbon emissions and, on the other hand, we want to become more independent from external sources," explains Erich Schmid. It is a substantial investment and, in the long term, photovoltaic systems should be installed wherever the prerequisites are favorable – for example, large roof areas.



ITALY

## WALTER EWAG ITALIA IS MOVING

**WALTER EWAG ITALIA** will open the doors to its new facility this summer. The new location is in Vertemate con Minoprio in Como Province in Lombardy, just a few kilometers from the previous headquarters in Bregnano. As a result of the move, the area has more than doubled from the previous 240 square meters to 820 square meters. Part of the new two-story building is a spacious demo center (120 square meters) for the presentation and demonstration of machines in a representative setting. Gaining more area was the main reason for the move, as the previous location was no longer sufficient due to the growing business activity in Italy. A team of twelve is responsible for sales, technical support, customer care, and administration at WALTER EWAG Italia.



SWITZERLAND

## INTERNATIONAL REPRESENTATIVE MEETING

**MORE THAN 300 SALES PARTNERS** and sales employees from 35 countries traveled to Thun in February for STUDER's annual international representative meeting. According to the motto "Expedition 2023", this time we embarked on a symbolic research journey. Participants learned more about new products and success stories in internal and external cylindrical grinding in order to provide even better advice and support to customers in their home countries. During workshops and a joint trip to the mountains, participants from Europe, America, and Asia found an opportunity to exchange knowledge. The STUDER annual press conference was also held on the occasion of the representative meeting. More than 60 international press representatives accepted the invitation.

SWITZERLAND

## 2023 FRITZ STUDER AWARD ANNOUNCED

**FOR THE SIXTH TIME** STUDER is awarding the "Fritz Studer Award". Students from Europe's technological institutes and universities of applied sciences can apply with projects that are relevant to mechanical engineering – for example, for innovative machine concepts, alternative materials, or solutions for grinding processes. The work of individuals or teams should demonstrate implementable approaches and innovations that drive the machine tool industry forward. The prize is awarded every three years and is endowed with 10,000 Swiss francs. The closing date for applications is September 30, 2023, the award ceremony will be presented in February 2024.



*The "Fritz Studer Award" encourages innovative ideas and new technologies for mechanical engineering*

When it comes to research and development, the UNITED GRINDING Group relies on regular exchanges with employees and external research institutions

TEXT: Markus Huth

PHOTOS: Thomas Kunz



# THIS IS WHERE THE SPARKS ARE FLYING!

*The STUDER TechCenter in Thun occupies an entire floor filled with machines, rooms, and systems for the development and testing of innovative products and grinding technologies*

*Thomas Engelfried  
heads the "Experimental  
and System Testing"  
department at WALTER*



HE WAS SOMEWHERE ON THE BALTIC SEA WHEN Thomas Engelfried looked at the radar display on the bridge of his sailboat and wondered: why wouldn't this also be good for machine tools? "Radar waves can penetrate through liquids, whether rain clouds or coolant. This must make it possible to precisely measure the grinding wheel in the micron range, even during machining," he explains. Until now, only tactile measurement has been used during processing breaks, which leads to significantly higher non-productive times. And because Engelfried manages the "Experimental and System Testing" department at WALTER, he immediately wrote an initial concept for technical implementation and discussed the project with his colleagues from the UNITED GRINDING Group – in fact, at exactly the same type of meeting taking place today at STUDER in Thun, Switzerland.

The Technology & Applications team is a group of employees from all companies of the UNITED GRINDING Group from the



*The WireDress® dressing process from STUDER is also an innovation developed in the TechCenter*

## "THE BEST IDEAS ARE SPARKED DURING THE BREAKS."

*Thomas Engelfried*

areas of research, development, testing, and technology. Its purpose is to bundle joint expertise for the benefit of the customer. The meetings take place twice a year alternately at various UNITED GRINDING locations, and today 19 experts have traveled to STUDER in Thun to exchange information on the latest technologies and projects.

"The development of new technologies and processes is extremely important for our success and that of our customers," says Frank Fiebelkorn, Head of Research and Technology at STUDER. He initiated and moderated these meetings. He is currently leading his colleagues Engelfried and Christian Josi, Head of Digital Engineering at UNITED GRINDING, through the in-house TechCenter – an entire floor full of machines and systems for testing and developing innovative products and grinding applications.

### THANKS TO C.O.R.E., MACHINES ALSO WORK AS A TEAM

The three stop by a machine with a C.O.R.E. panel; the large touch display is reminiscent of a futuristic smartphone – UNITED GRINDING's new cross-brand hardware and software architecture is installed on an increasing number of machines. "With its

intuitive operation, smart networking, process visualization, and digital assistance systems, C.O.R.E. is revolutionizing the way grinding machines are handled," Josi explains. Creating this technology was also only possible through the exchange of expertise and ideas ("Motion" reported in detail in issues 1/2021 and 1/2022).

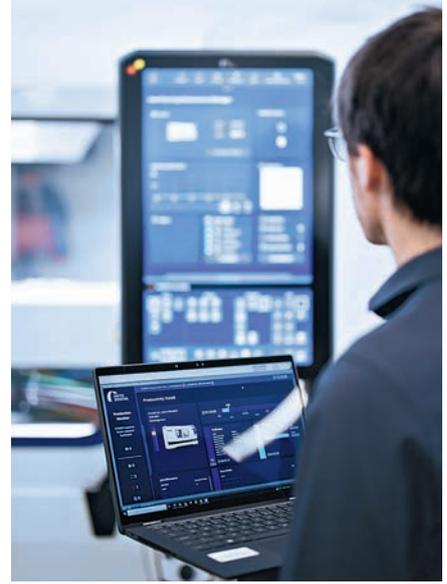
Josi leads the team responsible for the umati (Universal Machine Technology Interface) communication protocol, an initiative of the German Machine Tool Builder's Association (VDW). This allows C.O.R.E. to even communicate with machines from other manufacturing companies. "Imagine what would happen if people just did their job without sharing information and learning from each other. No team can function sustainably under those conditions! It has to be the same with machines," he explains. It is therefore important in cases like this that, in spite of competition, manufacturing companies take an active part in developing, standardizing, and standards in order to advance the industry as a whole. "For us, the focus is always on the customer – because we want to make them even more successful and offer them sustainable solutions and future-proof investments," explains Josi.

However, the creative and professional exchange is not just important within the corporate group. Thanks to its close links to industry associations, educational institutions, and research institutes, UNITED GRINDING is always close to the latest developments and innovations. For example, Engelfried's idea for the radar sensor led to a research project he led with the Technical University of Braunschweig and the Fraunhofer Institute for Applied Solid State Physics via a tender from the VDW. "After two and a half years, the radar sensor's functionality has now been proven for this specific application," he says.

**COOPERATION SERVES CUSTOMERS**

Fiebelkorn, who is chairman of the "Grinding Technology Working Group" at the VDW, also emphasizes that the cooperation between industry and research institutions ul-

timately directly benefits customers. "This is the only reason we are able to repeatedly set standards in technology, quality, and precision throughout the industry." For example, the STUDER WireDress® dressing process for metal-bonded CBN and diamond grinding wheels, is particularly suitable for use in e-mobility. This process is so good that it is now also adopted by others in the industry. But thanks to its in-house development, the UNITED GRINDING Group has a head start, and the latest generation is already here. In addition, a joint project is currently underway between STUDER and the Laboratory for Machine Tools and Production Engineering (WZL) of RWTH Aachen University for the development of a new assistance system that can provide operators with realistic forecasts of the process and component quality thanks to state-of-the-art sensor technology. The X-ray measuring head on the S41 for



*Machines with C.O.R.E. have a state-of-the-art touch display and communicate with third-party systems thanks to umati*

correct alignment of silicon crystals for wafer manufacturing in chip production is also the result of developments in cooperation partnerships. "In this way, STUDER makes an important contribution to the production of computer chips, because our cylindrical grinding machine can correctly align silicon or silicon carbide blanks for further processing based on their internal crystal structure thanks to its X-ray sensor," says Fiebelkorn.

**"THANKS TO UMATI AND C.O.R.E., GRINDING MACHINES AND MACHINE TOOLS CAN ALSO WORK AS A TEAM."**

*Christian Josi*

*Christian Josi, Frank Fiebelkorn and Thomas Engelfried (from the right) discuss innovative technologies during a tour of the STUDER TechCenter*



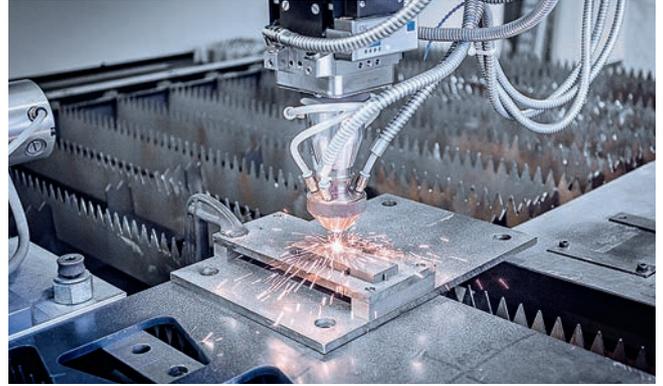
## WE RESEARCH TOGETHER

The best technologies are created by bundling ideas and competences. The UNITED GRINDING Group is therefore collaborating with a large number of renowned research institutions – here are some European examples



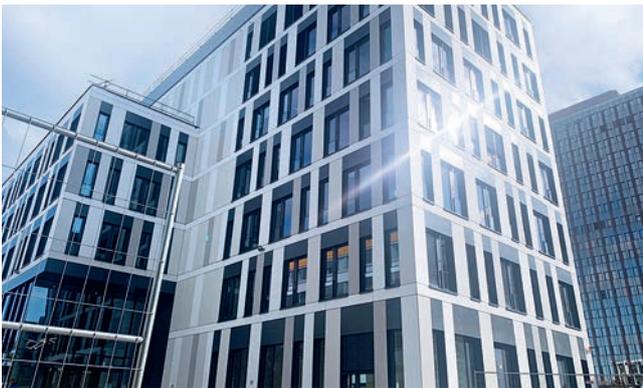
### WZL / RWTH AACHEN

For decades, the Laboratory for Machine Tools and Production Engineering (WZL) of RWTH Aachen University has enjoyed an excellent reputation in the field of production technology all over the world. Led by four Chairs, six research areas are devoted to both basic research and practical projects in cooperation with industry. There has been a long-standing trust-based cooperation with the UNITED GRINDING Group. Both BLOHM JUNG and STUDER are members of the “Grinding Technology Working Group” and, with WZL, are researching, for example, the next generation of digital assistance systems that can significantly improve process management and forecasting based on sensor data. There is also close cooperation with MÄGERLE, and WALTER EWAG participates in joint research projects in the “Tool Technology Working Group” in the areas of cooling lubricant and machine diagnostics.



### INSPIRE AG / ETH ZURICH

Inspire AG is a center of excellence in production technology and a strategic partner of the Swiss Federal Institute of Technology – ETH Zurich. As a publicly funded research institution, it conducts projects together with Swiss machine manufacturers, manufacturing companies, and other research institutions that bridge the gap between basic university research and industrial development. In addition to various products from the UNITED GRINDING Group, which are the result of joint projects with inspire AG, IRPD, a leading provider in the field of industrial additive manufacturing today, was born out of the collaboration. Furthermore, there is a long-standing partnership for the development of machine beds made of mineral cast Granitan®, which ensures exceptionally high stability and precision in grinding machines.



### THE VDW

One of the most important regulatory bodies for research projects in the German machine tool industry with production-related Chairs at German universities is the German Machine Tool Builder's Association (VDW) with the affiliated VDW Research Institute. Both are based in Frankfurt am Main, Germany. For more than 130 years, the VDW has been committed to ensuring that the German industry is among the international technology leaders. Employees of the UNITED GRINDING Group also participate in the various VDW working groups, propose research projects, participate in the awarding of contracts to the institutes, and support the project progress. In addition, the UNITED GRINDING Group has a seat on the VDW Board of Directors.



### IWT / UNIVERSITY OF BREMEN

For more than 70 years, the Leibniz Institute for Materials-oriented Technologies (IWT) has been synonymous with research into new materials, processes, and optimized components. It is independent, but cooperates closely with the University of Bremen and is located on its campus. There are regular collaborative research projects with the UNITED GRINDING Group that make grinding processes safer and more efficient, as well as investigate the potential of additive manufacturing. A currently planned project with BLOHM JUNG addresses a digital assistance system that can automatically warn the operator of grinding burn.

Arne Hoffmann is Head of "Project Planning and Technology" at BLOHM JUNG and gives a presentation via live video streaming



**"SPECIFIC USES CAN TRIGGER DEVELOPMENTS FOR THE ENTIRE INDUSTRY."**

*Arne Hoffmann*

**LASER CONTOUR CHECK WAS CREATED IN A TEAM**

This cooperation philosophy has also led to WALTER's innovative measuring method, which sets new standards throughout the industry: Laser Contour Check. This is a smart laser system directly integrated into the tool grinding and eroding machine for highly accurate, non-contact measurement of contours on cylindrical cutting tools. Previous comparable systems only worked selectively and were not able to scan the entire contour of a cutting edge. The WALTER technology with the more exact blue laser light is precise and, due to its wavelength, significantly less sensitive to coolant residues on the tool surface. Engelfried explains that the entire measured tool contour can be automatically corrected in the process, and he attaches particular importance to one aspect: "This kind of highly innovative development is not possible when working alone." Often, it is only at a meeting like the one today that it is decided for which company of the UNITED GRINDING Group a new technology is ideally suited. Laser Contour Check, for example, initially began at STUDER, was further developed

at WALTER, and is now in use in its machines. "By the way, the best ideas are often sparked in break-time conversations during meetings like the one today," laughs Thomas Engelfried.

**A BALANCING ACT BETWEEN BASIC RESEARCH AND APPLICATION**

The three colleagues are now finishing their tour of the TechCenter and returning to the large conference room. They are now looking forward to the presentation by their

colleague Arne Hoffmann, who heads the "Project Engineering and Technology" department at BLOHM JUNG. His picture appears large on the wall as he participates via live video stream. Among other things, Hoffmann talks about the balancing act between basic research and application development, which is often required in his day-to-day work to build tailored systems for customers. Together with the Leibniz Institute for Materials-oriented Technologies (IWT) at the University of Bremen, BLOHM JUNG is

*Frank Fiebelkorn, Head of "Research and Technology" at STUDER, is particularly committed to professional and creative exchange with regard to innovative technologies*



**"THE COOPERATION BETWEEN INDUSTRY AND RESEARCH INSTITUTIONS DIRECTLY BENEFITS CUSTOMERS."**

*Frank Fiebelkorn*



*Christian Josi (left) talks to Thomas Engelfried about what valuable information this transmitter could provide to further optimize processes*

currently planning a project with an algorithm that can predict grinding burn based on sensor data already available in the machine. Another project with the Laboratory for Machine Tools and Production Engineering (WZL) of RWTH Aachen University intends to use sensors to predict the correct dressing moment for grinding wheels. "In the best case scenario, there is a multiplier effect, in which a specific development can subsequently bring the industry forward as a whole," explains Hoffmann. Particularly in the field of electromobility and the streamlining of supply chains, he sees great opportunities for manufacturers of grinding and machine tools due to the new requirements.

### BREWING NEW IDEAS

After Hoffmann's presentation, everyone talks informally again during a break, exchanges ideas, and small groups form on different facets of the topic. In the end, Frank Fiebelkorn says goodbye to all participants and wishes them a safe trip home to their companies. Now many new ideas are brewing for future cutting-edge and enhanced GRINDING technologies, which will benefit all customers of the UNITED GRINDING Group. ○

**"AT UNITED GRINDING,  
THE DECISION ABOUT WHICH  
TECHNOLOGY BEST SUITS WHICH  
COMPANY IS DECIDED JOINTLY."**

*Thomas Engelfried*



*Arne Hoffmann speaks with Peter Frahm about the current status of new machines in the showroom / TechCenter*

# BETTER BATTERIES FOR THE CLIMATE

Batteries for electric vehicles are the key technology for climate-friendly mobility. Northvolt, with the largest battery factory in Europe, specializes in the sustainable production of these batteries. The UNITED GRINDING Group is supporting the company in Sweden with technology

TEXT: Markus Huth



*The „Northvolt Ett Gigafabrik“ in Skellefteå, Sweden, produces sustainable batteries for electromobility. It is the largest of its kind in Europe and is expected to rival Asia and the USA. The global competition for batteries for electric vehicles has not yet been decided*

ON AN ICY WINTER DAY two large trucks trundle along the snow-covered streets of Skellefteå in northern Sweden. Just a few hundred kilometers south of the Arctic Circle, there is only a few hours of sun a day and the long winter nights are sometimes illuminated by the glow of the Northern Lights. The trucks have come from the south, from the headquarters of BLOHM JUNG in the Hanseatic City of Hamburg, Germany. And they have a precious cargo on board. The two modern grinding machines, each weighing over seven tons, are equipped with the latest technology from UNITED GRINDING, including C.O.R.E., the revolutionary hardware and software architecture.

They have been configured and customized especially for the customer here in Skellefteå. Northvolt is one of the leading

companies in the production of environmentally friendly lithium-ion batteries for electric vehicles. The special thing about Northvolt batteries is that not only can they store clean energy, but their method of production is also particularly eco-friendly. Northvolt's goal is to manufacture batteries with a carbon footprint that is 80 percent lower than that of batteries produced using fossil energy.

#### **EFFICIENT USE OF RESOURCES THANKS TO RECYCLING**

This can only succeed because the electricity for production comes from renewable sources and important raw materials are also recovered by recycling used batteries. The aim of Northvolt's Revolt campaign is to recover at least half of its raw materials through recycling by 2030. To this end, they opened the



*On a cold winter day, two trucks from Hamburg bring BLOHM JUNG's machines to Skellefteå. They will support Northvolt in the production of environmentally friendly batteries*

*The „Northvolt Ett. Gigafabrik“ in Skellefteå, Sweden, was recently still a construction site and is now one of the most modern factories of its kind in the world. The machines from BLOHM JUNG are now also carrying out their important work here for sustainable battery production*



largest electric car battery recycling plant in Europe in May 2022 working in collaboration with the energy company Hydro. The plant is located in Fredrikstad, Norway. Major car manufacturers, such as Volkswagen, BMW and Volvo, are already working with them.

And BLOHM JUNG is now also making a major contribution to Northvolt's production of sustainable and environmentally friendly batteries. The two machines will complete the state-of-the-art machine hall at the Skellefteå „Northvolt Ett Gigafactory“, which was still a construction site around a year ago. The Swedes approached the Hamburg-based company with a particularly demanding assignment in 2021. BLOHM JUNG immediately started work on developing the custom machines.

The high quality of UNITED GRINDING's systems, regular communication and excellent technical services all guarantee high customer satisfaction in Skellefteå. And as Northvolt is currently expanding its production capacity considerably, there are already talks about ordering additional machines – and soon more trucks could be on their way from Hamburg. ○

## BLOHM JUNG MAKES AN IMPORTANT CONTRIBUTION AT NORTHVOLT FOR THE PRODUCTION OF SUSTAINABLE BATTERIES



*Philippe Walter,  
Sales Director China  
at STUDER*



## “WE HAVE THE RIGHT MACHINES”

Manufacturing batteries for electromobility requires state-of-the-art and precise technologies. Because the UNITED GRINDING Group invested in this area at an early stage, it now provides its customers with significant competitive advantages

**Mr. Walter, at STUDER, you are responsible for sales in China, a leading country in the production of lithium-ion batteries. Why are machine tools important for this?**

The market is not only extremely dynamic and highly competitive in China. Many companies now want to enter the market. However, this is not very easy because manufacturing batteries is complex and requires technologies and processes that have not been around for a very long time. It is now worthwhile that we invested in development in this area at an early stage because the right machine tools can bring decisive competitive advantages here.

**What role do grinding machines play in battery manufacture?**

Grinding machines are an important element of the overall concept. To put it simply, customers need our machines in order to manufacture and maintain the tools for battery manufacture. This is why we are currently experiencing increased demand for different systems.

**Can you give specific examples?**

The S131 Radius CNC universal internal cylindrical grinding machine from STUDER is important for grinding the diameters and radii of drawing dies for the production of battery housings for cylindrical batteries, for example. Cylindrical batteries are common among other geometric shapes and are typically produced in the size with a diameter of 46 millimeters (1.8") and a height of 80 millimeters (3.15").

Another example is sheet metal work in general for batteries, which must be much more precise than in other industrial sectors. The cutting and punching tools require special guide elements, which are not cylindrical as is common but have multi-surface bodies with several edges. These can be produced particularly efficiently and easily, for example with our S31 and S41 universal cylindrical grinding machines. They use our high-speed machining control software for high-precision and productive form grinding.

**Are there any other aspects related to batteries in which machine tools play an important role?**

Batteries are not the only energy source used to drive electric vehicles. Fuel cells with built-in compressors for gaseous media are also used. These special high-speed compressors have to be very powerful on the one hand, and space is limited on the other hand. These turbines are therefore made of particularly hard special material such as ceramic, which conventional grinding machines can only process inefficiently and with a lot of rejects. Our machine-integrated WireDress® electro-erosive dressing process, on the other hand, enables precise dressing, even for hard, metal-bonded grinding wheels. This gives our customers a great advantage here.

# WE CARE

Innovative technologies and machines tailored to individual requirements are among the UNITED GRINDING Group's trademarks. This is made possible by competent and motivated employees – we would like to introduce four of them



## “THE IN-HOUSE LABORATORY IS IMPORTANT”



**STEFAN FRUTIGER**

**POSITION:** Development Engineer at STUDER, Thun, Switzerland

**CONTACT:** Stefan.Frutiger@studer.com

“EACH NEW MACHINE contains different sensors, actuators, and devices for various purposes,” says Stefan Frutiger, describing one of the challenges of his work. Among other things, he uses EMC measurements to ensure that these various parts do not influence each other and affect the optimal operation of a system. “We do this during development and can thus ensure good efficiency and reliability for our customers at an early stage.” The qualified electrical engineer specializes in Industrial Automation and Control and has been with the company for 15 years. It is particularly important to Frutiger that nothing is installed that has not previously been tested in the in-house laboratory. He and his team thus achieve high EMC quality without delaying the development timeframe for new machines. “The interplay of different technologies and the analysis of their durability are very exciting and varied,” says Frutiger, adding “My working day is always different – from standardized measurements to testing new sensors and solving daily problems, I get to do everything.”

## “PEOPLE CREATE INNOVATION”



**WOLFGANG NUBER**

**POSITION:** Technology Division Manager at WALTER, Tübingen, Germany

**CONTACT:** Wolfgang.Nuber@walter-machines.de

“IN ORDER TO MEET the ever-increasing requirements of our customers for accuracy and automation, we are continuously researching, developing, and evaluating new technological approaches,” says Wolfgang Nuber, who heads the Technology Division at WALTER. His tasks include the coordination of over 50 employees at the sites in Tübingen, Germany, and Kuřim, Czech Republic, the maintenance of the product roadmap, budgeting, and patent-related processes. He is currently working on numerous new development projects. “It is very important to me that constructive ideas inspire and foster my team’s existing excellent competencies so that they can be put to use. This is the only way we can achieve optimal solutions with the required quality and within a realistic cost framework,” says the trained mechanical engineer, who has been working at the company since 2010. Nuber believes that competent and motivated employees are of equal importance as the technology in the machines when it comes to smart, innovative solutions. “It’s great if we can work together to improve every day and thus ensure customer satisfaction.”



## “CUSTOMERS BENEFIT FROM BETTER ENERGY EFFICIENCY”



### KAI HÖLK

**POSITION:** Research Engineer at BLOHM JUNG, Hamburg, Germany

**CONTACT:** Kai.Hoelk@blohmjung.com

KAI HÖLK'S MAIN TASKS INCLUDE DEVELOPING NEW MACHINES and prototypes as well as carrying out tests. The research engineer has been working at BLOHM JUNG since 2005 and is currently working on optimizing the energy efficiency of current and new models. “Most of our machines consist of a wide range of options and special customized solutions so that the consumption of compressed air or coolant pumps must be measured individually almost everywhere,” he says. But the work is worthwhile because, in the end, customers benefit from reduced energy consumption and production costs. “For example, we have been able to reduce the compressed air consumption of PLANOMAT-XT machines by more than 20 percent by optimizing the purge air supply to protect the bearings on table dressing devices,” he mentions. This significantly reduces costs, as compressed air is one of the more expensive energy expenditures. Hölk told us that he particularly enjoys the variety in his work. He is also pleased that the results of this work will benefit the entire Group thanks to the internal exchange of information.



## “EACH MACHINE IS CUSTOMIZED”



### FABIENNE SCHLÄPPI

**POSITION:** Mechanical Engineering Project Manager at MÄGERLE, Fehraltorf, Switzerland

**CONTACT:** Fabienne.Schlaepfi@maegerle.com

“WE GO THE EXTRA MILE FOR OUR CUSTOMERS, and I create new designs for things that do not yet exist,” says Fabienne Schläppi, describing one of her tasks as Project Manager for Technology and Mechanics at MÄGERLE. These can be a few assemblies or an entire machine. Our customers’ requirements and wishes are always the primary focus. “During the design phase, I clarify the technical feasibility with suppliers and obtain quotes,” says Schläppi, who has been with the company for around seven years. The qualified mechanical engineer works closely with other departments such as purchasing and sales, material planning, or assembly. Schläppi is currently working on several customer projects, including an MFP with a particularly high spindle speed of 12,000 instead of the standard 5,000 rotations per minute. In addition, as the Training Officer, she is responsible for the technical supervision and training of young designers. “I like the fact that I can pass on my knowledge, but conversely, I also learn a lot from the trainees,” she explains.







# “HOW DO WE MAKE THE SUPPLY CHAIN MORE RESILIENT?”

With the coronavirus pandemic and the Ukraine crisis, the resilience of supply chains has become a key competitive factor. Has supply chain management become supply chain risk management?

CEO Stephan Nell discusses the factors that can increase the supply chain's resilience with Sebastian Fabel from thyssenkrupp and Michael Henke from the Fraunhofer Institute for Material Flow and Logistics

TEXT: Michael Hopp

PHOTOGRAPHY: Natalie Bothur

*At the Fraunhofer Institute for Material Flow and Logistics IML (from the left) Supply chain expert Dr Sebastian Fabel, CEO Stephan Nell and Motion Editor-in-Chief Michael Hopp on the conversation*

Mr. Fabel, just-in-time, that was once upon a time...

**Sebastian Fabel:** Supply chain risk management has become more important. In the past, just-in-time, it was assumed that the supply chain worked. I have minimal stock. We live in a well-established system. Suddenly that was over. The chips no longer came. Clearly, there are various technological aids, risk management tools, visibility software, etc. Expertise in dealing with this is crucial. The topic has moved to a different place in the strategic discussion.

**Michael Henke:** What many companies call risk management is more akin to crisis management. At the moment when supply chains are breaking away, the crisis is already here, the risk is virulent and therefore professional risk management is no longer possible. Pro-active risk management, on the

other hand, tries to prevent the crisis situation as much as possible. Some companies achieved this very well, even during the coronavirus crisis. Obviously, they had the case of a serious pandemic on the risk radar even though it had not occurred in recent years and had emergency plans in the drawer.

**Mr. Nell, the supply chains of the UNITED GRINDING Group have proven to be relatively robust in the face of the upheavals. How did you do it?**

**Stephan Nell:** One aspect is that we have never placed much focus on where the material can be obtained most cheaply. We often buy from a location close to our production. Another point is that we involve our suppliers early on. And also important: The UNITED GRINDING Group has a high real net output ratio. We often do not need the finished component, but only the raw material – which was easier to procure during the crisis.

**Regardless, how severely were you affected?**

**Stephan Nell:** We felt it. For a while, we spent about a third of our engineering capacity on examining how we can build the machines with other components while maintaining the same quality. This, combined with great

commitment and flexibility in the operations department, enabled us to deliver about 40 percent faster than most competitors. However, the installation of other parts still has consequences for us as a machine manufacturer in that it affects us for the next 20 or 30 years – that is how long the parts need to be available for delivery as part of our service.

**We often hear that the alignment of supply chain management in companies needs to change. from low stock levels to greater security of supply, placing slightly less focus on efficiency. Do you share that opinion?**

**Stephan Nell:** Theoretically, yes, but in practice the problem isn't usually that your stock levels are too low, you just have the wrong thing. And the art is actually having the right parts in stock. I don't think it's a good idea to build up huge inventories to be prepared for a crisis, which will certainly happen again at some point. If I build up stock levels today and the crisis comes in five years' time, I'm guaranteed to have the wrong thing.

**Sebastian Fabel:** It is certainly not about increasing inventories beyond measure. We also see how capital commitment costs, interest rates, and inflation are developing. There is still a need to keep working capital as low as possible.

## TAKING PART IN THE DISCUSSION

### MICHAEL HENKE

Professor Dr. Dr. h. c. Michael Henke is Institute Manager at the Fraunhofer Institute for Material Flow and Logistics IML and is the Chair of Corporate Logistics (LFO) at the Dortmund University of Applied Sciences for Mechanical Engineering. He also serves as Adjunct Professor for Supply Chain Management at Lappeenranta University of Technology Business School in Finland.

### SEBASTIAN FABEL

Dr. Sebastian Fabel holds a degree in economics and a doctorate from the Logistics and Service Management Chair at the WHU Beisheim School of Management. He has held various positions at thyssenkrupp AG since 2014 and has been Head of Digital Supply Chain Services at thyssenkrupp Materials Services for one year. There he develops digital services as they relate to the supply chain under the term "Materials-as-a-Service".

### STEPHAN NELL

Stephan Nell has been Chief Executive Officer of the UNITED GRINDING Group worldwide since 2012. He joined STUDER in 2003 as Sales Manager for Europe and served there as Chairman of the Board from 2007 to 2011.



*CEO Stephan Nell explains why the supply chains of the UNITED GRINDING Group proved to be relatively robust in times of crisis*

## “PROACTIVE RISK MANAGEMENT ATTEMPTS TO PREVENT CRISES AS MUCH AS POSSIBLE.”

*Michael Henke*



*Dr. Sebastian Fabel shows how thyssenkrupp's "Materials-as-a-Service" strategy affects customers' supply chains*



*Professor Dr. Michael Henke from the Fraunhofer Institute recommends blockchain technology to increase the resilience of supply chains*

**Stephan Nell:** We are currently testing a kind of early warning system. Software scans the information in the world that is relevant for a smooth supply. Using this should then make it possible to derive whether there is an impact on a component that we have to buy in six months or three months. Maybe it helps, maybe not.

**Michael Henke:** Limiting supply chain disruptions and delivery process delays as much as possible primarily requires one thing: Transparency. The sooner and more clearly I see what I'll be facing in terms of the supply chain, the sooner, more flexibly, and affordably I can successfully prevent disruptions and delays, or at least reduce their effects. At the same time, I am building a foundation for sustainability and flexibility. The more clearly I see, the more sustainable and flexible my management becomes.

**Dr. Fabel,** with 250,000 customers around the world, thyssenkrupp has become an intermediary in supply chains with the "Materials-as-a-Service" strategy. What does that mean?

**Sebastian Fabel:** thyssenkrupp itself has a lot of in-house expertise to manage sites, products and supply chain networks. Against the backdrop of increasing challenges in the supply chain, we use this expertise as part of our "Materials-as-a-Service" strategy by supporting our customers with innovative services such as demand forecasting, or the optimization of complete supply chains.

**Mr. Nell,** are there any connecting factors here?

**Stephan Nell:** It always depends on where you stand. A few years ago, we networked all plants in an SAP system and plan across

all plants in one system. This helped us in the situation because we were able to access it on all continents. If you have a customer who isn't at that point yet, implementing that type of project is quite time-consuming – so your services are surely useful.

Would everyone in the group sign off on the sentence: The higher the level of digitalization in the supply chain, the smarter it is?

**Sebastian Fabel:** No.

**Stephan Nell:** No.

**Michael Henke:** Yes and no.

Wow, that was fast!

**Sebastian Fabel:** Digitalizing a bad process simply makes it a bad digital process, but still not a good one. Digitalization is not an end in itself. It must be done intelligently in order to add value. This is where data-based intelligence comes into play. The information processing alone that goes along with it!

Whether it has to do with exchange rates or political risks, inquiries or prices. It creates a completely different basis for making decisions. This helps with forecast quality, visibility and responsiveness.

**Stephan Nell:** The prerequisites are the right processes. We can then digitalize them, but the process has to be right first. During the crisis, we also had promises from suppliers, which were revised a few hours later. Then they said that AI was now doing the allocation. I prefer to have people on the phone rather than an AI that calculates my updated needs every 24 hours and thinks it knows what we sell. All of this needs to be further developed.

**Michael Henke:** No one can achieve the level of transparency required today with paper trails and clipboards. This was already apparent even before COVID and the Ukraine invasion, during crises like the financial crisis or Fukushima. Instead of that, we need to use all the state-of-the-art hardware and



*Michael Hopp, Motion Editor-in-Chief, moderates the conversation*

software we already possess, but especially blockchain technology. If widely used, this can actually provide excellent transparency about the companies using blockchain. At Fraunhofer IML, we have set ourselves the goal of developing the silicone economy to completely virtualize value creation processes end-to-end and then to automate and make them autonomous on this basis.

**Stephan Nell:** However, transparency must also be intentional. The more connected a system is, the more vulnerable it is. Is the efficiency gain so great that it is worth taking the risk that the machines will be completely at risk in the event of a cyber attack? We've experienced it for ourselves. We were attacked and we had to perform a hard shutdown of the systems. Our plants had different networking levels. A plant with systems that still had a certain degree of isolation came back online faster than fully automated ones – those took the longest.

It is often said that experiences during COVID taught us a lot. But what exactly? And can we use this to see into the future?

**Michael Henke:** Churchill said, "Never let a good crisis go to waste!" If we have learned one thing – times are not getting safer. Therefore, we need to learn more and faster from crises and further develop our value creation networks. When supply chain managers collect all the accessible and available data from a value creation network, they can – ideally via real-time monitoring – identify who in the supply chain is affected where and by what. Is climate change also having an impact on supply chains now?

**Sebastian Fabel:** Climate change itself is not yet making itself felt, but rather the various preventive measures, such as the German Act on Corporate Due Diligence Obligations



**“THE ART IS TO HAVE THE RIGHT PARTS IN STOCK. INVENTORY ALONE IS NOT ENOUGH.”**

*Stephan Nell*

**“DIGITALIZATION  
IS NOT AN END IN  
ITSELF. IT CANNOT  
TURN BAD  
PROCESSES INTO  
GOOD ONES.”**

*Sebastian Fabel*

in Supply Chains, emissions reporting, and emission prevention strategies. And it is being felt within companies in their search for concepts that cut emissions and enable circular value creation.

**Stephan Nell:** In the UNITED GRINDING Group, there is one ecological aspect that is decisive when it comes to procurement. It doesn't make sense to transport components across the world's oceans if I can purchase them on the same continent. In my opinion, transport is too cheap. It is worth transporting inexpensive components from A to B, because transport effectively costs nothing. I think the world could benefit from more nearshoring. We can already see this on the customer side. Not in Europe. But in Europe, we tend to talk about an issue for a very long time first. There are other countries in the world that simply started. This could lead to reduced transport volumes, which would certainly help the climate.

**How difficult is it to meet societal and political demands on supply chains? Aren't there often conflicting goals?**

**Sebastian Fabel:** The Act on Corporate Due Diligence Obligations in Supply Chains will certainly lead to expenses, initially. However, we also see the opportunities in sustainable solutions. For example, we are currently working with a manufacturer of production equipment on a research project in which we improve visibility in the supply chain in order to reduce sheet metal waste in the supply chain and thus save material and CO<sub>2</sub>.

**Stephan Nell:** For us as medium-sized companies, many things are very difficult to implement and impractical. When we purchase steel from the dealer, we often don't know which foundry it comes from, how much electricity was consumed during production, let alone how sustainably it was produced... European policy is struggling to find a measure for evaluating a machine's energy consumption. It doesn't work the way it does for a washing machine. If it is possible to optimize the process and produce the part three times faster, the contribution to the climate is much higher than if the machine consumes a little less energy.

**Sebastian Fabel:** In our Swiss t-kontrol project, documents are digitalized in order to make the history of a product visible to the customer and, in the medium-term, to show the original mine that produced the ore in a product. This provides the customer with complete transparency and a paper trail. We are currently developing and testing this with our customers, who can also map and calculate the carbon balance.

**Stephan Nell:** They say they are in development. But we face the challenges today.

**Sebastian Fabel:** Yes, that's precisely the question. How do I make the transition from the status quo and pilot projects to the target structure and scaling? When the Ever Given got stuck in the Suez Canal, everyone wanted real-time transparency to know which materials were where. But I think there were too many phone calls and Excel files to find out. The costs were then many billions of dollars. ○



# "I GIVE EVERYTHING FOR THE CUSTOMERS"

Understanding customers and finding solutions – this is how Joseph Szenay and his team see their job at the US plant in Miamisburg. What is a typical day like for you?

TEXT: Markus Huth

PHOTOS: Nathaniel Smith

"MY FATHER WAS A TOOLMAKER. I learned a lot from him as a teenager and grew up sweeping the floors of our workshop," says Joseph Szenay, who is now Vice President Customer Care at UNITED GRINDING North America. At the headquarters in Miamisburg in the US state of Ohio, he is responsible for over 50 employees from service, spare parts sales and rebuild. The qualified production engineer has been with the company for over 28 years. He and his team are currently working on a strategic growth plan in the Customer Care business unit to be implemented by 2025 and are also responsible for converting a MÄGERLE MGC. "I like the fact that no two workdays are the same and that there are always new opportunities to make customers happy through tailored solutions. At UNITED GRINDING, I have the best team a manager could wish for," says Szenay. After all, everyone has the same vision and passion for achieving the best results for customers.

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Joseph.Szenay@grinding.com

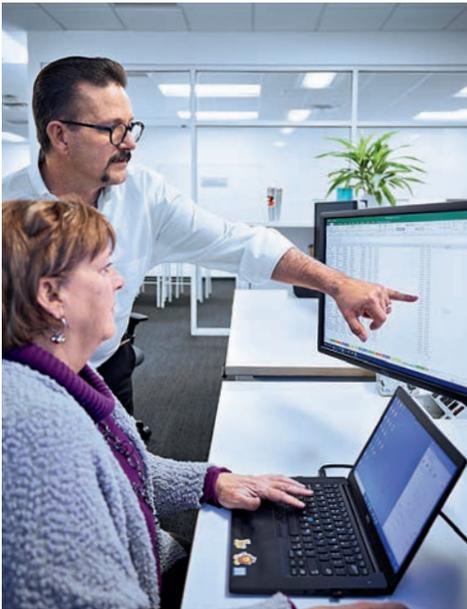
## 9:00 A.M.

### STATUS CHECK

Joseph sets off to the production hall to check the status of several conversion projects.

UNITED GRINDING North America's rebuild team carries out the complete overhaul of WALTER, BLOHM and MÄGERLE machines





## 9:30 A.M.

### DATA REVIEW

Joseph reviews data for a service report together with Allison Plennert, Administration Services Supervisor for Customer Care

## 10:45 A.M.

### DIGITAL PROJECTS

He discusses planned projects for digital solutions with Field Service Manager Rafael Linan. Linan is a specialist for UNITED GRINDING Digital Solutions™ in North America



## 12:00 P.M.

### CONVERSION IN PROGRESS

Joseph examines the conversion of a MÄGERLE MGC, one of the largest projects to date, in the production hall. He takes a look at the control system together with his colleague Wesley Overholser

**“I HAVE THE BEST TEAM  
A MANAGER COULD WISH FOR.”**

*Joseph Szenay*



## 2:00 P.M.

### AT THE DESK

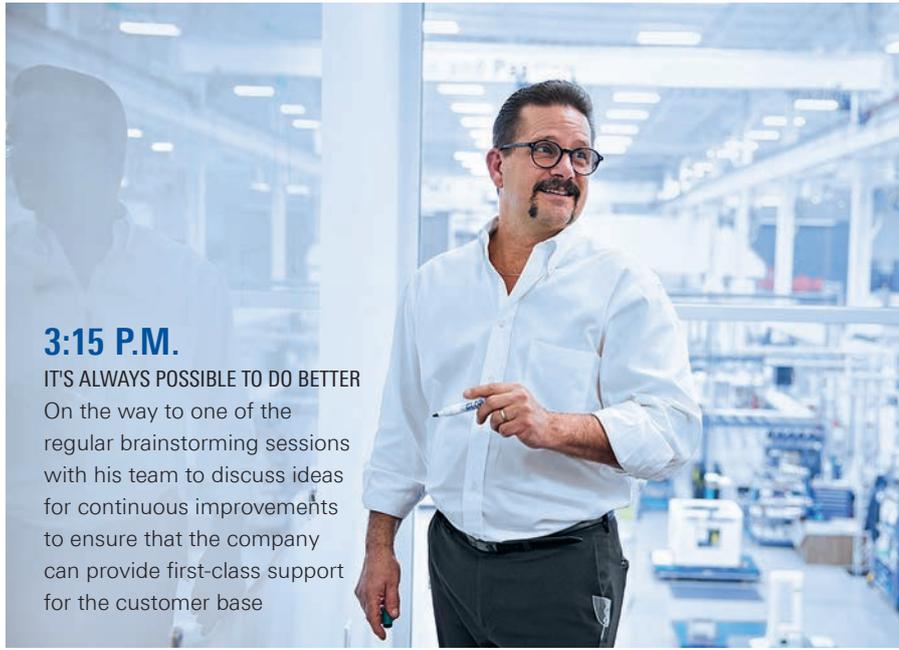
Back at his desk, he reads emails and compiles data for a report. Standardized reports help enhance the performance of the UNITED GRINDING service team around the world



## 3:15 P.M.

### IT'S ALWAYS POSSIBLE TO DO BETTER

On the way to one of the regular brainstorming sessions with his team to discuss ideas for continuous improvements to ensure that the company can provide first-class support for the customer base



**“WE ACHIEVE THE BEST RESULTS FOR OUR CUSTOMERS BY WORKING AS A TEAM.”**

*Joseph Szenay*



## 4:00 P.M.

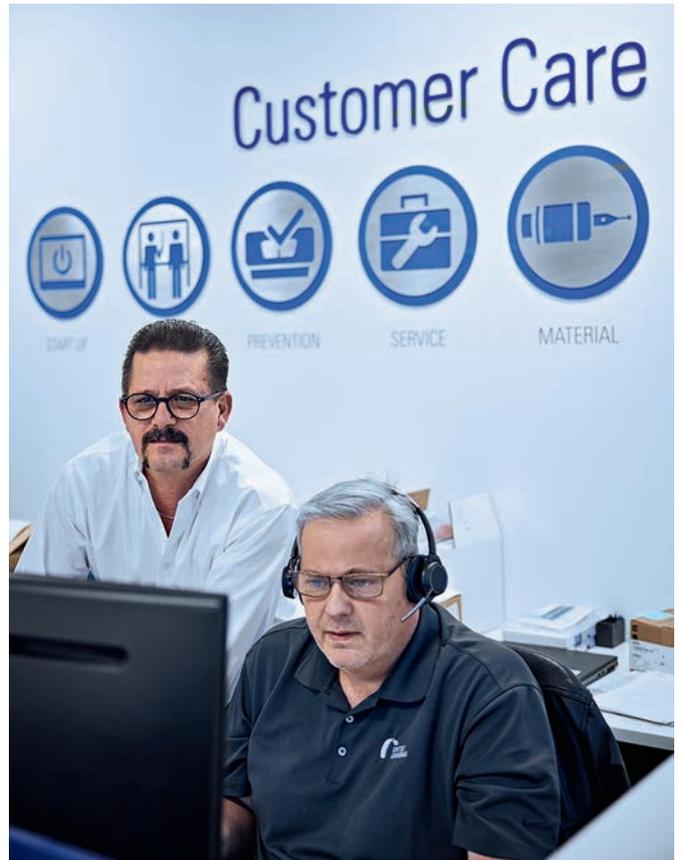
### C.O.R.E.

Joseph gives communications specialist John Kelly an overview of the new C.O.R.E. panel to bring him up to date with the latest developments

## 5:00 P.M.

### REMOTE SERVICE

He talks to a customer together with Field Service Manager Michael Boesch. Remote service sessions like this are part of the Digital Solutions package introduced in North America in 2022

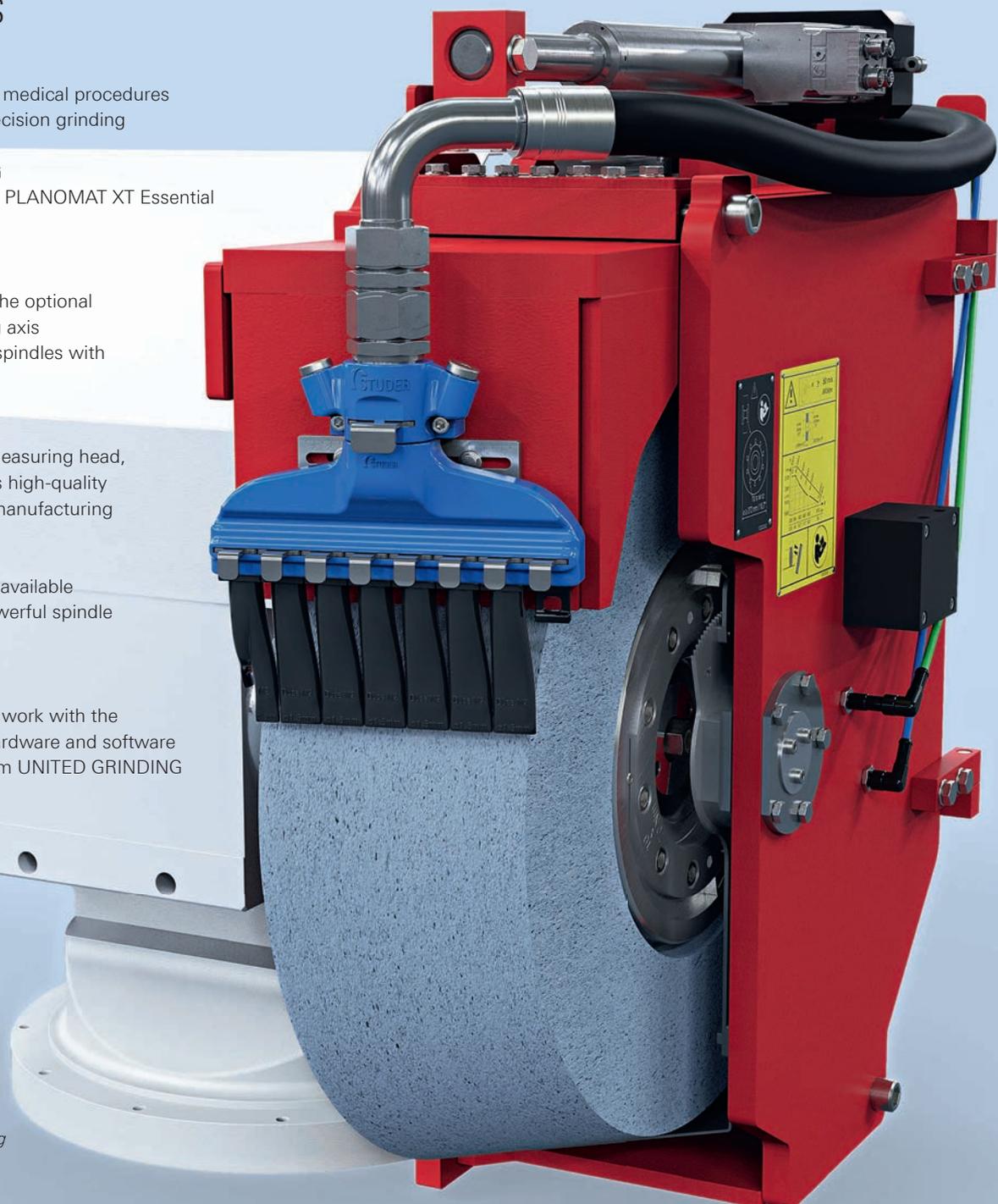


# TOOLS & TECHNOLOGY

NEWS FROM THE UNITED GRINDING GROUP

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First customers work with the revolutionary hardware and software architecture from UNITED GRINDING



*The grinding spindle of the STUDER S36 external cylindrical grinding machine with SmartJet® cooling system*



*The HELITRONIC MINI AUTOMATION is used by many companies for large-scale production of tools – also for healthcare applications at companies like evonos*

# DRILLING FOR MEDICINE

The use of drills in surgery places particularly high demands on precision and reliability. WALTER contributes significantly to the success of treatments in this area

MECHANICAL DRILLING of an enclosed body cavity in surgery is called “trepanation,” derived from the Greek word for drills. One of the most sensitive applications here is a cranial trepanation on living humans. This is needed, for example, to reduce internal pressure after a traumatic brain injury or to remove projectiles that have penetrated the skull. A drill used for this purpose, known as a cranial perforator in technical terminology, must meet special requirements for the safety of patients – and WALTER makes a decisive contribution here to the successful completion of cranial trepanations.

## CRANIAL PERFORATORS HAVE STRINGENT REQUIREMENTS

For example, one of the leading manufacturers of cranial perforators at evonos in Tuttlingen, Baden-Wuerttemberg, has the HELITRONIC MINI AUTOMATION, which gives the evoDrill the necessary finish. “Particularly precise, fast, and with a not too

high drilling pressure are just some of the features surgeons need for successful treatment,” said Volker Petschauer, Application Engineer at WALTER. The HELITRONIC MINI AUTOMATION makes it particularly easy to produce in high quality. Using HELITRONIC TOOL STUDIO software, automatic machining of the cranial perforator, with its particularly complex edge profile and tiny drill tip, can be set up in advance. And the robot loader with up to 1,500 storage positions ensures fast, reliable, and precise production.

Depending on the application, the diameter of the drills varies. It is six millimeters (0.236 inches) for biopsies and up to 14 millimeters (0.55 inches) for other applications. One of the major challenges in the grinding process is the special properties of the medical steel. It is essentially softer than the high-carbon steel used in tool production and requires precise timing

and speed in the machining and cooling process to obtain optimal material properties. “But the HELITRONIC MINI AUTOMATION also masters this without a problem,” said Petschauer.

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*evoDrill cranial perforator from evonos, produced on the HELITRONIC MINI AUTOMATION*



# FLEXIBLE AND PRECISE

PLANOMAT XT Essential is ideal for tool and mold-making as well as for manufacturing special fixtures

THIS 3-AXIS SURFACE GRINDING MACHINE is suitable for a wide range of applications thanks to its precision and flexibility. At the Italian company Serena Manuel Spa in Luzzara, the PLANOMAT XT Essential supports manufacturing parts and devices for agricultural livestock breeding, for example, fittings for barrier fences. A system optimized for surface grinding in reciprocating and creep feed modes and a capacity of 600 by 1200 millimeters (23.6 by 47.2 inches) is used. The BLOHM JUNG machine replaces two older surface grinding machines at Serena Manuel.

## HIGH-PRECISION SURFACE GRINDING

The Italian company is precisely one of the target groups that BLOHM JUNG wants to reach with the PLANOMAT XT Essential: Users from the tool and mold-making industry who attach great importance to

excellent grinding quality, and do not require all the technical features of a regular PLANOMAT XT. The axis speeds, driving power, and configuration of the PLANOMAT XT Essential, were precisely defined for the requirements of high-precision surface grinding. The machine is equipped with an electro-permanent magnetic chuck (DQ18, optional DQ13) for a load of up to 1,500 kilograms (3,300 pounds) and a diamond holder with a single point diamond, and prepared for the use of an optionally available manual balancing unit. The usual pneumatic equipment for the machines of the PLANOMAT series is no longer required.

Another company that is so convinced by the PLANOMAT XT Essential, Doeko B.V., has already ordered a second machine. The Dutch manufacturer of stamping dies, molds, and precision mechanics first learned about the machine at GrindingHub 2022. Today, Doeko uses it to manufacture high-precision alignment components, which are used in wafer production to determine the position of the optics in lithography machines. The required tolerances are in the range of just a few microns.

## CONTACT:

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## THE BENEFITS AT A GLANCE

- Centralized, automatic grease lubrication for guides and ball screws
- Linear scales for the Y- and Z-axes
- Manual balancing unit
- Coolant mist extractor
- Universal hinged dressing unit with pneumatic equipment
- Various rotary profile dressing attachments

*The S151 machine for internal cylindrical grinding offers benefits when machining long workpieces*



## EVERY MICROMETER COUNTS – VERTICALLY TOO

STUDER offers its S151 machine for internal cylindrical grinding with an optional vertical grinding axis for high-precision grinding of tool spindles in one clamping

THE STUDER S151 CNC UNIVERSAL INTERNAL CYLINDRICAL GRINDING MACHINE with workpiece lengths of up to 1,300 millimeters (51.2 inches) (including clamping devices) is primarily used for machining large spindle shafts, spindle housings, rotor shafts, and flange parts. In particular, the tool holding fixture poses a challenge when grinding high-quality precision tool spindles for large machining centers due to the interlocking keyways

and keys. For this reason, the taper is usually ground on an internal grinding machine and the surface with keys and keyways on a separate vertical grinding machine.

### HIGHEST PRECISION REQUIRED

Spindle designs with protruding keys are particularly difficult – especially when precision depends on every micron. “Then simple grinding to the right and left of the key is no longer sufficient,” explained Michel Rottet, Internal Grinding Product Manager at STUDER, and continued: “In the case of particularly high-quality spindles, axis deviations in the micron range between the end face, the internal cone, and the bearing seats of the spindle are allowed. With machining operations on two machines, this is achieved only with considerable time investment.” It is therefore a real breakthrough that STUDER has developed a vertical grinding axis with a recirculating ball bearing guide for the S151 for high-precision machining of the shaft end faces – regardless if with or without keyways and keys.

The new Y-axis is on the revolving turret wheelhead, which can also be equipped with up to three additional grinding spindles for internal and external grinding. When configuring the turret wheelhead, the customer can combine the vertical axis with three in-

ternal spindles or two internal and one external spindle. “Our customers usually want to have the full configuration to enable them to use the machine flexibly,” said Michel Rottet, confirming the high demand in the European and Asian markets. The outstanding precision of the grinding operation on the S151 with a vertical axis is also enhanced by the additional correction options with interpolation of all axes and the dresser for the Y axis.

### CONTACT:

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### THE BENEFITS AT A GLANCE

- Workpiece length (incl. clamping devices): for max. 700 mm / 27.5 inches or max. 1,300 mm / 51,2 inches
- Workpiece diameter: max. 550 mm / 21.65 inches
- StuderGuide® guideway system with linear drive
- High-precision axis drives with linear motors
- Grinding spindle turret with up to four grinding spindles
- Grinding spindle turret with ultra-fast direct drive
- Automatically swiveling worktable
- Y-axis for key and keyway grinding



*View of the vertical Y-axis module*

*The S41 with integrated X-ray measuring head ensures high wafer quality in chip manufacturing*



## S41 WITH X-RAY MEASURING HEAD

STUDER meets the increasing demand for high-precision wafers for the semiconductor industry with a special version of the S41 external cylindrical grinding machine

THE GLOBAL DEMAND for semiconductors has been increasing for years. Supply bottlenecks occur time and again, and it can be assumed that the situation will not improve in the future. Studies and analyses predict that the growing e-mobility market alone will increase the demand for high-performance semiconductors by more than 20 percent annually. There is also the photovoltaics sector. Here the interest in silicon carbide semiconductors, in particular, is increasing sharply. Their efficiency is up to 13 percent higher than conventional silicon semiconductors – even in terms of range and re-charging duration.

### COMPLETE PROCESSING OF WAFER INGOTS IN ONE CLAMPING

Due to this high demand, STUDER has equipped the special version of its S41 external cylindrical grinding machine with a fully integrated X-ray unit, among other things. This development had already begun with the S40 in the nineties, where productivity and grinding quality were continuously increased. The X-ray measuring head (XRD-OEM) is used for the integrated measurement and control of the crystal axis of an optical or electronically crystalline material relative to the grinding axis. In this way, the S41 can minimize material loss and achieve the geometric features for the material such as diameter, flat(s), and notch(es) in just one grinding operation.

The optics and semiconductor manufacturing industries usually grow their

required materials in large reactors in the form of long, cylindrical single crystals. This is followed by cutting them into manageable ingots and grinding their surface to the required dimensions and alignment to the main crystal axis on the S41. After further alignment, the wafers are then sawn and polished. A marking makes it easy to see the crystal orientation on the finished wafer. It is usually produced by grinding a flat section on the ingot or by grinding a V-slot (notch).

### MINIMAL DEVIATIONS BETWEEN MEASUREMENTS

The integrated X-ray measurement is performed at the periphery of the rotating ingot before and after grinding. Freiberg Instruments' patented X-ray technology uses what is known as the Omega-Scan method to measure the inclination of the primary crystal axis relative to the central grinding axis. The maximum tilt of the primary crystal axis with respect to the polished wafer surface should typically be a few degree minutes. The X-ray probe head calculates the inclination with

absolute precision with a standard deviation between measurements of less than 0.003 degrees. Tolerances of less than 0.4 degrees also apply to the maximum offset between the projected inclination of the main axis and the flat or notch.

However, manufacturers of semiconductor components want even smaller deviations here. This is also no problem for the S41 with an X-ray sensor, as it is able to measure the position of the notch and flat with absolute precision. The standard deviation between the measurements is below 0.005 degrees (notch) or below 0.03 degrees (flat). Ultimately, the conclusion is that, with the highly precise, stable, and user-friendly S41 with an X-ray sensor, STUDER makes a significant contribution to the manufacturing of particularly high-quality wafers with high-precision crystal structures already aligned in the machine as a carrier for high-performance semiconductors.

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#### THE BENEFITS AT A GLANCE

- Minimal material loss
- Determination of the orientation of the crystal axis with X-ray unit
- Complete machining in a single clamping
- W-axis for automatic length compensation of ingots
- QR scanner, laser, and measuring probe for automatic registration of the diameter
- Option for automatic loading and unloading of ingots

*X-ray unit for measuring the crystal axis*



*The S36's optional high-performance spindle for particularly wide grinding wheels with the SmartJet® cooling concept*



## MORE POWERFUL SPINDLE AS AN OPTION

A new option for the S36 allows flexible adaptation to customer requirements

A MORE POWERFUL SPINDLE with an output of up to 25 kilowatts (33 hp) is now available as an option for the S36 external cylindrical grinding machine. A wide grinding wheel (diameter 610 millimeters/24 inches, width 160 millimeters/6.3 inches) enables productive plunge grinding of workpieces with widths of up to 160 millimeters (6.3 inches) in a single grinding operation. "This makes it possible to grind this part range very efficiently," said Sales Director Martin Hofmann.

STUDER offers the new spindle — a hollow spindle with electronic balancing and wheel contact detection — in two versions. For cutting speeds of 30 to 50 meters per second (5,900 to 9,840 sfpm) and 63 to 80 meters per second (12,400 to 15,750 sfpm) at full power. The patented SmartJet® cool-

ing concept also contributes to high productivity, effortlessly overcoming the strong airflow over the wheel caused by the high cutting speeds.

### NEW FUNCTIONS AND PROVEN TECHNOLOGY

The S36 is an economical and high-quality grinding solution for medium to large series with a wide range of automation options. The machine demonstrates its particular advantages for hydraulic, pump, tooling, and e-mobility applications. These include high grinding power, cutting speeds of up to 80 meters per second (15,750 sfpm), a longer grinding wheel service life due to the large diameter, and state-of-the-art equipment with C.O.R.E. panel, SmartJet® cool-

ing, and StuderGuide® guideways. Proven components such as the sturdy Granitan® machine base ensure the required precision.

#### CONTACT:

Martin.Hofmann@studer.com

#### THE BENEFITS AT A GLANCE

- Distance between centers: 650 mm / 26.5 inches
- Center height: 225 mm / 8.85 inches
- Workpiece weight 150 kg / 330 lbs (max.)
- Grinding wheel D = 610 x 160 mm / 24 x 6.3 inches (max.)
- Adjustable grinding wheel angle: 0, 15, 30 degrees
- X axis travel: 370 mm / 14.5 inches
- Driving power: 9 kW / 12 HP (belt-driven spindle) 15 or 25 kW / 20 or 33 HP (motor spindle)
- Cutting speed: 50, 63, 80 m/s / 9,840, 12,400, 15,750 sfpm

*Front view of the S36 machine with C.O.R.E. touch display*





Manufacture of modular precision tool holders on the PLANOMAT XT 408 with C.O.R.E. touch display

## D'ANDREA IS ENTHUSIASTIC ABOUT C.O.R.E.

The UNITED GRINDING Group's first customers benefit from the many advantages offered by C.O.R.E.

**EXQUISITE AND INTUITIVE:** Looking like a large modern smartphone, the C.O.R.E. touch display on a PLANOMAT XT 408 from BLOHM JUNG recently delivered to Milan, Italy. The local company D'Andrea is a leading global manufacturer of high-precision accessories for machine tools —and is one of the first customers to receive a system with C.O.R.E., the UNITED GRINDING Group's revolutionary and cross-brand hardware and software architecture. Since July 2022, D'Andrea has been using the C.O.R.E. system to manufacture modular precision tool holders for drilling, milling, and thread-cutting. "Thanks to the new C.O.R.E. machine, we have a 30 percent higher output and achieve the required high degree of precision reliably and with repeatable accuracy,"

said Marino D'Andrea, who manages the family company with his father and siblings in the third generation. Since the commissioning of the PLANOMAT XT 408, he has been able to significantly increase the production of his surface and profile grinding department. "We are so satisfied with the precision and productivity of the machine that, after eleven months, we decided to order a second one from BLOHM JUNG," said D'Andrea.

### C.O.R.E. MAKES PRODUCTION MORE EFFICIENT

"With C.O.R.E., we are further expanding our digital skills," said Philipp Wappler, Senior Key Account Manager at BLOHM JUNG. Thanks to the integrated umati interface (universal machine technology interface), C.O.R.E. machines can also exchange data with systems from third-party manufacturers and can thus be optimally integrated into a larger system network. "The interface is really very user-friendly," confirmed D'Andrea. In addition, the smart operating system simplifies the control system and monitoring of production processes and enables straightforward contact with Customer Care via video call directly on the C.O.R.E. display through the UNITED GRINDING Digital Solutions™ application platform.

A 24-inch multi-touch display with a process overview visible from a distance, self-explanatory icons, and the fact that the touch display can also be operated with gloves facilitate and speed up the training process, set-up, and operation of the machines. "C.O.R.E. thus makes a significant contribution to cost savings and error reduction," emphasized Philipp Wappler.

#### CONTACT:

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#### THE BENEFITS AT A GLANCE

- Native data exchange between machines with C.O.R.E. technology
- Data exchange with third-party products via umati interface
- Runs autonomously in the customer's internal network, service requests to UNITED GRINDING via a high-security server
- UNITED GRINDING Digital Solutions™ applications are fully available
- 24-inch multi-touch display for the machine control system and as an access point for the entire network



A typical precision tool holder manufactured by D'Andrea

# HIGHEST STANDARDS

In Japan, machine tool customers have particularly high demands on quality and service. After the difficult years of the pandemic, the industry is now looking more positively into the future

TEXT: Markus Huth





WITH A THICK CLOUD OF STEAM and an eminent passenger onboard, Japan's first train departed 150 years ago. Emperor Meiji wanted to personally experience the almost one-hour maiden voyage from Tokyo to Yokohama in 1872. It is just one example of the many industrialization projects that catapulted Japan into the modern world at an incredible pace. Within a few decades, the land of the rising sun (Japanese: Nippon) evolved from an agricultural country to an industrial power that was the only non-European culture of its time to compete with the geopolitical heavyweights of the West. After the World Wars of the 20th century, the island state in the Pacific is now firmly integrated into the global economic system as a democracy and, together with the USA, China, and Germany, is one of the largest economies in the world.

Because Japan's modern high-tech economy relies heavily on complex supply chains and exports, the COVID-19 pandemic hit it particularly hard. According to the World Bank, gross domestic product shrank by 3.5 percent from 2019 to 2021 to around 4.94 trillion US dollars. Fortunately, 2022 brought significant improvements thanks to a successful vaccination campaign and government support for companies and the population. Meanwhile, the economy has reopened to the outside world and recovered almost to pre-pandemic levels.

### ONLY THE BEST QUALITY AND SERVICE

As one of the country's core industries, the machine tools sector is also looking more positively into the future. Japan has one of the largest machine tool industries in the world and enjoys an excellent reputation as the home of renowned quality brands. Conversely, this also means that, if Japanese

companies want to survive in this market, they must offer the best product quality, innovative technologies, and customer care at the highest level.

"If there is one word that best describes our customers, it is 'demanding,'" said Jun Ikeda, President of WALTER EWAG Japan. The location in the city of Anjō was chosen due to its central location on the main island of Honshū and its good connection to ports, highways, and the Shinkansen high-speed train. Less than an hour's drive from here, Toyota and its neighboring cities are home to the headquarters of the world's largest car manufacturer and its most important suppliers, whose hunger for employees, raw materials, and services shapes the infrastructure of this urbanized region.



**"JAPANESE CUSTOMERS ARE AMONG THE MOST DEMANDING IN THE WORLD."**

*Jun Ikeda,  
President of WALTER EWAG Japan*

Viewed from above, Honshū is a carpet made up of cities home to millions such as Nagoya, Osaka, and Tokyo, as well as larger and smaller towns connected by a dense network of highways, country roads, and railways. The idyllic landscape of green forested mountains emerges almost unexpectedly in between, crowned by Japan's highest mountain, the snow-covered volcano Mount Fuji. This constant alternation between urban settlement and mountainous nature is characteristic of Japan. Nearly all of the 126 million inhabitants live on Honshū and the other three main islands of Hokkaidō, Shikoku, and Kyūshū. Space is therefore limited, and at its fringes, the island nation frays into a rugged coastline and smaller islands.

### COOPERATION AND TRADITION

This special island geography is not the only factor that has shaped the history and culture of the Japanese, but also its location in the Pacific Ring of Fire, and thus the constant threat of earthquakes and volcanic eruptions. The result is a nation with a strong cohesion that places great importance on its tradition. Anyone who wants to be successful in business in Japan must understand this mentality. "Without a network of local representatives who have long business relationships in the region, it is almost impossible to acquire new customers," said Joris Brand, who manages BLOHM JUNG's business in Japan and is well acquainted with language and culture.

Brand mentioned that it is true that Japanese customers are particularly demanding when it comes to grinding machines and machine tools, and usually only choose non-Japanese manufacturers when domestic brands have disadvantages in certain applications or technologies. On the



# 248,000,000,000 EUROS

was the revenue Japan made from global machine sales in 2020, which represented about 9.6 percent of total global sales. *Source: VDMA*



*Vending machines are an integral part of Japanese consumer culture and can be found in both large cities and small towns*

## NEED FOR AUTOMATION

We travel eastwards from Anjō to the Tokyo metropolitan region with its 40 million people, skyscrapers, neon lights, and historic temples and palaces. Like all Japanese places, the capital city amazes travelers with its vending machines everywhere on the streets. In general, there is a high affinity for machines and robotics in Japan; the country is one of the global technology leaders in this field. One reason for this is the rapidly aging and shrinking population, where technology increasingly has to replace the dwindling human workforce, for example, in the care of the elderly. This has implications for the labor market, including the machine tool sector.

“The Japanese grinding industry traditionally uses well-trained and experienced specialists on more conventional machines,” said Hajime Hirayama, who manages STUDER’s Japanese site in Tokyo. However,

these professionals are increasingly retiring and there are not enough young people to replace them. “We are therefore increasingly receiving requests from companies that require high-precision machines that can achieve reproducible quality with the help of automation and software assistance, even with less experienced operators.”

So the outlook in the country of the rising sun is a little brighter after the difficult pandemic years – but this does not mean that there are no challenges. Rising prices for energy and raw materials in the wake of the Russia-Ukraine war remain a problem, as do inflation and the strain on the supply chains. “If Japan is to compete internationally, we will require more flexibility and innovation in the coming years to survive under the new conditions,” said Jun Ikeda, adding: “at UNITED GRINDING, we will do everything we can to help our customers continue to be successful.”

other hand, once a business partnership is established, the relationship will remain in place for the long term. Japanese customers’ loyalty is a major opportunity, precisely for manufacturing companies of quality and precision machines that are known for innovative technologies, like the UNITED GRINDING Group. This is because there is high demand for this in the high-tech country. For example, in the automotive industry, where the switch to emission-free and more automated mobility calls for new processes. Japan also has one of the world’s largest merchant fleets, invests in offshore wind power, and is a leader in electronics and robotics. The fact that the Japanese market, like the markets in Europe and North America, is characterized by many small and medium-sized companies is also good news because it fosters diversity and customized solutions.

*Major Japanese cities like Tokyo are lit up at night with countless advertising and promotional displays*



Images: Shutterstock/kyu\_photo, Lucas Vallecillos/Alamy Stock Photo, Shutterstock/Sean Pavone

## UPDATE

# NEW IN DIGITAL SOLUTIONS

Monitoring machines from anywhere in the world, at any time! The digital products and services under the label UNITED GRINDING Digital Solutions™ deliver on this claim. "Motion" already did an in-depth report on Remote Service in issue 01/2020. What has changed since then? What are the new developments?

TEXT: Michael Hopp

## REMOTE SERVICE

Remote service without on-site presence gained enormous importance during the pandemic. With the introduction of the C.O.R.E. panel, the UNITED GRINDING Group has been able to enhance digital support for customers. A camera built into the panel now enables a video chat between machine operators and the UNITED GRINDING Group Customer Care department directly on the machine. With the built-in whiteboard function, drawings or notes on photos and documents can be shared during the video conference. This greatly improves the speed and quality of problem-solving.



*Brings the right personnel directly to the machine: In addition to chat and whiteboard functions, the C.O.R.E. panel also enables video conferencing*

## SERVICE MONITOR

The Service Monitor keeps an eye on all important maintenance tasks based on the machine's actual run-time. The fact that the maintenance schedules of the machine park can be managed, monitored, and documented centrally in a Service Cockpit is a specific benefit when a large number of machines are connected. This saves time-consuming maintenance checks and documentation of individual machines.

## PRODUCTION MONITOR

The Production Monitor allows detailed monitoring of production performance in real-time, anywhere and at any time, as a desktop or dashboard application, but also conveniently as an app on a smartphone. The result is valuable information about the capacity utilization and condition of networked machines. The latest version supports the global communication standard umati UA4MT (Universal Machine Technology Interface for Machine Tools). This offers the advantage that, in addition to the machines of the UNITED GRINDING Group, third-party machines that support umati can also be integrated into the Production Monitor.



*The Production Monitor monitors the capacity utilization and condition of networked machines and now also supports UA4MT. This allows integration of third-party machines*

## DIGITAL SOLUTIONS APP

The Digital Solutions app is a mobile control center and enables production monitoring on a smartphone. It provides a listing of all connected machines and a production overview for each system. Service requests with specific data attachments can be triggered quickly and easily directly via the app on the smartphone.



*In MOTION 01/2020, there was a report on the then-new customer support functionality under the title "Magic word: remote" (page 20) for the first time*



# BACK TO THE

Everyone is always talking about digitalization – but there is one word that is changing our world even more profoundly: digitality. Why information technologies are reshaping structures for a global world that benefits regions too

TEXT: Max Thinius

# VILLAGE



NO TECHNOLOGICAL REVOLUTION can be achieved without profound changes. This was already the case at the beginning of industrialization. In order for centrally located steam engines to be able to put their advantages to use, entire cities had to be converted. People, as the workforce, should ultimately be as close as possible to this new technology. Industry and politics realized that with the new technology, centralized structures were more efficient and produced better results. Along the way, our everyday life was shaped by this: with new working hours, social laws, and the development of new types of insurance. We made more money, banking expanded, and supermarkets developed, as did increasingly global structures – globalization picked up speed. In an industrial context, this meant the highest possible level of centralization of processes, thereby increasing efficiency and profitability. Export nations and logistical structures were created, which, in their perfection, enabled “just-in-time” production across several locations.

Digitality does not abolish this industrial globalization either, but it is changing and becoming more varied. Digital technologies are increasingly supplementing existing global structures with local value-creation opportunities or even replacing them completely. We observe these kinds of processes in all industries, for example in the lumber industry. Shelves for a large furniture store are still largely produced centrally in Asia, Georgia or Romania. However, due to digitality, there is increasingly a different form of production via local carpentry companies, directly in the respective sales markets. These compa-

nies work on digitally-controlled machines, they are networked around the world, monitored by sensors, and can produce exactly the same quality at every local location – for the people in the respective region. Digital machines are even in a position to produce products with special dimensions at almost no additional cost. The production costs are however on average 20 to 40 percent higher than the current globally centralized structures. However, the logistics chain is significantly shorter and the risk of oversupply is lower.

## DIGITALITY PROMOTES AUTONOMOUS STRUCTURES

The major ready-to-wear manufacturers in the textile industry are also increasingly moving towards producing certain collections in the regions where they are to be sold. Here, too, the machines for manufacturing have become so inexpensive and flexible that the total costs can often be lower than production in the Far East. A crucial factor is that the setup costs of state-of-the-art digital and network-capable machines are increasingly eliminated, and digital assistance systems support operators for simplified and more efficient production. In addition, unlike before, no minimum quantities of individual sizes or widths, need to be produced. Instead, the

## ABOUT

### MAX THINIUS

As a futurologist, best-selling author Max Thinius is concerned with how people, companies, and regions can identify and shape new opportunities for the future. Among other things, he advises the German Federal Government, ministries, and DAX companies. With his lecture show "Zukunft unplugged" (Future unplugged) and numerous media appearances, he introduces his ideas to a large audience.



individual product can be produced exactly in the quantity required, as it is needed locally. And for larger quantities, several local producers join forces globally.

This trend can be observed in many other industries. In the automotive industry, for example, it is no longer uncommon for certain spare parts to be produced on-site in workshops using 3D printing. In the digital world, we are talking about decentralized solutions that are beginning to replace centralized industrial structures. The novelty here is that they are self-sufficient in themselves and can take all the necessary steps largely independently. They only connect to larger networks when needed. This means there is no longer a centralized control point; instead, customized machines with artificial

intelligence (AI) can use various data from society, supply chains, incoming orders, market analyses, the environment, or social influences to ensure the best possible production processes. This reduces various risk parameters of global supply chains, product adjustments, or market changes.

### VALUE CREATION RETURNS TO REGIONS

The special feature of digital globality is that it once again ensures local value creation in the regions. It can also be used by businesses in small and medium-sized cities and even rural areas. This is exciting, as it establishes a new form of global distribution. Different regions can blossom again, and greater diversity is possible, as each has different advantages that it can deliver within a decentralized network. But in the end, digital technology is not only changing globalization and our supply chains but also enabling new structures in all areas of life that are developing into new smart systems.

With this development in mind, the question arises as to whether it should even be called "industry" in the future. Perhaps it is better if we think of it in other terms such as "automotive digitality," "textile digitality," or "food digitality." Because if we already think of it under a different name, we can open ourselves up to the new structures and find new solutions more easily – and

thus also new business models. The latter can offer significantly better value than our previous models, which also increases the general public's interest to implement them.

We are only at the beginning of this development today. Even large Internet corporations are still companies that are largely characterized by the classic industrial structure but are already very adept in using digital technologies. Only when the potential of digitality is exploited in the economy, society, politics, finance, and other areas of life can opportunities for everyday human life be multiplied. The great thing about this is that the possibilities for this already exist today – and precisely because we are still in the early stages, we can help to shape this future.



## EMO HANOVER – LEADING TRADE SHOW FOR PRODUCTION TECHNOLOGY

SEPTEMBER 18–23, 2023,  
HANOVER, GERMANY

ONE OF THE WORLD'S MOST IMPORTANT TRADE SHOWS for manufacturers in production technology will take place this year in Hanover. Under the motto "Innovative Manufacturing", more than 1,000 exhibitors will be presenting the entire range of modern metal processing technology. Major focal points are machining and forming machine tools, as well as production systems and precision tools. It is one of the most important meeting places for professionals from major industrial sectors, including machinery and systems, automotive, and aerospace technology sectors.

The UNITED GRINDING Group will also be represented with its own exhibition area, where it will present innovations from its companies. "We are very pleased that after four years, an EMO is taking place in Hanover again and that we can personally welcome customers and visitors," said Paul Kössl, Global Head of Business Development and Marketing at UNITED GRINDING Group.

**EMO – Exposition Mondiale de la Machine Outil**  
September 18–23, 2023, Hanover Exhibition Center,  
[www.emo-hannover.com](http://www.emo-hannover.com)

### OTHER TRADE SHOWS:

#### MAY/JUNE 2023



**MAY 30–JUNE 2, 2023**  
MACH-TOOL –  
POZNAN, POLAND

#### JULY 2023



**JULY 4–7, 2023**  
MTA VIETNAM –  
HO CHI MINH CITY, VIETNAM

#### OCTOBER 2023



**OCTOBER 10–13, 2023**  
MSV –  
BRNO, CZECH REPUBLIC



**OCTOBER 18–21, 2023**  
MECT –  
NAGOYA, JAPAN

#### NOVEMBER/DECEMBER 2023



**NOVEMBER 22–25, 2023**  
THAIMETALEX –  
BANGKOK, THAILAND



**NOV. 30. TO DEC. 2, 2023**  
TECH INDUSTRY –  
RIGA, LATVIA

**YOU CAN FIND THE LATEST  
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