

Motion

02.2019
The customer magazine of the
UNITED GRINDING Group

INNOVATION
INDEPTH
INTERVIEW

Why grinding is a superior manufacturing process
Your smartphone and the laser
Smart machines need competent employees

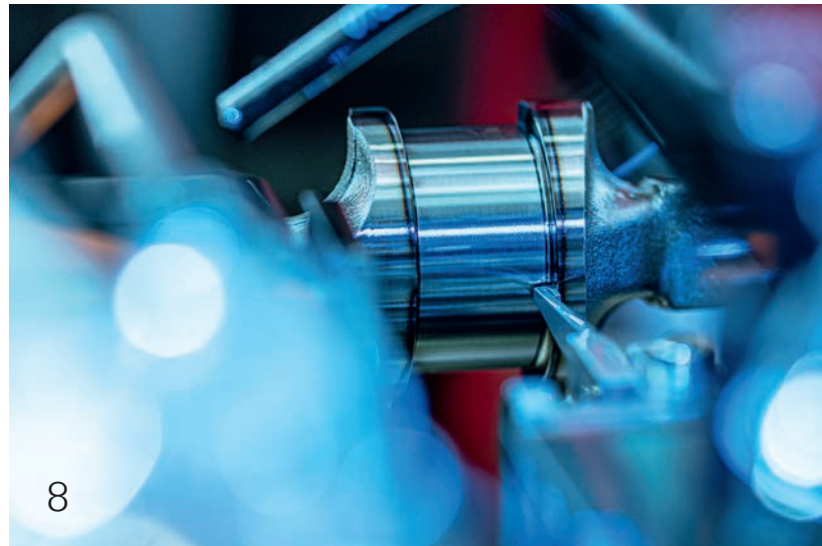


SHARING KNOWLEDGE

Practical knowledge of grinding is an important element in the international education and training system of the UNITED GRINDING Group

Still young but already experienced: Nico Peschke has worked in various capacities at WALTER in Tübingen. He is now applying these experiences as a service technician





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EDITORIAL DETAILS

PUBLISHER United Grinding Group Management AG, Jubiläumsstrasse 95, 3005 Bern **RESPONSIBLE** Paul Kössl **PUBLICATION MANAGER** Myria Aeschbacher **CHIEF EDITOR** Michael Hopp (responsible for the purposes of press law) **ART DIRECTION** Tobias Zabell **OPERATION MANAGER** Niels Baumgarten **PICTURE EDITING** Thomas Balke **AUTHORS** Heinz-Jürgen Köhler (copy editor), Ira Schoers, Sabrina Waffenschmidt **TRANSLATION** locsoft.net GmbH **LAYOUT** Claudia Knye **PRODUCTION** Wym Korff **HOUSE AND ADDRESS OF EDITORIAL OFFICE** HOFFMANN UND CAMPE X, belongs to HOFFMANN UND CAMPE VERLAG GmbH, Harvestehuder Weg 42, 20149 Hamburg **READER SERVICE** +49 (0)40-44188-293 (Tel.), +49 (0) 40-44188-236 (Fax) **MANAGEMENT** Heiko Gregor, Tim Jung **ACCOUNT MANAGER** Niels Baumgarten **LITHO** P-R-O-MEDIEN PRODUKTION GmbH, Hamburg **PRINTING** optimal media GmbH, Röbel/Müritz. Printed on FSC®MIX certified paper (FSC® C108521). For better legibility we use the masculine form as a collective term in our texts, but this includes all gender forms.

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“MACHINES WITH THE BEST TECHNOLOGY, EMPLOYEES WITH THE BEST EXPERTISE – WE COMBINE BOTH, TO MAKE YOU MORE SUCCESSFUL.”

DEAR READERS!

“In the combination of cost-effectiveness, efficiency and machining quality, grinding is superior to all other manufacturing processes.” Prof. Dr. Konrad Wegener said this at the Grinding Symposium. And this is also the theme of this edition of “Motion”. Grinding is actually a very simple and very old manufacturing process. Many scientists and companies – including ourselves – have continued to perfect it in terms of precision and efficiency over the past decades. The outstanding precision achieved by grinding today and the future technologies in which grinding plays a key role are explained by our cover story. Something which perhaps only a few people know: **Without grinding, there would be no microchips or robots.**

Another key factor is the focus of two articles in this edition: human know-how. **You can’t learn grinding itself at university**, but only by – grinding. What this means for our companies and our employees, can be read in the Interview and in the section “International”. Machines with the best technology, employees with the best expertise – we combine both, to make you more successful. On this note, I hope you enjoy reading this new issue of “Motion”!



Stephan Nell
CEO, UNITED GRINDING Group



Stephan Nell,
CEO, UNITED GRINDING Group





MORE THAN JUST A SHOWROOM

ABOVE ALL, THE CUSTOMERS should feel at ease in WALTER's 800 square meter showroom in Tübingen – and be able to get an idea of the most important machines in the product portfolio. "All CNC grinding machines and CNC eroding machines in the showroom are equipped with different wheel and electrode changer types, as well as different loading systems. And of course we also present our full range of optical CNC measuring machines here", explains Jochen Reiff, Application Technology Project Manager. "They are all connected via UNITED GRINDING Digital

Solutions™, so that the operating state of each individual machine can be viewed in real time in the demo room."

Most visitors are customers who wish to obtain general information about the machine portfolio or are already interested in specific machines. Many customers also test the production of a defined tool, so that they can assess the performance of the machines and software for their individual product.

With meeting rooms that can be flexibly divided, the showroom is also ideal for training. "We can train our customers directly on

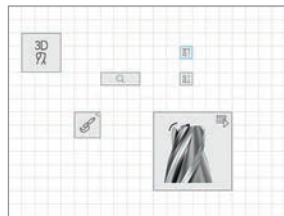
the machines here and introduce them to the HELITRONIC TOOL STUDIO software, for example, which is used on every grinding and eroding machine", says Reiff.

Numerous training courses are also held for employees in the showroom. To ensure that all employees are always fully up to date, training sessions are provided by product managers and application technicians for sales representatives, who work at the various locations around the world. Training for all of the Group's Customer Care employees worldwide also takes place here in Tübingen.

MIAMISBURG/USA

MORE SPACE FOR TRAINING

ADDED VALUE FOR THE CUSTOMER: To achieve this, the Solution Center in the US branch is being modernized. Only built in 2018 with the new facility in Miamisburg, the Solution Center is already being further optimized, in order to meet customer requirements even better. In addition to grinding demonstrations, external and internal events as well as customer training will also take place there in future.



TÜBINGEN/GERMANY

NEW ERA OF MEASUREMENT

TO ENABLE THE HIGH-PRECISION MEASUREMENT of rotationally-symmetrical tools, WALTER has developed new software. The WALTER METROLOGY CENTER combines a host of application possibilities with extremely simple operation. The operator interface is individually configured to the customer's requirements. Each user can thus concentrate on his specific tasks. Measuring machines in the HELICHECK PRECISION, PRO and PLUS series as well as older measuring machines with the CNC-06 control and later, as well as Windows 7 can be upgraded.



TÜBINGEN/GERMANY

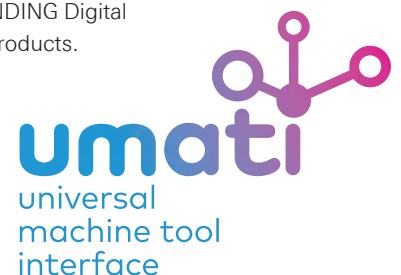
TECHNOLOGY FOR KIDS

DESIGN A TOOL ON THE COMPUTER, then have it manufactured, measured and laser-engraved by WALTER machines. This was the highlight for seven children from the Hector Children's Academy. For five days in spring they visited the factory in Tübingen and learned a lot about CNC grinding machines, precision and tools. Since 2012 the Hector Academy has offered particularly gifted children the opportunity to broaden their expertise while still at primary school and develop their individual interests. The aim is to inspire them to learn through discovery.

BERN/SWITZERLAND

COMMON MACHINE LANGUAGE

THE MORE MACHINES that are linked together, the more urgent the requirement for a common machine language. In addition to other well-known manufacturers, the UNITED GRINDING Group is a project partner of VDW – the Association of German Machine Manufacturers – for the development of such a standard. The umati interface ("universal machine tool interface") is based on the OPC UA data exchange standard. The Group's customers can also connect third-party machines to UNITED GRINDING Digital Solutions™ products.



HANNOVER/GERMANY

FOCUS ON DIGITAL SOLUTIONS

SYSTEMATIC FURTHER DEVELOPMENT of the proven PLANOMAT series in the form of the new BLOHM PLANOMAT XT, which was presented at EMO in Hannover. Around 117,000 production experts from 150 countries met at the world's leading metalworking trade show. The UNITED GRINDING Group introduced an innovative stand concept in Hannover, in which the brands were grouped around a central island with the UNITED GRINDING Digital Solutions™ products. The PLANOMAT XT made its debut at the show. This machine offers larger travel distances, optimized machine rigidity and a higher axis speed. The new BLOHM will then come onto the market at the end of 2020.



The BLOHM PLANOMAT XT made its debut at EMO



THUN/SWITZERLAND

CURRENT TRENDS

OVER 1500 INTERNATIONAL VISITORS experienced new technologies from precision machining and current trends in the manufacturing industry at the Grinding Symposium held by the UNITED GRINDING Group in Thun, Switzerland. You can find some impressions of the event here: www.grinding.ch/grindingsymposium2019



Photo: Thomas Pfruender

BERN/SWITZERLAND

PROMOTING YOUNG TALENT

SWISS APPRENTICES and trainees have been competing in national and international skills championships for almost 70 years. Young employees from the companies in the UNITED GRINDING Group have already impressed the judges on a number of occasions, most recently aspiring automation technician Josia Langhart (photo) from STUDER, who won the bronze medal in summer 2019 at the WorldSkills in Kazan, Russia. In order to further promote this flagship program of Swiss vocational training the UNITED GRINDING Group will support the next national skills championships, SwissSkills 2020 in Bern, as a Silver Partner.

SHANGHAI/CHINA

AWARD FOR WALTER

INNOVATIVE ACHIEVEMENTS in the metalworking industry are distinguished with the Ringier Technology Innovation Award in China. The WALTER HELITRONIC G 200 has just received this award. Inaugurated in 2006, this award has become one of China's most influential industry awards. The WALTER HELITRONIC G 200 was distinguished as a creative tool grinding machine with resource-efficient operation. Teams from China and Germany worked together at WALTER for the first time to bring the machine onto the Chinese market.

ALL THE WAY TO



Whether aerospace technology or microelectronics: Grinding machines play a vital part in many future technologies. Even 174 years after the first grinding machine, grinding has lost none of its importance as a superb manufacturing process

TEXT: Heinz-Jürgen Köhler

PHOTOGRAPHS: Andreas Scheunert

MARS

“HIGHEST REMOVAL RATES, SHORT CYCLE TIMES AND MINIMAL TOOL WEAR. NO OTHER TECHNOLOGY OFFERS THIS.”

*Harri Rein,
CTO Tool*

AN INCONSPICUOUS GRAY BOX stands on the red sand of Mars. Smoke rises from the satellite system. Alexander Gerst controls the Rollin' Justin robot from a spaceship. The robot opens the system on the surface of Mars. It identifies the smoking module and replaces it with a new one. The astronaut uses a tablet to define which work steps the robot must perform. Finished! Communication with the red planet is ensured.

Admittedly, this was only a simulation. The robot was deployed in the Space Center in Oberpfaffenhofen, Germany, and Alexander Gerst was controlling it from the International Space Station (ISS). Intelligent robots are actually considered a crucial factor in the discovery and exploration of distant planets. And it's quite possible that with Rollin' Justin or one of his colleagues a piece of grinding technology from the UNITED GRINDING Group may also be used on Mars.

So-called robot speed reducer gears are used in robot joints. These reducer gears decrease the speed of the motor that drives the joints. Without them, the robot would not be able to execute metered movements.

“In the combination of cost-effectiveness, efficiency and machining quality, grinding is superior to all other manufacturing processes”, declares Prof. Dr. Konrad Wegener from the Institute for Machine Tools and

Production at ETH Zurich. The robot speed reducer gears are an impressive illustration of this: Semicircular grooves with a diameter tolerance of $\pm 3 \mu\text{m}$ ($\pm 0.00012''$) are ground into the joints. Manufacturing is 24/7 unmanned operation. “Around 2.5 million such gears are ground each year with MÄGERLE machines”, estimates Product Manager Viktor Ruh.

THREE CRITERIA

Grinding as a machining process is an age-old technology. As far back as Ancient Greece grinding stones were cooled with water or oil. The first cylindrical grinding machine came onto the market in 1845. And in the 174 years since, this manufacturing process has lost none of its relevance.

“The process is distinguished by the highest removal rates, short cycle times and minimal tool wear. No other technology offers this”, concludes Harri Rein. Rein is CTO of the Tool Technology Group. Daniel Huber performs this role for Cylindrical, Daniel Mavro for Surface & Profile. Together with Christoph Plüss, the Group's Chief Technology Officer, they form the CTO Board, which establishes the guidelines for the technological development of the eight company brands.

Grinding is used not only in robotics but also in microelectronics. The so-called semi-

conductor wafers, used as the base plate for electronic components, are ground.

In innovative technologies, the use of new materials is often only made possible by the relevant machining processes. Ceramic composites in jet engines in the aerospace industry, for example, can best be machined by grinding. “Lightweight components made from carbon fiber reinforced plastic for the automotive or aircraft industry are machined with PCD tools, which have first passed through a grinding process”, explains Huber.

ADVANTAGES IN APPLICATION

The high machining quality of grinding provides numerous advantages in industrial applications. “Finer surface qualities in the automotive sector cause less friction and so lead to a higher engine efficiency”, says Mavro. “Narrower tolerances in the aerospace industry increase the efficiency of jet engines, for example, by reducing cooling airflow losses.”

In the automotive sector for instance, the Group's brands offer a host of innovative applications, such as grinding balance shafts on a SCHAUDT ShaftGrind S. These ensure smooth running in a combustion engine by producing counter frequencies. They are neither straight nor cylindrical –



**“DIGITALIZATION WILL ENABLE
THE PRECISE MODELING
OF COMPLEX PROCESSES
IN FUTURE.”**

*Daniel Mavro,
CTO Surface & Profile*



Photo: Thomas Eugster

THREE QUESTIONS TO PROF. DR. KONRAD WEGENER

Swiss Federal Institute of Technology Zurich, ETHZ

“MACHINES INCREASINGLY MAKE THEIR OWN DECISIONS ABOUT WHAT TO DO”

How important do you consider grinding from the viewpoint of sustainability?

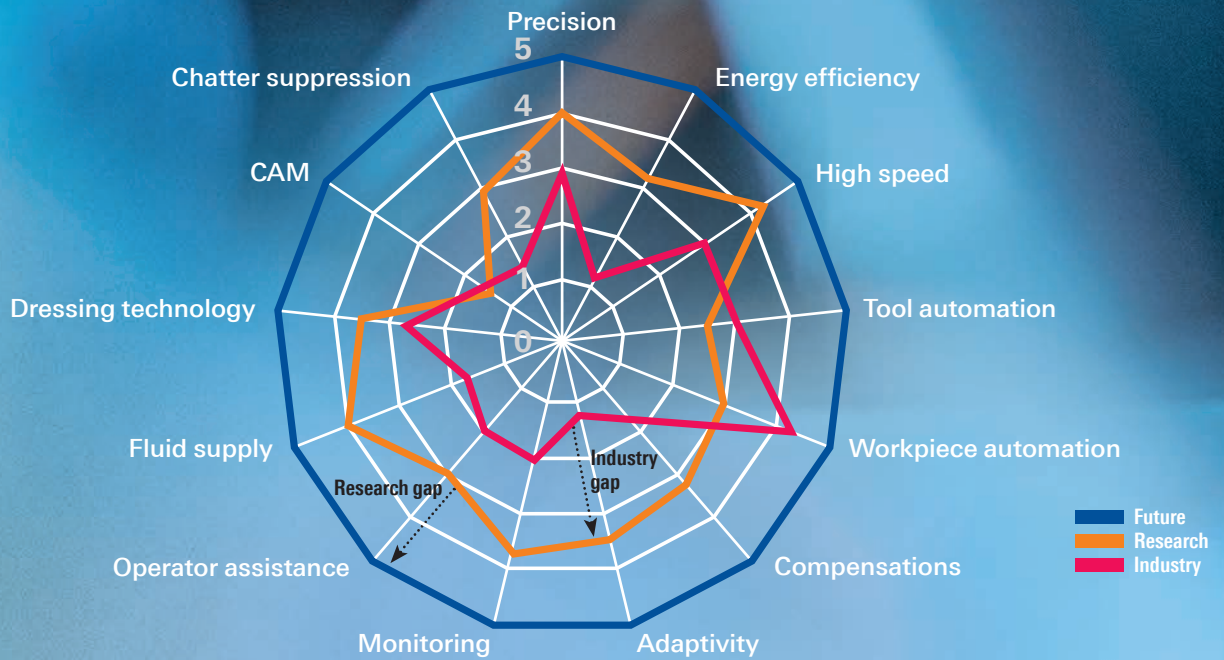
The high tungsten consumption from cutting with a defined cutting edge, for instance, speaks in favor of grinding technology. With regard to sustainability often only energy consumption is considered today, where grinding does not score well due to its high coolant usage. However, the problem is not the energy that can be obtained from regenerative sources, but limited material resources.

Modern grinding machines operate with precision in the μm range. Do you think such precision can be further improved?

Precision in the μm range is a vague statement. 1 μm working space accuracy means positioning accuracies of the individual axes of 0.1 μm (4 mill”) and thus measuring systems with an interpolation accuracy of 0.01 μm (0,4 mill”). Overall, one can say that accuracy can be improved. An ultra-precision accuracy will often be requested, but with increasing precision the market becomes smaller, because ultra-precision machines are correspondingly expensive.

How will digitalization change grinding?

Everything will fundamentally change, whatever you want to call it: whether digitalization or Industry 4.0. I am not keen on the term digitalization, because this is something we have already been doing for 70 years, unless you don't consider the NC control as a digital technology? There will be more and more computing power and we must get used to machines themselves increasingly deciding what to do. Machines will perform extremely complex processes themselves without human interaction, and obtain missing skills via digital twins on the Internet. Model-based machine learning will improve their capabilities. We may then need to discuss whether older, experienced machines are better than new ones.



THE PARAMETERS OF GRINDING

Assessment by grinding experts at the CIRP General Assembly 2017 in Lugano

and therefore represent a major challenge for machining. Or the machining of toothed steering racks on a MÄGERLE MFP, on which up to eight workpieces with profile depths up to eleven millimeters and widths up to 300 millimeters are ground in one clamping – something that presents an extreme challenge in terms of spindle power and the stability of the entire machine.

MEASURING AND GRINDING

The actual grinding process can be connected to adjacent processes such as measuring or dressing. “A grinding machine can be combined with a measuring machine to form a cell, with a robot for loading as an interface between the two, says CTO Rein. The result is unmanned or even “lights out” production, which enables mass quantities to be produced. The parameters of the tools to be produced can be stored in WALTER’s Internal Measuring System (IMS). In the case of deviations, the system regulates the machining process or stops production if the tolerance range is exceeded. “Even with small lot sizes or individual workpieces, in-process gauging is important for immediately achieving the required accuracy,” explains Huber.

Dressing ensures that grinding wheel wear is compensated. This guarantees exactly the same workpiece tolerances and the

same quality across the entire production cycle. “In certain application areas harder materials such as ceramic are increasingly being used. These require superabrasives, which in turn need a high-strength, i.e. metallic bond of the grinding wheel”, explains Wegener.

And for a metallic-bonded grinding wheel, WireDress® technology is the tool of choice for dressing. The grinding wheel is dressed contactlessly according to the principle of wire-electro-erosion. The result is a maximum proportion of grain space and optimum cutting ability. “I believe that WireDress® will help metal-bonded grinding

wheels make a breakthrough”, says Wegener, whose Institute developed the technology jointly with STUDER.

THE HUMAN FACTOR

Another important factor which defines the result of the grinding process is the employees. “Their wealth of experience is vitally important”, emphasizes CTO Rein. All companies of the UNITED GRINDING Group therefore devote significant resources to the training and ongoing education of their employees (also see page 36 ff.). Human know-how will also remain important in the course of further digitalization.

“Firstly, the know-how of today’s grinding machine operators must be incorporated into assistance systems and databases, and secondly the operator will have to deal with more demanding tasks in future”, says Huber. Because: “With a complex machining cell the operator needs skills on a whole new level”, Mavro adds.

And so the UNITED GRINDING Group has resolved to achieve two things: ever improving technologies and ever improving employees. Both ultimately lead to ever improving grinding results. ◦

“IN TERMS OF PRODUCTIVITY AND QUALITY, MATERIALS SUCH AS CERAMIC, TUNGSTEN CARBIDE OR PCD CAN ONLY SENSIBLY BE MACHINED BY GRINDING.”

Daniel Huber, CTO Cylindrical

The photos in this section were taken at SCHAUDT MIKROSA in Leipzig and show a ShaftGrind S machining balance shafts.

*Tailor-made tools to meet customer requirements:
Dr. Claus Dold (l.),
Head of Process
Innovation at EWAG*



GLASS PROFILES

Glass and ceramic are increasingly used as materials in modern, 5G-capable smartphones. Their machining places high demands on tools. In order to fulfill these demands, the tools are ideally produced by EWAG using laser technology

TEXT: Heinz-Jürgen Köhler

IT'S A REAL RACE: Which manufacturer will launch its new smartphone generation on the market, and with which features? Faster processors, better or more cameras, a larger screen, fingerprint sensor, facial recognition, rounded metal housing, a screen with a rounded edge. Manufacturers Samsung, Huawei and Apple, who together control half of the global market, regularly try to outdo each other. South Korean manufacturer Samsung landed a coup in this race in spring 2019, when it unveiled the world's first smartphone with a 5G mobile chip.

The various phone generations incorporate know-how and machining power from WALTER and EWAG, the tool machining companies of the UNITED GRINDING Group. With classic cell phones the shell was manufactured using a plastic or metal die casting

process. The die casting molds were generally produced with tools, which were in turn manufactured with WALTER machines. These are known as 3C tools according to the international abbreviation for Computer, Communication and Consumer Electronics.

PCD PROFILE CUTTERS

Since the iPhone 6 and Samsung Galaxy S5 smartphone generations, increasing emphasis has been placed on machining with tools produced by laser technology. On the Apple iPhone 6 for instance, the bevel on the aluminium housing is machined with PCD profile cutters. On the iPhone X however, stainless steel is integrated into the housing frame. These cannot be machined with diamond-coated tools such as PCD due to the chemical affinity with ferrous materials, and

CBN cutters are used instead. These tools can also be manufactured with machines such as the EWAG LASER LINE ULTRA or the LASER LINE PRECISION.

With new demands on design and technology, materials such as glass and ceramic are being used increasingly, not least due to the arrival of 5G smartphones. These materials offer a number of advantages. One relates to the reception quality of smartphones: "In principle, metal housings shield wave transmission in wireless communications", explains Andreas Bußmann, expert in terminal devices at Deutsche Telekom. Therefore, on devices with a metal housing, this is used for the antenna. "For this purpose however, it must be shielded from other integrated metal parts. This is done with plastic strips."

DIRECTLY ON THE BOARD

This shielding is not required on mobile devices with a glass or ceramic housing. "I can place the antennas directly on the board, which enables more design liberties", says Bußmann. And this design liberty is very welcome in 5G applications, because generally these require the integration of more internal antennas into the smartphone. The frequency used in Europe for 5G is 3.5 Ghz (4G: 2.6 Ghz), while in the USA and Japan the millimeter wave spectrum of 28 Ghz is used.

In order to receive these frequencies, up to three antennas are integrated into the smartphones, and even up to four in the millimeter wave spectrum, which is particularly sensitive and practically needs a direct "line of sight" to the antenna. The main challenge here is not integrating the antennas into the device from the installation space perspective, but installing the antennas in such a way that they are not covered by the user's body.

In addition, glass or ceramic as materials for the cell phone shell are higher quality and more sustainable than plastic for instance, and allow greater freedom of design. A device like the Samsung Galaxy S10

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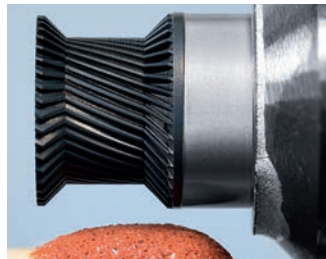
Up to antennas

are needed by smartphones to achieve ideal reception qualities in the millimeter wave spectrum

"SMALLEST INTERNAL RADII, TURNED PARTS, SHOULDERS AND OTHER GEOMETRIES CAN BE PRODUCED WITH THESE TOOLS."

Dr. Gregory Eberle, Laser Technology Process Specialist, EWAG

Tools for machining smartphone housings with diameters between 1.8 and eight millimeters



thus dispenses with a metal back, to enable wireless charging of the device by induction. "Due to their brittleness, hardness and low thermal conductivity, materials such as glass or ceramic place quite specific demands on the tools used to machine them", explains Dr. Claus Dold, Head of Process Innovation at EWAG.

HIGHLY SPECIFIC GEOMETRIES

"We increasingly receive customer requests for 3C tools with highly specific geometries, for use in machining glass housings for instance", explains Dold. "To fulfill the particular requirements on customers' individual tools we then develop the machining and programming steps for our laser machines, to enable us to manufacture these tools."

"The smallest internal radii, turned parts, shoulders and other geometries can be produced with these tools", says Dr. Gregory Eberle, Laser Technology Process Specialist at EWAG. In conventional machining, tools with these geometries would have to be assembled from several parts. With an EWAG LASER LINE ULTRA for instance, they can be produced fully automatically and in one work step. ◦

EVER MORE POWERFUL NETWORKS

1991

2G 📶



SMS



0.1 MB/second

1998

3G 📶



SMS



Internet



0.1–8 MB/second

2008

4G 📶



SMS



Internet



video



15 MB/second

2020

5G 📶



SMS



Internet



HD, ultra 3D



Internet of Things



1–10 GB/second

“WE WOMEN OFTEN HAVE DIFFERENT IDEAS”

The machine tool sector is still a male domain, but more and more women are working in technical professions. We introduce some of these employees of the UNITED GRINDING Group here

STRENGTHENING CUSTOMER RELATIONS



JUSTINE HOFMANN

POSITION:

Service Technician, Fritz Studer AG, Steffisburg, Switzerland

CONTACT: justine.hofmann@studer.com

A CUSTOMER'S FIRST REACTION often amuses Justine Hofmann – because most of them don't expect a female service technician. But all customers react positively, and Justine Hofmann quickly convinces them with her ability and open manner.

The qualified machine and equipment operator completed her basic training as a maintenance technician at the end of 2018 and since then has maintained and repaired different STUDER machine types, primarily in companies in Northeast Germany. “The great thing about this job is that you learn something new every day and establish important relationships with the customer”, she says. Justine Hofmann's goal is clear: “If the machine is working perfectly and the customer is satisfied at the end of the day, then I am happy.”



FLEXIBLE THINKING AND PROBLEM SOLVING



LARA SCHNEIDER

POSITION:

Design Engineer, Ewag AG, Etziken, Switzerland

CONTACT: lara.schneider@ewag.com

BACK IN SCHOOL Lara Schneider didn't even know that there was such a job as a design engineer. Today it's her dream job. “What I like best is that at the end I can see and touch what I have created”, she says. Design engineers draw up designs for making products and components. This requires logical and network thinking as well as a good spatial sense. “It is always a question of finding a solution for a problem”, says Lara Schneider. “To do this you must be able to think flexibly and keep an open mind, as there are always several ways to achieve your goal.”

The fact that the profession is strongly dominated by men doesn't bother her. “Men communicate more directly than women, I've always liked that. We women think quite differently to men and often have different ideas. When men and women work together as a team, they complement each other very well.”



Photo: Benedikt Schmermann

BETTER THROUGH INTERNATIONALIZATION



JUDY XI

POSITION:

Head of Precision Measurement,
United Grinding (Shanghai) Ltd., Shanghai, China

CONTACT: judy.xi@grinding.cn

"WE ARE A FIRST-CLASS MANUFACTURER of precision machines, with global products and international experts and technicians", enthuses Judy Xi. She has been working for United Grinding China for twelve years. Her responsibilities include designing measuring methods for customer workpieces and the necessary measuring tools, as well as programming measuring processes.

"I am used to working very carefully, and love measuring work and the interaction between people and machines. The challenge of my job lies in adapting the customers' ever changing parts and requirements in the measuring program", says Xi. Her colleagues are all very experienced and encourage her to continually improve her technical level. "We are constantly learning from and encouraging one another."



PAYING ATTENTION TO EVERY DETAIL



CHANDELLE YOUNG

POSITION:

Sales Support Engineer,
United Grinding North America, Inc., Miamisburg, USA

CONTACT: chanelle.young@grinding.com

"EVERY DAY I KNOW MORE than I did before, there is so much to learn", says Chanelle Young. This is one of the reasons why she loves her job. One and a half years ago she joined United Grinding North America as a sales support engineer and since then has been working in the Rebuild Group, a team that updates machines and components in line with the latest developments.

Together with the Head of Rebuild and the regional sales manager she prepares projects through to sale of the machines, helps to prepare parts lists for the sale of specific machines, calculates materials planning and delivery dates on the basis of the machine plans and coordinates deliveries to the customer. "Throughout the process I pay close attention to the details, to ensure that every task is done and the machines arrive with the customer as good as new and at the right time", says Young.

*Passing the ball in tabletop soccer
Martin Hoffmann, Prof. Ralph Bruder
and Heinz Poklekowski (from left)
during the interview in Stuttgart*





NEW WORK IS MORE THAN JUST TABLETOP SOCCER

How do employees' new demands affect machine manufacturers? And what are these companies doing to win over high-potential employees? A conversation

TEXT: Michael Hopp

PHOTOGRAPHS: Dominik Obertreis

Mr. Poklekowski, are you desperately seeking employees? Are there shortages and if so, in which areas?

Heinz Poklekowski: We have a turnover rate of just under five percent and an apprentice level of six percent. Grinding machine operators, process engineers, application engineers, you can't find them on the job market. We have to train them ourselves. Our main challenge is therefore finding apprentices we can retain in the long-term. Yet it is precisely in the areas of software development, electrical technology, the engineering professions but also in the purchasing and supply chain sector that the quality and quantity of applicants has decreased. The job market has changed and as a company we can no longer count on a large number of applications today. Nevertheless, we are still in the fortunate position of being able to implement our growth plans.

How do requirements such as automation, digitalization and internationalization affect the applicant profiles you look for?

Martin Hoffmann: It is generally very difficult to find good service technicians in the machine manufacturing sector in particular. The reason: People travel for leisure more than ever – but they are very unwilling to do so professionally, as this goes against their idea of the work-life balance.

Poklekowski: For a number of years we have noticed that employees are less willing to travel for business. We are trying to react with appropriate measures, for instance with a rotating system in the Customer Care department in one of our companies. The service technician agrees with his supervisor when he will travel and when he will be in the office. We need to meet our employees' ever-changing demands.

In the machine tool sector we also often talk about practical and traditional knowledge, which is passed on from generation to generation. To what extent are new work practices becoming accepted here?

Ralph Bruder: It is certainly an industry that many people think has nothing to do with New Work. This is associated more with knowledge work, smaller units or agencies. This is quite different in a large manufacturing company. Part of the discussion about new work practices concerns the flexibility

“THE ABILITY TO WORK IN INTERDISCIPLINARY TEAMS IS ONE OF THE MOST HIGHLY VALUED SKILLS.”

*Martin Hoffmann,
Senior Department Head
of Mechanical Engineering,
Hays AG*



ty of workplaces and working hours – and this is very relevant, for service employees in particular. A second aspect is stylish new workplaces, flexible space concepts, a soccer table... You still don't find these very often in production companies today, but the world has changed here too. The third point is the demand for self-fulfillment and participation. This is exactly what the traditional industries have always done. The fourth area for me is the question of meaning. These four elements are all easily identifiable in the machine tool industry. The employees have a great sense of purpose, are strongly committed to the company and proud of their

IN CONVERSATION

PROF. DR. RALPH BRUDER

Is Director of the Institute of Ergonomics at Darmstadt University of Technology. Bruder studied electrical engineering and did his doctorate on the application of artificial intelligence in ergonomics.

MARTIN HOFFMANN

Studied sociology, political and media science and is Senior Team Manager of Mechanical Engineering at Hays Recruitment Agency in Stuttgart. Headquartered in London, the company employs 10,000 employees worldwide and specializes in the placement of engineers in particular.

HEINZ POKLEKOWSKI

Is Chief Financial Officer of the UNITED GRINDING Group. Poklekowski studied business management and joined JUNG in 1992. Between 2004 and 2014 he was CEO of the Tool Grinding Technology Group.



“WE HAVE A TRAINING SYSTEM THAT IS FIRMLY ROOTED IN EUROPE, WHICH WE EXPORT TO CHINA AND THE USA.”

*Heinz Poklekowski,
CFO UNITED GRINDING Group*



work. Thus the UNITED GRINDING Group already has everything that young companies are striving for.

Is it true that Generation Y introduces these New Work demands to companies during the first job interview?

Poklekowski: We can't avoid changing values in society. We see an increased interest in working conditions from both applicants and employees. We accept this challenge and offer exciting project work with an interdisciplinary structure. Part-time work, home office – all of these aspects are covered in our companies. Added to this is the high standard of our office facilities and equipment.

Hoffmann: If someone has been to UNITED GRINDING, then they know it. But how do people find you – that's the challenge we face with our customers in the machine manufacturing industry. Because these qualities are not visible at first glance or are not associated with these companies. It is not enough to have a good website or wonderful magazine, young people expect to be addressed directly. We need to take account of this in recruiting too.

How important are honesty and authenticity?

Hoffmann: When promising flexibility you have to be absolutely honest and mustn't make any false claims. Complete flexibility simply does not exist in many industries. What UNITED GRINDING offers is a high level of stability. This may come at the expense of complete flexibility – but I believe it can be reconciled, because Generation Y also wants to have a certain stability. And if you can put this in proportion, then you have an interesting offer for these people in particular.

How does the UNITED GRINDING Group present itself to applicants: as a mid-sized company or a big corporation? You are both, after all...

Poklekowski: We actually have a multi-brand strategy. We use our corporate brand, UNITED GRINDING Group, in China and the USA, where it is important for employees to work for a large corporation. Even if we are cooperating with RWTH Aachen or ETH in Zurich, we present ourselves as the UNITED GRINDING Group with a vast range of experience. If, for example, we are address-

ing apprentices for the local job market, we recruit regionally and put the local company brands to the fore. We have a regional base, people know us, we are a major employer.

Hoffmann: Regionality is an important topic, especially for us in recruiting. In Schwaben, for example, we have a completely different candidate market to that in Hamburg. We find it relatively easy to place engineers at customers in Hamburg, because there are fewer companies looking for engineers compared to what we have here in Stuttgart.

Poklekowski: Our corporate vision meshes with our employer branding here. We are an international group, made up of innovative, mid-sized companies. Our employer branding must take account of both these facets. As an international company group with exciting challenges, we are not yet sufficiently recognized by experienced professionals and talented people outside our regional sphere.

What would the arguments be for a software developer in a large corporation, for instance, to change to UNITED GRINDING?

Poklekowski: In a mid-sized machine manufacturing company the decision-making



“GRINDING MACHINE OPERATORS, PROCESS ENGINEERS, YOU CAN’T FIND THESE ON THE JOB MARKET. WE HAVE TO TRAIN THEM OURSELVES.”

*Heinz Poklekowski,
CFO UNITED GRINDING Group*

processes are short and quick, development results of the employees flow directly into the product and can be managed throughout the entire product life cycle. Once the employees have experienced our working environment and realize how much they can help shape the overall process, they really value these opportunities. Opportunities also regularly arise to work on international projects and their implementation at company-wide level.

Bruder: The opportunity to do new things and discover the world: This is what large companies offer graduates. Good career prospects, a dynamic environment, combined with stability. The mid-sized company, on the other hand, is perceived as being boring, with little change, and little international orientation.

Hoffmann: And yet often you find greater dynamism there, if you take the “Hidden Champions”...

Poklekowski: ... and a much higher level of internationalism. And they can also climb the ladder far more quickly with us.

On the topic of internationalism – how important is the high standard of Euro-

pean training, when you are looking for workers in the USA and China?

Poklekowski: We have a big advantage. We have a training system that is firmly rooted in Europe, which we can export to China and the USA. For this purpose we use our own service academies, where employees from all countries receive training. And in Czechia we have developed internal trainee programs for training. Although these are not dual systems, they offer excellent practical training.

Hoffmann: What about intercultural learning in the other direction? Can we in Europe also copy a thing or two?

Poklekowski: We have developed a machine for the Asian market, for example, using an international team. Asians and Europeans have complemented each other’s knowledge in this project.

Bruder: What we need to provide for such training models is curious young people. We don’t make it part of a curriculum, but we tell all students they should spend at least one year abroad. And that they should assume they will always be working in intercultural teams. That is routine, that is normal.



“EMPLOYEES IN MACHINE MANUFACTURING ARE STRONGLY COMMITTED TO THE COMPANY, AND PROUD OF THEIR WORK.”

*Martin Hoffmann,
Senior Department Head of Mechanical Engineering, Hays AG*

“WE TELL ALL STUDENTS TO ASSUME THEY WILL ALWAYS WORK IN INTER-CULTURAL TEAMS.”

*Prof. Dr. Ralph Bruder,
Darmstadt University of Technology*



How important are soft skills for machine manufacturing today, in addition to hard skills? And what does this mean for young talent?

Hoffmann: Our annual HR report, for which we survey 600 top managers across all industries, shows time and again that we need both, hard skills and soft skills. It is essential to have people who are capable of learning and willing to change.

Poklekowski: In our industries you have to combine practical knowledge with digital requirements. This is only possible in a mixed project of experienced and young specialists. Soft skills are therefore of considerably greater importance today. Only if I am capable of working in a team, can I make my knowledge available in the project. Only if I am willing to question approaches and admit mistakes, can I learn. For digitalization in the machine tool industry and the relevant job profiles, this means: We don't need digitalization specialists, but specific knowledge and skills that enrich the team.

Hoffmann: We also see these results in our studies. The ability to work in interdisciplin-

ary teams is one of the most highly valued skills, besides learning capability and willingness to change.

Bruder: Exactly, the whole learning process is not quite so simple in Germany. We come from a tradition that says: Certified engineer, put a stamp on it, and that's it. To break with this and say, the learning isn't done yet, creates uncertainty in Germany. It has long been the case that you have to manage it "on the job" in companies.

Today, children are used to speaking to devices and getting meaningful answers. Won't these digital natives have an unbeatable advantage as machines become more and more intelligent?

Poklekowski: The know-how of the experienced employees combined with the digital affinity of the younger employees gives a higher added value. As an employer we must offer a platform where both professional

experience and the expertise of the digital natives are valued equally and positively influence the work results.

Hoffmann: I also don't believe that these young people will have a better chance from the outset or will replace the others. Especially if we need more soft skills – that also includes leadership skills, mediation between the disciplines, creating stability, providing orientation – then my generation is more in demand. I was born in 1980. When I recruit new employees, I notice that they frequently ask me what the next step is now. At these times I am Alexa or Siri (laughs).

Bruder: Particularly when operating machines we need self-assured people who don't accept everything the machine specifies. I often see people who are inclined to take the digital environment for granted. The experience of mixed teams is needed to shape it. ◦





A DAY WITH ... ALEXANDER HEITER

He is the Head of Mechanical Production at STUDER: Alexander Heiter takes care of production, administration and communication and ensures a common management philosophy in the team. We accompanied him for a day

TEXT: Sabrina Waffenschmidt
PHOTOGRAPHS: Meinrad Schade

07:00

ARRIVAL AND FIRST MEETINGS

Alexander Heiter arrives in the office in Thun and organizes the day ahead. First meetings with the department managers and representatives from production control, purchasing and warehouse await him.

A STAUNCH TEAM PLAYER and in constant dialog: Alexander Heiter controls Fritz Studer AG's entire mechanical production together with six department managers and handles the majority of administrative tasks. He is responsible for planning, structuring, monitoring and optimization of production cycles and processes. And he ensures that products are manufactured to a high quality, paying special attention to operational safety and efficient personnel deployment. This also encompasses all personnel issues such as vacation, sick leave and further training, which affect almost 90 employees in the production department. "I try to smooth the way for my department managers, so that they are free to manage their departments optimally", explains Heiter.

To this end, he is in constant consultation with his team and other departments. "I like directing and coordinating, passing on information and communicating. This particularly drives me to create a common understanding in my own and related departments."

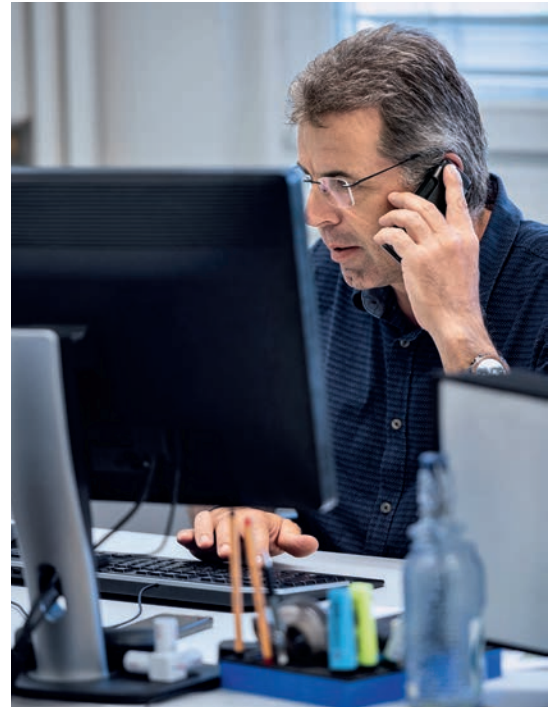
CONTACT:
alexander.heiter@studer.com

10:00

PROJECT WORK

Besides administrative work, Heiter is also heading up a number of projects and managing the introduction of the new production data logging system for the entire UNITED GRINDING Group.

“I TRY TO KEEP THE WAY CLEAR FOR THE DEPARTMENT MANAGERS, SO THAT THEY CAN MANAGE THEIR DEPARTMENTS OPTIMALLY.”

**13:30**

DEPARTMENT MANAGERS' MEETING

Where are we and what is our goal? The department managers meet regularly, to discuss the status of the annual targets and the necessary measures in production.

**14:30**

MODERNIZATION OF CUBIC PRODUCTION

Together with his team Alexander Heiter is working on the modernization of cubic production. The project has already reached the final phase and the machines are being started up.

15:00

PRECISION SURFACE GRINDING SHOP

Changeover optimization, grinding allowance adaptation and machining strategy definition: Heiter checks the production process of a new component for potential improvements in efficiency.



16:30

QUALITY INCREASE

In order to continually increase quality and productivity, Heiter regularly gets feedback from his employees.



17:00

ANALYSIS

Heiter checks the dimensions of a machine part together with a colleague and optimizes the program.

17:30

SUMMARY

Before finishing work Heiter summarizes the day and organizes the to-dos for the next day.

“IT IS IMPORTANT TO ME TO CREATE A COMMON MANAGEMENT PHILOSOPHY IN MECHANICAL PRODUCTION.”




TOOLS & TECHNOLOGY

NEWS FROM THE UNITED GRINDING GROUP

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Aircraft turbine blades can be machined with high efficiency with the new 5-axis grinding center
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Precise production of tool holding fixtures



*The SCHAUDT
ShaftGrind S can
use emulsion or
oil as coolant*

The MÄGERLE MFP 30 was unveiled to the public at the Grinding Symposium in May 2019



GRINDING COMPLEX GEOMETRIES WITH HIGH EFFICIENCY

With its new compact 5-axis MFP 30 grinding center MÄGERLE has developed a solution for grinding complex geometries for vanes, blades and heat shields of aircraft turbines

EXTREMELY COMPACT and space-saving, the MFP 30 has a footprint of just 2900 x 2525 millimeters. Its design ensures optimal accessibility and favors ergonomic loading of the work area – either manually or from the top using a crane.

The modular concept offers the user the choice between a 2-axis table with swiveling A-axis and rotating B-axis or a 3-axis indexing unit with additional rotating C-axis. The 3-axis table enables the machining of radial cuts on the root of a compressor blade without profile errors, in a single clamping.

Despite its compact size, the MFP 30 is distinguished by large grinding wheel dimensions. This ensures wide cuts, so that several profiles can be combined in one pass. The grinding support is supported by hydrostatic wrap-around guideways on a thin oil film. The main benefits are high dampening and low resonance, leading to higher removal rates and a longer tool life.

"THANKS TO THE WIDE GRINDING WHEELS SEVERAL PROFILES CAN BE COMBINED, WHICH CONSIDERABLY REDUCES PRODUCTION TIME."

Viktor Ruh,
Sales Engineer and Product Manager,
Mägerle AG Maschinenfabrik

The integrated high-pressure grinding wheel cleaning also contributes to its exceptional material removal rate capability. The servo-controlled table dressing device supported on two sides enables the mounting of diamond rolls with roll lengths of between 207 and 307 millimeters (with a diameter of 150 millimeters) enabling a large variety of different machining profiles. This helps significantly minimize changeover times.

The integrated automatic tool changer offers added flexibility. It can be equipped with different grinding wheels and tools for milling and drilling operations, as well as a measuring probe for quality or workpiece position checks. Tools can be loaded into the magazine in parallel without interrupting production. This eliminates unwanted down time and ensures a high level of flexibility. MÄGERLE offers the user the choice between a 12 and a 24-position changer.

The powerful spindle drive allows the combination of different grinding process-



NC-controlled coolant supply and integrated high-pressure grinding wheel cleaning



Coolant nozzles on grinding support for milling and drilling tools

es – for example creep feed grinding with corundum or grinding with CBN. In addition, the high-performance spindle with speeds up to 12'000 rpm offers optimal machining conditions for carrying out demanding grinding and milling operations in a single clamping. Full power and high torque are available even at low spindle speeds.

EFFICIENT PROCESS DEVELOPMENT

Either emulsion or oil can be used as coolant media. The coolant supply is NC-controlled via two axes. Nozzles are built into the grinding support to aid with the application of drilling and milling tools, and an additional option is available for supplying coolant through the middle of the spindle and tool. To ensure an energy-efficient coolant supply, the compact coolant filter is operated with a frequency-controlled pump.

A Siemens NX postprocessor is available for CAM process development. The generated NC programs use the Mägerle grinding cycles. As a result the programs can be easily edited on the machine control unit via operator guidance. Mägerle provides a Vericut package for simulating and checking the programs.

THE ADVANTAGES AT A GLANCE

- Small space requirement and optimal production flow thanks to compact design
- High flexibility and efficient machining
- Precision and long working life thanks to the hydrostatic guideway system

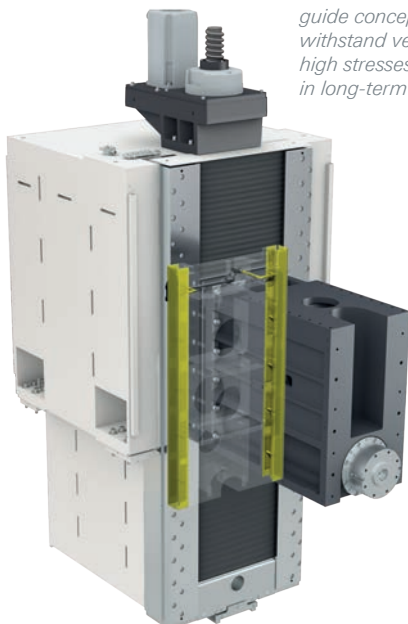
OPTIONS

- 3-axis indexing unit
- Tool changer: 12 or 24-position
- Coolant supply through the spindle for drilling and milling tools
- Tool measurement with laser
- Measuring probe
- Siemens NX postprocessor

LARGE GRINDING WHEEL DIMENSIONS

- Grinding wheel Ø: max. 300 mm
- Grinding wheel width: max. 60 mm
- Radial use: max. 80 mm
- Flange type: HSK-B80

The wear-free guide concept can withstand very high stresses, even in long-term use



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EFFICIENT MACHINING OF TURBINE COMPONENTS

Swiss company La Rapida SA specializes in the manufacture of gas turbine components for power generation and relies on MÄGERLE technology



In its basic configuration the MÄGERLE MFP 51 comes with an integrated portal tool magazine

SINCE AS FAR BACK AS 2008 La Rapida has been using 5-axis grinding centers from MÄGERLE. It uses two MFP 50s, MFP 100 and, since the middle of 2018, the new MFP 51. With the changeover from conventional 3-axis grinding machines to MÄGERLE grinding centers, La Rapida has optimized the complete machining of turbine components and has been able to considerably increase its production capacity. In order to expand its customer base and product range, the company now also produces blades, vanes and heat shields intended for applications in the aerospace industry. La Rapida obtained the necessary EN 9100 certification at the beginning of 2019.

All four MÄGERLE machines are configured so that the complete array can be machined on them, regardless of whether they are intended for power generation or

the aerospace industry. They are equipped with tool changers and 2-axis indexing tables as well as parameterizable grinding and dressing cycles for turbine applications. Because of the machine's generous working range La Rapida uses the MFP 100 primarily for machining large components – here specifically blades and vanes for gas turbines.

INTERCHANGEABLE RANGE OF PARTS

On the MFP 50 and MFP 51 models, an interchangeable range of parts is ground, including aerospace components. Even the grinding wheel flanges are interchangeable between the two machines. The MFP 51 is ahead of its sister machine here: The optional nozzle changer which stores up to six process-optimized coolant nozzles guarantees that the cooling lubricant is directed to the workpiece in a process-specific and opti-

mized manner. This significantly improves the grinding conditions for the different profiles. The MFP 51's simultaneous tool and dressing roll changer also reduces auxiliary times.

La Rapida SA was the first company to purchase an MFP 51: "We are very happy with this decision", says Managing Director Nicola Pusterla. "We especially benefit from the large capacity of the tool changer. It allows us to machine recurring lot sizes without long downtimes." The tool magazine for grinding wheels, diamond rolls and tools is designed as a gantry system. The 66 positions can be equipped with different tool types.

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Photo: Marco Cappelletti



La Rapida in Chiasso, Switzerland



EVERY 2ND

car worldwide will be an electric vehicle by 2030, according to estimates by the Boston Consulting Group

ONE SHAFT IN 45 SECONDS

With the cylindrical grinding machines in the ShaftGrind series SCHAUDT offers a future-proof technology for the high-precision grinding of rotor shafts for electric motors

“OUR EXPERIENCE IN GRINDING CAM AND GEAR SHAFTS REALLY PAYS OFF FOR MACHINING ELECTRIC ROTOR SHAFTS.”

Wadim Karassik, Head of Process Engineering, Schaudt Mikrosa GmbH

THE PROPORTION OF ELECTRIC VEHICLES on Europe's roads is steadily increasing. As a result the requirements on the grinding technologies used for production are changing, and grinding of the rotor shaft for the electric drive is a crucial aspect. Manufacturing companies are therefore now well advised to use flexible grinding machines which are capable of machining rotor shafts precisely and cost-effectively. SCHAUDT offers such a solution with the cylindrical grinding machines in the ShaftGrind series.

very complex geometries are machined in a maximum of 90 seconds on the ShaftGrind L with two or more grinding wheels. The precision requirements for the rotor shaft are in line with those for a gear shaft: for example, roundnesses of 3 to 5 µm and a torsion-free seal seat.

Depending on their design, the rotor shafts are clamped using an external chuck or internal clamping mandrels, which mesh precisely with the shaft spline. Here too, SCHAUDT utilizes its existing experience

with clamping mandrels. Manufacturers of electric rotor shafts not only benefit from the proven technologies, which SCHAUDT impressively combines on the ShaftGrind. If the electromobility market develops differently from expectations, they will also be able to use the ShaftGrind flexibly for grinding any type of shaft at any time.

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IN A SINGLE PLUNGE

Typical rotor shafts are between 250 and 400 millimeters long with a main diameter at the joint seat of the laminated cores of 40 to 70 millimeters. Bearing seats, seal seat, joint seat and shoulders are ground. Normally machining takes place sequentially from two sides. This is different on the ShaftGrind S. Depending on the shaft geometry, all areas of the rotor shaft are ground in a single plunge – with a grinding wheel up to 500 millimeters wide and with different coatings. The grinding time for a rotor shaft is thus only 45 seconds. Shafts with

As a double-slide machine the ShaftGrind L2 opens up new possibilities for shaft machining



ERODING OR GRINDING? BOTH!



The WALTER eroding machines: HELITRONIC VISION DIAMOND 400 L, HELITRONIC POWER DIAMOND 400, HELITRONIC DIAMOND EVOLUTION (from left)

WALTER'S two-in-one concept enables cost-effective production of PCD tools

THERE IS A STEADY INCREASE in the demand for complex full-head PCD tools. Without them, CFRP machining in the aerospace industry in particular is inconceivable. However, the efficient production of these complex tools is a challenge. Combination machining, enabled by WALTER'S two-in-one machines, is currently the only process for manufacturing such tools cost-effectively.

EFFICIENT ROTARY EROSION

WALTER currently has three machines in the range, which are based on the two-in-one concept and combine eroding and grinding processes on one machine. PCD tools from a variety of industries can be

produced on these machines – whether for the woodworking, automotive or aerospace industry. Special applications can also be implemented.

The tools can either be simply ground on the machines (tungsten carbide), solely eroded (PCD) or produced in a combined machining system with both processes in a single clamping. The decisive advantage: Time-consuming reclamping of the tool is eliminated.

A powerful grinding spindle guarantees a perfect production result and the rotary erosion process used by WALTER is much more cost-effective than conventional wire spark erosion in many cases.

ENTRY INTO THE PCD MARKET

The efficiency of the machining process is not the only advantage of the two-in-one concept. These highly flexible machines allow customers to tap the PCD market risk-free: If business does not develop as expected, the previous product portfolio can easily be ground on the machine – in the usual WALTER quality.

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IT ALL COMES DOWN TO THE DIE PLATE

The STUDER S121, S131 and S141 show their potential in the manufacture of die plates for beverage can production



The STUDER S131 enables a maximum work-piece length of 300 millimeters

ONLY RECENTLY, UNITED GRINDING North America presented this technology at the Cannex metal packaging trade fair: Beverage cans made of aluminium or tinplate are drawn from a metal disk with a plunger and several extracting rings then trimmed, washed and coated on the inside.

The quality of the tools used (plunger, extracting rings, punch and forming tools) directly affects the process efficiency. The more precisely they are ground, the higher the can output. The STUDER S121, S131 and S141 radius grinding machines demonstrate their abilities here: The combination of direct-drive B-axis, which can be swiveled up to 90° to the tool centerline, and... the StuderSIM software enables a continuous swivel movement as well as interpolation of the X and Z-axis with the B-axis. This results in perfect radii.

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ADVANTAGES AT A GLANCE

- Axial and radial runout accuracies $< 1 \mu\text{m}$
- Precision of the in-process measuring equipment used $< 0.5 \mu\text{m}$
- Special clamping systems for reliable workpiece fixing
- Narrowest form tolerances
- StuderFormHSM programming software
- Adaptive contour grinding with in-process dimensional control
- Individual automation possible

MODERN TOOL HOLDING FIXTURE FOR CONTEMPORARY MACHINING PROCESSES

With its cylindrical grinding machines STUDER offers cost-effective solutions for the high-precision production of polygon shank cone (PSC) tool holding fixtures

AS THE INTERFACE BETWEEN TOOL and work spindle, tool holding fixtures must enable quick tool change and maximum production accuracy. While in the past the rotationally-symmetrical HSK holding fixture was the measure of all things, a new interface geometry has developed from the trend towards multiple tool use: The polygonal hollow shank cone with face contact, PSC for short.

A PSC tool holding fixture guarantees the highest repeatability precision, short machine changeover times and a high basic stability and precision. It transfers high torques, is rigid and self-centering and has quick change functions.

EFFICIENT AND PRECISE

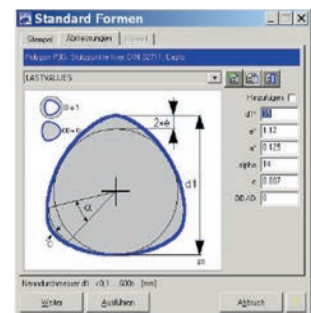
As an experienced partner of the tool industry, STUDER understands the technical challenges of the production process for PSC tool holding fixtures. With axial and radial runout accuracies below $1 \mu\text{m}$ ($40\text{mill}''$) and in-process measuring equipment with an accuracy below $0.5 \mu\text{m}$ ($20\text{mill}''$), the high-precision STUDER cylindrical grinding machines S41, S31, S22, S131 and S141 bring ideal prerequisites for economical PSC production.

STUDER also offers special clamping systems for reliable workpiece fixing to ensure the required modularity, repetition accuracy and concentricity. At the same time the narrowest form tolerances ensure large contact areas for force transmission. The StuderFormHSM programming software allows simple programming of PSC tool holding fixtures with function-oriented correction geometries. STUDER cylindrical grinding machines allow adaptive contour

grinding and offer in-process dimensional control of the polygon. High process reliability is guaranteed even for small quantities. Individual automation with the aid of manual clamping means, single loaders or highly flexible portal loading systems also guarantees a high product variety with a wide range of quantities.

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The StuderFormHSM programming software enables simple programming of tool holding fixtures



“AS AN EXPERIENCED PARTNER OF THE TOOL INDUSTRY STUDER UNDERSTANDS THE REQUIREMENTS OF THE PRODUCTION PROCESS.”

*Stefan Schneider,
Shaft Project Development, Fritz Studer AG*



NICO PESCHKE

Field Service Technician,
WALTER, Tübingen,
Germany

Nico Peschke particularly
values the Group's
international nature.

YOU CAN'T LEARN GRINDING AT UNIVERSITY

The quality of the grinding process depends largely on the qualification of the employees and is based on the experience and knowledge that is passed on to young people. The UNITED GRINDING Group has its own special training and education system worldwide

TEXT: Sabrina Waffenschmidt

HE WAS ALWAYS VERY EAGER TO LEARN – and fascinated by machines since childhood. Six years ago Nico Peschke began his training as a mechatronics engineer with WALTER in Tübingen. After his apprenticeship he was taken on in prototyping in the Assembly Department and moved to Service in early 2018. At the same time Peschke pursued further training as a certified technician.

“It is important to me to gain a lot of experience, because this is essential in our job”, he says. The UNITED GRINDING Group provides him with great support. “My job is very varied and there is actually no routine. You have to learn something new almost every day, so that you are up to date”, emphasizes Peschke.

OPPORTUNITIES FOR YOUNG TALENT

The companies of the UNITED GRINDING Group offer a variety of training opportunities to inspire young talent. “The requirements and measures vary widely from company to company”, says Sonja Ludwig, Head of Human Resources at the UNITED GRINDING Group. “STUDER, for example, has a long tradition of training and has set up its own vocational training center.” 84 apprentices are currently receiving training there

in seven professions. That is more than ten percent of the entire workforce. Companies like BLOHM or JUNG offer training in mechatronics engineering.

EXPERIENCE PLUS NEW STIMULI

In addition, says Ludwig, there are large regional and country-specific differences in the job market and in the training system. “In Czechia for example, short internships are offered for pupils and trainee programs for students, but there is no vocational training like there is in Germany or Switzerland. In Germany, on the other hand, we have further strengthened the dual training system in recent years.”

However, one thing applies for all companies: Experience and experienced employees are of great importance. “Complex knowledge can only be transferred by our best people”, says Nico Peschke. “This particularly applies for grinding.” Because this, stresses Sonja Ludwig, cannot be learned at university, but only by working on the machine. Many companies in the Group provide new employees with a mentor to act as a permanent contact. “We put our new employees together with an experienced colleague, to pass on their experience”, ex-

“I THINK IT’S FANTASTIC THAT YOU ARE ALWAYS LEARNING ABOUT NEW CULTURES AND LANGUAGES. THIS IS PARTICULARLY IMPORTANT FOR ME AS A SERVICE TECHNICIAN.”

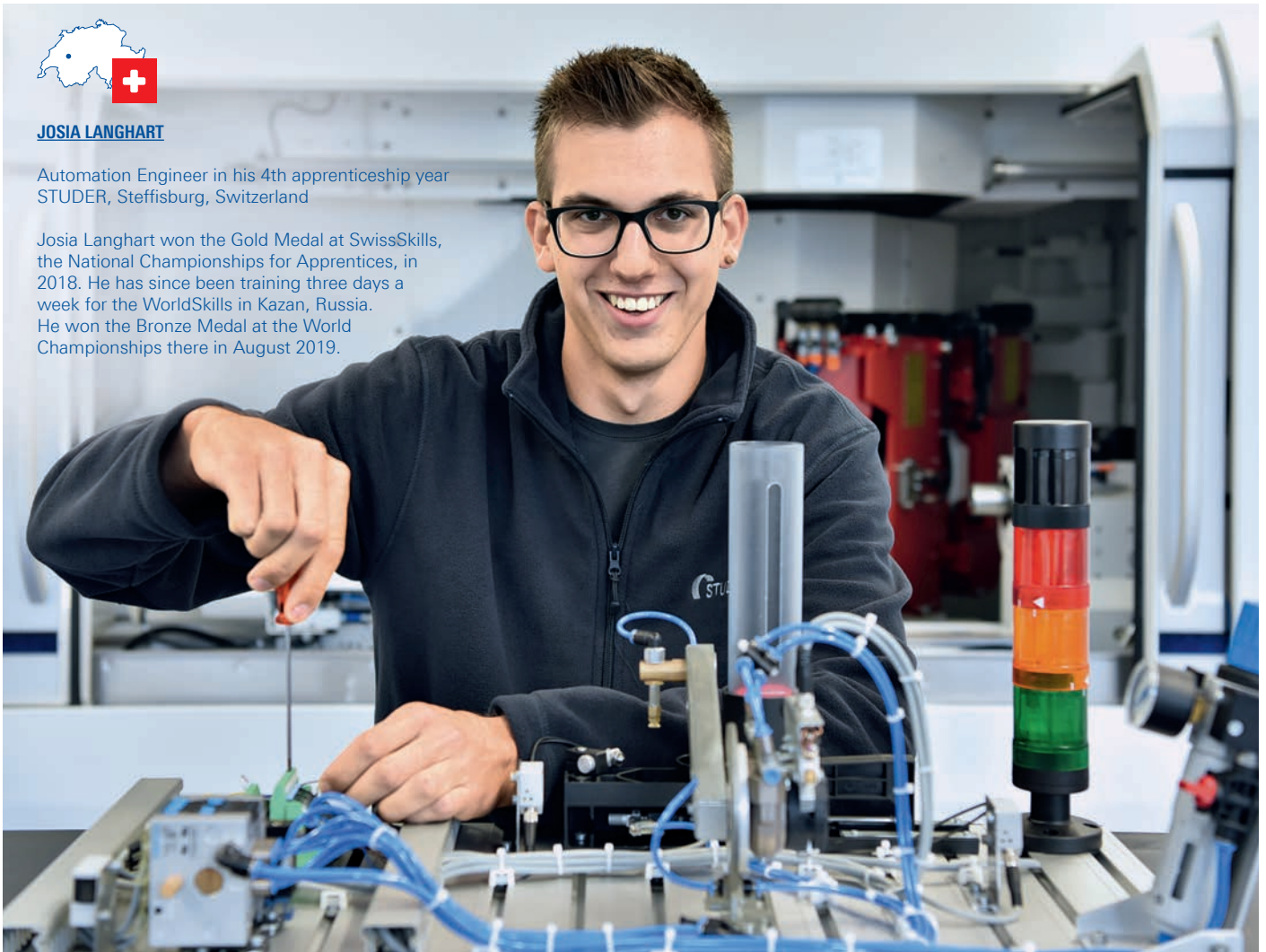
*Nico Peschke,
Field Service Technician,
WALTER, Tübingen, Germany*



JOSIA LANGHART

Automation Engineer in his 4th apprenticeship year
STUDER, Steffisburg, Switzerland

Josia Langhart won the Gold Medal at SwissSkills, the National Championships for Apprentices, in 2018. He has since been training three days a week for the WorldSkills in Kazan, Russia. He won the Bronze Medal at the World Championships there in August 2019.



plains Sarah Brinkerhoff from United Grinding North America. "This cooperation with a mentor enables the new employee to ask his questions in a personal conversation, and strengthens team building."

OLD AND YOUNG COMPLEMENT EACH OTHER PERFECTLY

"Practical knowledge comes from experience", emphasizes Sonja Ludwig. "We have many teams with a large age gap between employees: one is 25, another 55. The older ones bring experience, while the younger ones bring new impetus. They complement each other perfectly."

The challenge faced by managers when putting the teams together is constantly increasing. "With increasing digitalization and interdisciplinary exchange as well as the change in job profiles, there are more and more different types of employees", explains Ludwig. "It is all the more essential to assemble the teams correctly. Much like a football team, we need both defense and strikers. They just need different coaching."

In principle there is no right leadership, but only the right leadership for this one employee. Some need to be encouraged, while others are already very active by nature. Further training for managers and personal development seminars dealing with topics such as conflict management are held across the UNITED GRINDING Group, to ensure a common management philosophy.

INTERNATIONAL EXCHANGE OF KNOWLEDGE

Retaining existing employees and developing their skills is just as important to the UNITED GRINDING Group as good training of young talent. Career paths are developed and possible vocational and further training courses discussed with the employees. These range from imparting the latest technical skills through to safety training and language courses. The topic of further training is regularly discussed on an individual basis. The training level, existing skills and the current standard of knowledge as well as the wishes of the individual employees are all taken into

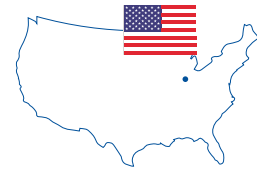
"STUDER WAS VERY GENEROUS AND PROVIDED ME WITH OUTSTANDING SUPPORT IN PREPARING FOR THE SWISSKILLS."

*Josia Langhart,
Automation Engineer in his 4th apprenticeship year, STUDER, Steffisburg, Switzerland*



“WORKING WITH A MENTOR IS THE BEST WAY TO TRANSFER EXPERIENCE.”

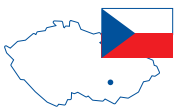
*Tyler Metzger,
Project Engineer, United Grinding
North America, Miamisburg, USA*



TYLER METZGER

Project Engineer,
United Grinding North America,
Miamisburg, USA

Four years ago, as a student, Tyler Metzger started working at United Grinding North America as part of a cooperation program of the University of Cincinnati and was taken on after gaining his bachelor degree.



LENKA RAUSCHOVA

Dispatch Administrator
Walter Kuřim s.r.o.,
Kuřim, Czechia

Lenka Rauschova is responsible for global machine exports.

“WALTER HAS ENABLED ME TO IMPROVE MY SKILLS ON MANY LEVELS, FOR INSTANCE WITH LANGUAGE COURSES OR TRAINING FOR INTERACTION WITH CUSTOMERS.”

*Lenka Rauschova,
Dispatch Administrator, WALTER Kuřim, Czechia*



BJÖRN MICKETEIT

System Assembly Manager, BLOHM JUNG, Hamburg, Germany

At 27 years of age Björn Micketeit is already an "old hand". He began training as a mechatronics engineer in 2008. After holding several other positions in the company he is now System Assembly Manager and at the same time is pursuing further training in technical business management.

account. The UNITED GRINDING Group not only provides support in the form of specific training programs, but also through financial support and flexible time models.

INTERNATIONAL EXCHANGE

Knowledge transfer also takes place between the different locations, companies and countries. WALTER, for example, offers its apprentices an apprentice exchange between Tübingen and the branch in Kuřim, Czechia.

For example, three STUDER apprentices learned about their Chinese colleagues' approach to work during a visit to Shanghai. United Grinding China, for its part, sends many of its service and application engineers to STUDER, MÄGERLE, WALTER or EWAG, and the employees of United Grinding North America also visit their European colleagues regularly. "The exchange has proved to be

extremely positive, because not only has it strengthened the personal bond between the employees at both locations, but all those involved take away new knowledge and new skills", says Sarah Brinkerhoff from United Grinding North America.

ON THE PATH TO DIGITALIZATION

The requirements on applicants have now changed and HR managers attach increasing value to soft skills: Does the applicant's personality fit into the company? How open are they to new areas of responsibility? And, more importantly: How willing are they to learn?

Digitalization also places new demands on employees, their skills and experience. "It is also a matter of integrating a new way of thinking and people from other areas with different perspectives", emphasizes Sonja Ludwig. ◦



"WHAT I LIKE ABOUT THE UNITED GRINDING GROUP, IS THAT IT PROMOTES AND CONTINUALLY TRAINS ITS EMPLOYEES."

*Björn Micketeit,
System Assembly Manager,
BLOHM JUNG, Hamburg, Germany*



"I AM ACTIVELY SUPPORTED DURING MY TRAINING AND CAN INCREASINGLY DEEPEN MY KNOWLEDGE."

*Lukretia Schindler,
Polymechanic in her 4th apprenticeship year,
MÄGERLE, Fehraltorf, Switzerland*



LUKRETIA SCHINDLER

Polymechanic in her 4th apprenticeship year, MÄGERLE, Fehraltorf, Switzerland

Like all apprentices, Lukretia Schindler learns about different departments as part of her training. At present she is working predominantly in machine assembly.



WU TIANWEI

Cylindrical Product Manager,
United Grinding China,
Shanghai, China

Wu Tianwei has been working at United Grinding China for almost twelve years and knows how crucial shared knowledge is.

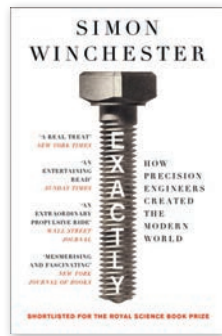


"IT IS IMPORTANT THAT ALL ENGINEERS GO THROUGH A TRAINING PROGRAM, SO THAT WE CAN COMMUNICATE WITH EACH OTHER IN THE SAME LANGUAGE."

*Wu Tianwei,
Cylindrical Product Manager,
UNITED GRINDING China, Shanghai, China*

TRANSFORMING THE WORLD

Precision is the key to the modern world, but how and when did precision begin to transform the world? In “Exactly: How precision engineers created the modern world” author Simon Winchester seeks to answer these questions. Read some text excerpts from his book



PRECISION IS AN ESSENTIAL COMPONENT of the modern world, yet it is invisible, hidden in plain sight. We all know that machines have to be precise; we all recognize that items that are of importance to us (our camera, our cellphone, our computer, our bicycle, our car, our dishwasher, our ballpoint pen) have to sport components that fit together with precision and operate with near perfection; and we all probably suppose that the more precise things are, the better they are. At the same time, this phenomenon of precision, like oxygen or the English language, is something we take for granted, is largely unseen, can seldom be fully imagined, and is rarely properly discussed, at least by those of us in the laity. Yet it is always there, an essential aspect of modernity that makes the modern possible.

Yet it hasn't always been so. Precision has a beginning. Precision has a definite and probably unassailable date of birth. Precision is something that developed over time, it has grown and changed and evolved, and it has a future that is to some quite obvious and to others, puzzlingly, somewhat uncertain. Precision's existence, in other words, enjoys the trajectory of a narrative, though it might well be that the shape of that trajectory will turn out to be more a parabola than a linear excursion into the infinite. In whichever manner precision developed, though, there was a story; there was, as they say in the moviemaking world, a through line.

ABOUT

SIMON WINCHESTER

Simon Winchester is a British writer, journalist and broadcaster who grew up in South-West England and studied geology at Oxford. Winchester's father was a precision engineer and would smuggle him into one of his factories once in a while, where he would gaze in either admiration or puzzlement at the machines. Today he lives in western Massachusetts and New York City, is the bestselling author of "The Man Who Loved China", "A Crack in the Edge of the World" and "Krakatoa", among many other titles, and was awarded the Order of the British Empire. The memory of his childhood factory visits still exerts a pull – and in 2011 he received, quite unexpectedly, an e-mail from a complete stranger. It was headed simply "A Suggestion", and its first paragraph started: "Why not write a book on the History of Precision?" So he did.



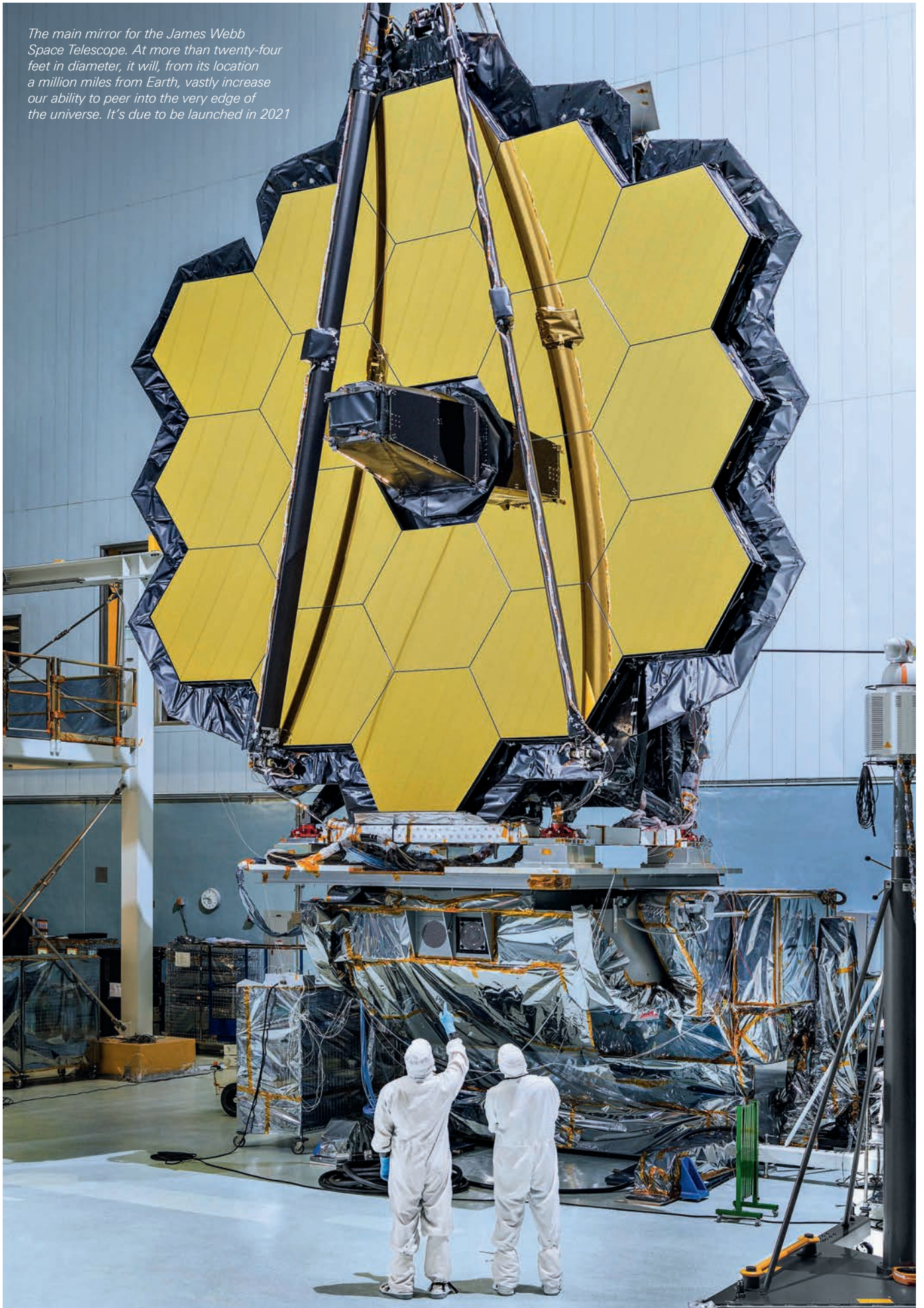
Before we delve too deeply into its history, two particular aspects of precision need to be addressed. First, its ubiquity in the contemporary conversation – the fact that precision is an integral, unchallenged, and seemingly essential component of our modern social, mercantile, scientific, mechanical, and intellectual landscapes. It pervades our lives entirely, comprehensively, wholly. Yet, the second thing to note – and it is a simple irony – is that most of us whose lives are peppered and larded and salted and perfumed with precision are not, when we come to think about it, entirely sure what precision is, what it means, or how it differs from similar-sounding concepts – accuracy most obviously, or its lexical kissing cousins of perfection and exactitude and of being just right, exactly!

NEAR-IMPOSSIBLE TINY TOLERANCES

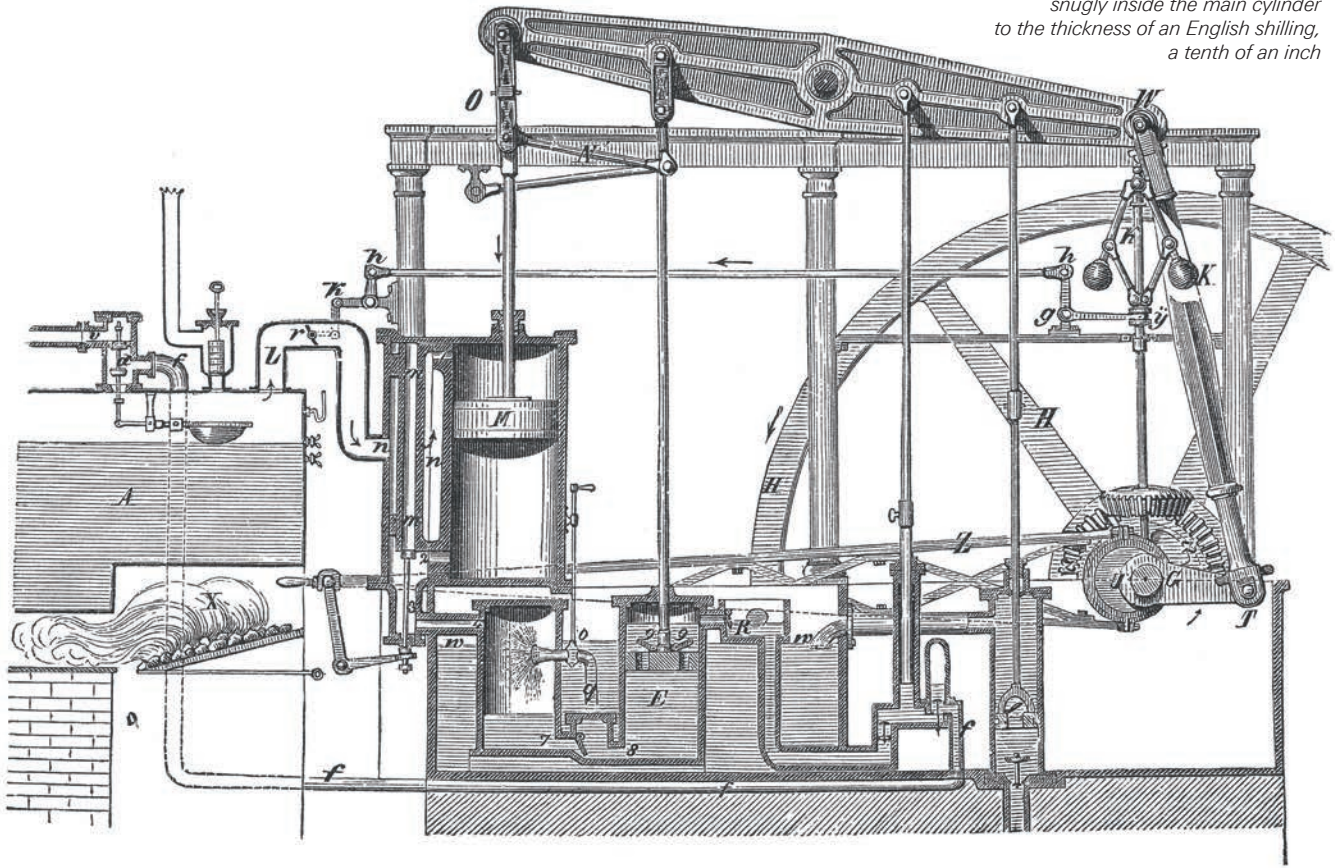
An ever-increasing desire for ever-higher precision seems to be a leitmotif of modern society – from large tolerances of 0.1 and 0.01 to the absurdly, near-impossible tiny tolerances to which some scientists work today – claims of measurements of differences of as little as 0.000 000 000 000 000 000 000 000 01 grams, 10 to the -28th grams.

Yet this principle also prompts a more general philosophical question: why? Why the need for such tolerances? Does a race for the ever-increasing precision suggested by these measurements actually offer any real benefit to human society? Is there perhaps

The main mirror for the James Webb Space Telescope. At more than twenty-four feet in diameter, it will, from its location a million miles from Earth, vastly increase our ability to peer into the very edge of the universe. It's due to be launched in 2021



The late eighteenth-century Boulton and Watt steam engine: The piston fits snugly inside the main cylinder to the thickness of an English shilling, a tenth of an inch



“THE BRITISH STANDARDS INSTITUTION HAS CLAIMED THAT WITH ITS FINE-TUNED CESIUM FOUNTAIN CLOCK NPL-CSF2 THE SECOND COULD BE MEASURED TO A DEGREE OF PRECISION OF 0.000 000 000 000 000 23. THIS MEANS IT WOULD NEITHER LOSE OR GAIN A SECOND IN 138 MILLION YEARS.”

a risk that we are somehow fetishizing precision, making things to ever-more-extraordinary tolerances simply because we can, or because we believe we should be able to?

CHEMICAL AND PHYSICAL PROPERTIES

Any piece of manufactured metal (or glass or ceramic) must have chemical and physical properties: it must have mass, density, a co-efficient of expansion, a degree of hardness, specific heat, and so on. It must also have dimensions: length, height, and width. It must possess geometric characteristics: it must have measurable degrees of straightness, of flatness, of circularity, cylindricity, perpendicularity, symmetry, parallelism, and position – among a mesmerizing host of other qualities even more arcane and obscure.

And for all these dimensions and geometries, the piece of machined metal must have a degree of what has come to be known as tolerance. It has to have a tolerance of some degree if it is to fit in some way in a machine, whether that machine is a clock, a ballpoint pen, a jet engine, a telescope, or a guidance system for a torpedo. There is precious little point in tolerance if the machined object is simply to stand upright and alone in the middle of a desert. But to fit with another equally finely machined piece of metal, the piece in question must have an agreed or stated amount of permissible variation in its dimensions or geometry that will allow it to

fit. That allowable variation is the tolerance, and the more precise the manufactured piece, the greater the tolerance that will be needed and specified.

A CONCEPT THAT WAS INVENTED

Precision was not always there, waiting in the shadows, needing to be found and then exploited for what its early admirers believed would be the common good. Far from it.

Precision was a concept that was invented, quite deliberately, out of a single and well-recognized historic need. It was brought into being for several practical reasons – reasons that had much to do not with any dreamy twenty-first-century wish to confirm (or otherwise) the existence of vibrations from the collisions of distant stars. Rather, it had to do with a down-to-earth eighteenth-century realization of what was then a pressing matter of physics, and which was related to the potentially awesome power of that high-temperature form of water that since the century before had been known as and defined by the word steam.

Precision’s birth derives from the then-imagined possibility of maybe holding and managing and directing this steam, this invisible gaseous form of boiling water, so as to create power from it, and to demand that by the employment of this power, it perform useful work for the good (perhaps, and with luck) of all humankind. ◦

Illustration: iStockphoto/ZU_09

MOTION CALENDAR: THE MOST IMPORTANT DATES IN THE COMING MONTHS

June 2020

2.6. – 5.6. ITM INDUSTRY EUROPE 2020,
POSEN, POLAND



ITM Industry Europe has a very long tradition: It will be taking place for the 92nd time. 1000 exhibitors from 26 countries are expected to attend Eastern Europe's largest machine tools trade show, including STUDER.

<https://itm-europe.com>



MAY 2020

25.5. – 29.5.20 METALLOBRABOTKA
MOSCOW, RUSSIA

The trade show for technology, machines and tools for the metalworking industry invites visitors to Moscow for its 21st edition. Almost 1200 exhibitors from 33 countries are expected, including all of the Group's brands.

www.metobr-expo.ru/en

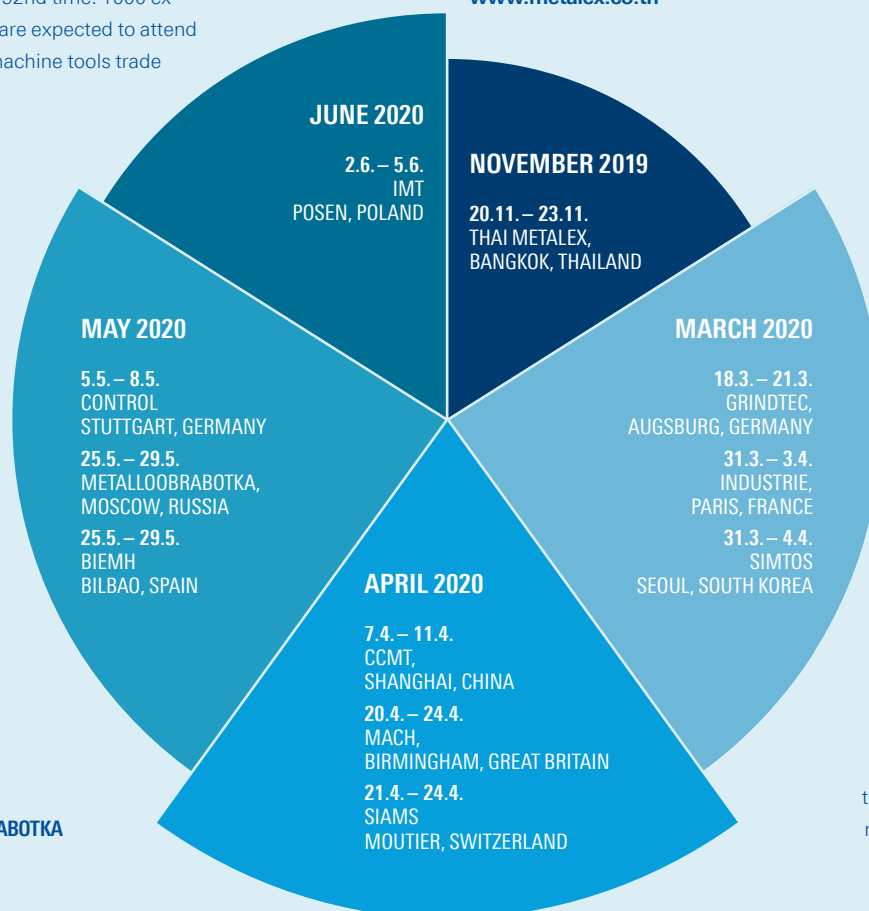
November 2019



20.11. – 23.11.19 THAI METALEX
BANGKOK, THAILAND

Thai Metalex is the largest trade show for machine tools in the ASEAN region. The 33rd edition will focus on microelectromechanical systems (MEMS) and the Internet of Things. Germany is the partner country, and the UNITED GRINDING Group will be represented at the trade show by STUDER, WALTER and EWAG.

www.metalex.co.th



18.3. – 21.3.20 GRINDTEC
AUGSBURG, GERMANY

More than 600 exhibitors will present their new products and offerings at the international grinding technology trade show. Following a record number of visitors in 2018, the biennial event has become established as the world's leading trade show in the grinding technology sector. The UNITED GRINDING Group will be represented by all its brands.

www.grindtec.de



April 2020

7.4. – 11.4.20 CCMT
SHANGHAI, CHINA

The China CNC Machine Tool show is the partner show of CIMT, the China International Machine Tool Show. It primarily presents CNC machines, machine controls and machine components. All brands of the UNITED GRINDING Group will be included in the around 1200 exhibitors.

www.ccmtshow.com



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