

COMPLETE

Nr. 01/24

The complete machining magazine

SUCCESS STORY | Founded on tradition at Auma Drives

INNOVATION | Outlook for the Technology Meeting 2024

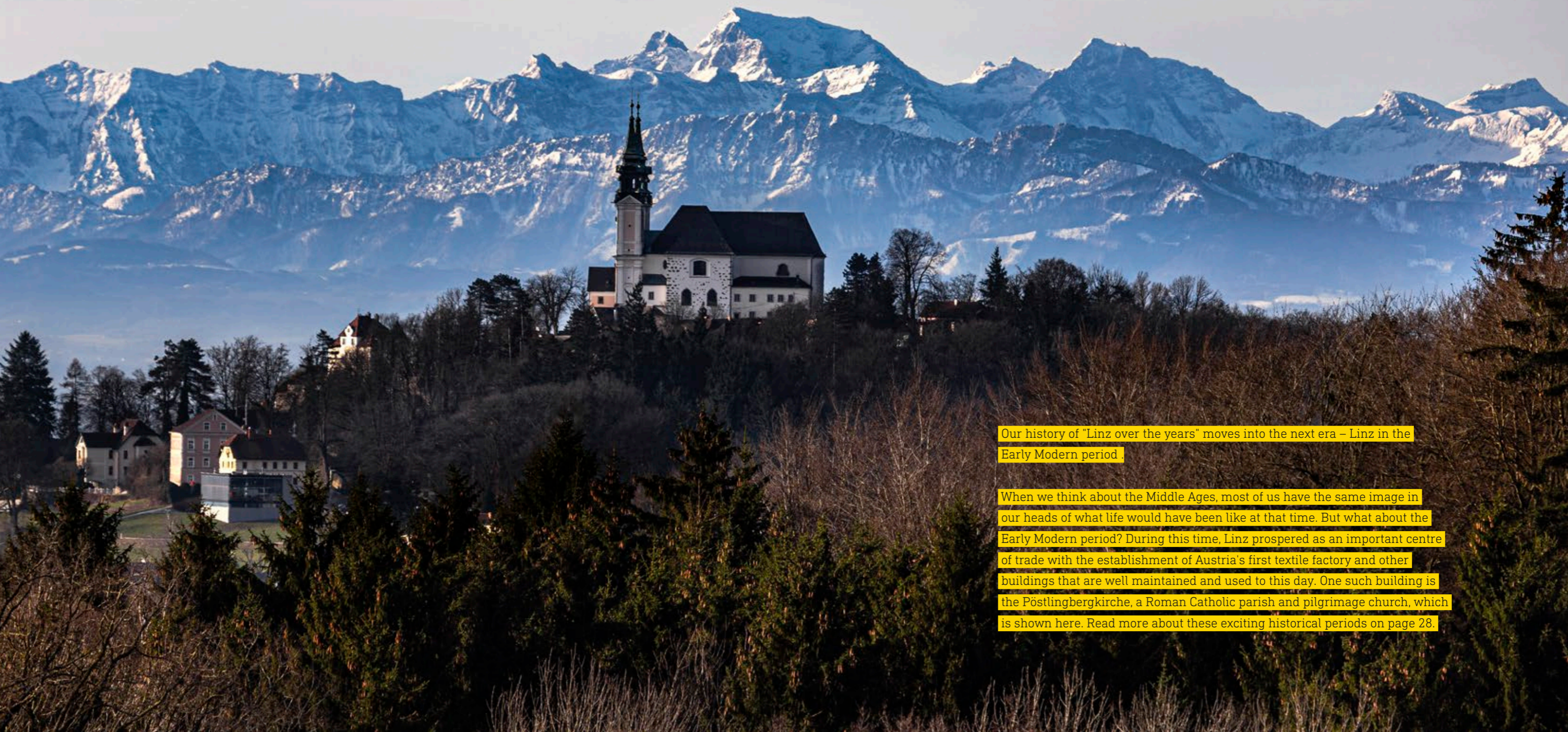
ALL EYES ON | Automation with articulated robots



All eyes on:
The flexible
MILLTURN

An overview of the entire Flanx range
with a focus on the new Flanx-Measure.

Back in time.



Our history of "Linz over the years" moves into the next era – Linz in the Early Modern period .

When we think about the Middle Ages, most of us have the same image in our heads of what life would have been like at that time. But what about the Early Modern period? During this time, Linz prospered as an important centre of trade with the establishment of Austria's first textile factory and other buildings that are well maintained and used to this day. One such building is the Pöstlingbergkirche, a Roman Catholic parish and pilgrimage church, which is shown here. Read more about these exciting historical periods on page 28.

Dear customers and readers,

We hope you have had a good and successful start to the new year and a peaceful end to 2023. We are looking forward to an exciting year, with a continued focus on the consistent further development of technology and the development of innovative solutions for our customers.

Technology Meeting: The first quarter of 2024 will be the focus of our machine and technology highlights at the WFL Technology Meeting. A perpetual and increasingly important topic is automation. This can be a major advantage for our customers, not only in the context of the shortage of skilled workers that is being experienced by many companies, but also in terms of productivity and efficiency. Together with our subsidiary, FRAL, we are able to offer interesting solutions. Visit us in March to find out more. We look forward to welcoming you.

A range of measurement methods: WFL offers various solutions for in-process measuring and develops solutions tailored to specific customer requirements. Take, for example, the fix-mounted in-process radio transmission probe, which can be swivelled in and out fully automatically without having to replace the machining tool. The new myWFL Health Check software now enables semi-automated measurements of the B-axis, tailstock and main and counter spindles to check the machine geometry. A real advantage when it comes to avoiding scrap thanks to the correct machine geometry.

Manufacturing Solutions: WFL not only offers customer-specific solutions for new machines but also unique second-hand machine solutions as an alternative to buying new. The stable construction of MILLTURNS provides a solid foundation even following decades of operation.

In this edition, you will find interesting information on the advantages of horizontal machining and the innovative WFL solutions for the horizontal complete machining of chuck parts; on the M30 and M35 MILLTURN, two of the smaller turning-boring-milling centres in the WFL range; and on automation by means of a mobile robot. Read the success story of Auma Drives, developer and manufacturer of gear unit solutions, a company that uses an M40X-G MILLTURN to produce large worm shafts. We also present the success story of Waldrich Coburg, well known for manufacturing particularly large, powerful gantry machining centres and gantry grinding machines that can be used in a wide range of industries. Not forgetting the increasing interest in the second-hand machine business – an increasingly important element when it comes to sustainability and cost-efficiency.

We hope you enjoy reading this edition!

The WFL Management-Team



Günther Mayr
Managing Director Sales, Technologies
and Services

Norbert Jungreithmayr
CEO

»Innovative solutions
for customers are at the
heart of what we do.«



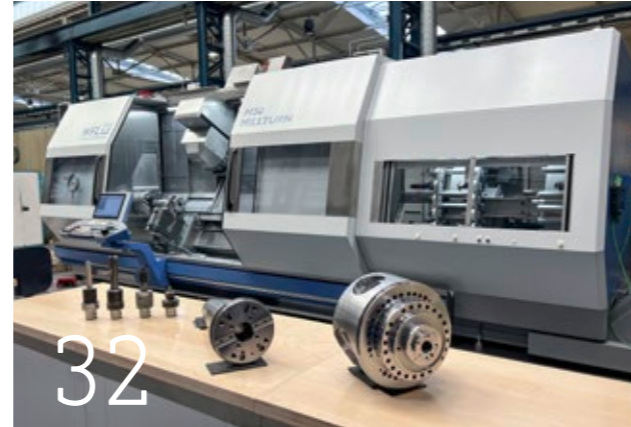
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This new business model breathes new life into second-hand machines. The machines are bought back and given a general overhaul with a focus on sustainability.

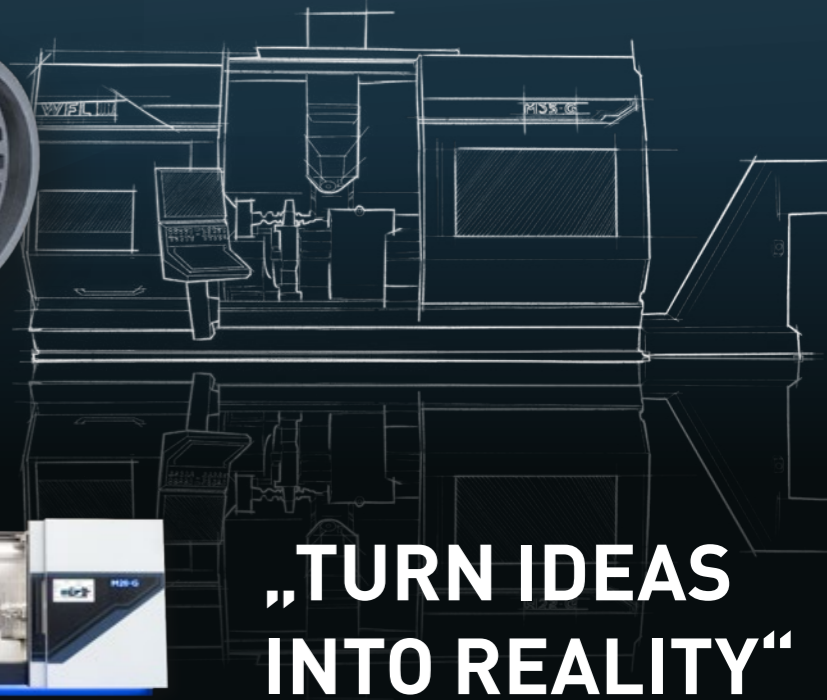
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M80 MILLTURN gear shaft



WFL Technology Meeting Highlights

MARCH 5TH to 7TH, 2024



„TURN IDEAS INTO REALITY“

M20-G

MILLTURN | 1500mm

- Optional individual tool carrier with B-axis
- Further nominal center distances available

Workpiece
Material: 42CrMo4 Clamping(s): 1
Length: 150mm Industry: Aerospace
Ø: 300mm



M35-G

MILLTURN | 1800mm

- robCELL - automation with use of articulated robots
- Automatic jaw change

Workpiece
Material: 42CrMo4 Clamping(s): 3
Length: 560mm Industry: Crankshaft
Ø: 120mm



M50

MILLTURN | 3000mm

- Live machining on a power generation shaft
- Live machining of turbine blades, fir tree and generator shaft profiles

Workpiece
Material: 42CrMo4 Clamping(s): 2
Length: 2355mm Industry: Energy
Ø: 600mm



M80X

MILLTURN | 4500mm

- Live machining on a gear shaft
- Grinding with prismatic tool
- Manufacturing of gearings using WFL FLANX cycles
- Intelligent tools: a vibration damped Silent Tools™ Plus boring bar

Workpiece
Material: 42CrMo4 Clamping(s): 1
Length: 1824mm Industry: Engineering Gear
Ø: 800mm



M150

MILLTURN | 6500mm

- Heavyweight Machining with workpiece weight up to 25t
- Heavy machining of components in one clamping
- Machining of high strength steels
- Manufacturing large gearings with Flanx Large Module

Workpiece
Material: 42CrMo4 Clamping(s): 1
Length: 5240mm Industry: Engineering
Ø: 1180mm



More Highlights

- Siemens Sinumerik ONE on all MILLTURNS
- myWFL: Software for operational data acquisition
- Extended Solutions: Second-hand and Retrofit Machines by WFL

Automation highlights by FRAI

- mobileCELL - The mobile robot solution
- Automatic change of power chuck
- Automatic loading & unloading of tools in the magazine



WFL is the world's leading supplier in the field of complete machining. In order to live up to this role, we are always in pursuit of innovations, improvements and increases in efficiency. All this requires change, reflection and forward-thinking.

Three of our employees give us an insight into the changes they have experienced during their many years of employment at WFL. They describe their day-to-day work then and now and tell us their biggest highlights.

„I started at WFL in 1996 as a Purchasing apprentice, later taking maternity leave and since then working as a general Purchasing employee. I have witnessed major developments at WFL during this time. During my apprenticeship, almost everything had to be processed manually: orders were initiated by our department, and we then had to search for the appropriate micro-cards for drawings in the archive. We then packaged and sent copies of the drawings in envelopes. This process sometimes took several days. Today, I can send hundreds of orders with automatic drawing assignment to suppliers with a single click.“



Olivia, Purchasing
(joined WFL in 1996)



Herbert, Head of Development
(joined WFL in 1993)



Carola, Mechanical Design
(joined WFL in 1994)

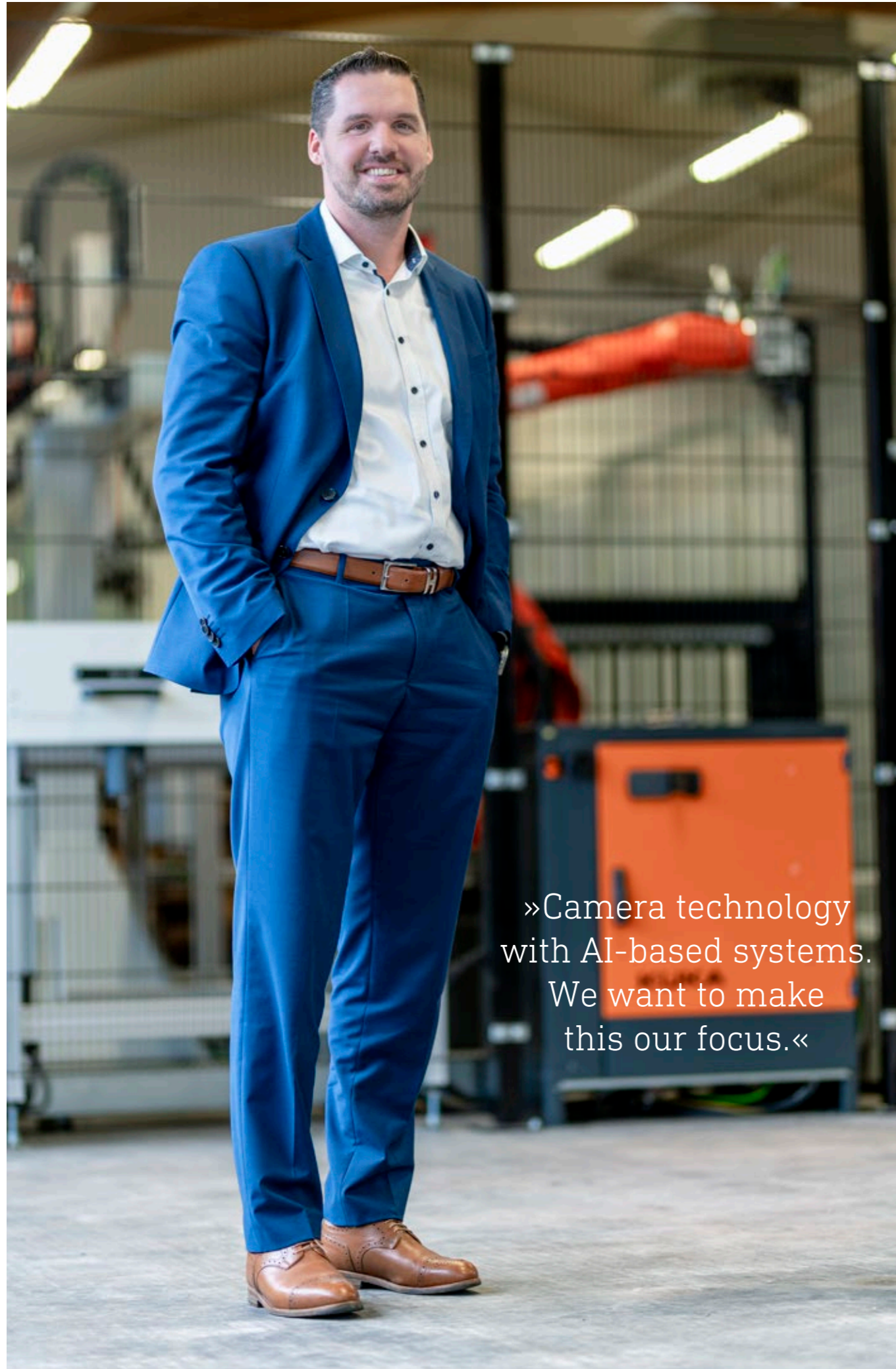
„When I joined, WFL was a very small company. I was a design engineer responsible for individual assemblies with two other employees. Today, I am head of the development department, leading 25 employees. WFL's beginnings were similar to that of a start-up and the company had a very uncertain future. WFL is now a high-tech industrial company with a very strong market position and excellent public image. We have experienced rapid and positive development, which many industry insiders at the time were not expecting. Switching from 2D drawings to 3D CAD programs allowed us to achieve a higher degree of perfection.“

„When I first joined WFL, I was involved in development for the creation of finished part drawings. Today, I create 3D AR models in the mechanical design department. In the beginning, my work was extremely time-consuming. My tasks primarily involved the creation of 2D finished part drawings, re-enlargements of micro-card drawings, the creation of assembly drawings for installation and the archiving of original drawings. Today, I mainly create 3D working areas, robot models and shell models. 3D programs have made my work significantly easier. Changes can be identified extremely quickly and we work with viewable images.“

40 years of MILLTURN Then and now

The logo for WFL MILLTURN TECHNOLOGIES is displayed on a building facade. The letters 'WFL' are large and blue, with 'MILLTURN TECHNOLOGIES' in smaller blue letters below them. The building has a modern, industrial design with a grid-like pattern on the roof.





»Camera technology with AI-based systems. We want to make this our focus.«

Back to the future

With FRAI Robotic Technologies

Franz Plasonig, CEO

We live in a time when computers and robots are part of everyday life. A time that is advancing faster than we can run. Many interesting and major inventions are finding their way into industry, but also the commercial sector. Take, for instance, children's toys, which are already voice-controlled and can independently move in various directions. Concepts that start small develop into major industrial projects. Complex and ever-growing innovations set the pace. The possibilities appear unending... Whether in the medical industry, the technical industry or amongst end consumers, it's impossible to imagine a world without robotics. The question of how to create added value with the help of these new technologies is constantly on the mind of Franz Plasonig, CEO of FRAI Robotic Technologies. To achieve great things, the tool and associated technology must first be developed and created. The team at FRAI Robotic Technologies works on solutions for fully automated production and is already an integral component of the future of automation. Inspired by blockbusters and futuristic concepts, Franz Plasonig leads a company that is already daring to leap into the

future and charting new territory with unique developments. Articulated robots, AGVs and automated interlinking systems are concepts that are just scratching the surface of the future and creating the drive for more exciting solutions in the field of mechanical engineering. In this COMPLETE interview with Franz Plasonig, we catch a small glimpse into this new world and consider the outlook for the future of automated industry at FRAI Robotic Technologies.

Mr Plasonig, please introduce yourself.

My name is Franz Plasonig, I was born and raised in the beautiful Lavanttal in Carinthia and have lived in Upper Austria since 2008. I am married and have two children aged 9 and 12.

There are many companies that offer automation solutions - what makes FRAI stand out from the crowd?

First and foremost, it is essential that we always understand what the customer wants. An automation solution must not only be easily adaptable in production, but also at a later date with a small investment. The lifecycles of products are becoming ever shorter, which makes it all the more important that customers re-

ceive a product from us that fits perfectly with their current product range but can also be used for future products. This is something we are able to achieve thanks to our experience and is also precisely what makes FRAI special.

What exactly can FRAI offer WFL customers?

In short, anything the customers desire. From a "simple" robot cell that simply loads and unloads the machine tool to a complex host-computer-controlled cell that takes orders from the customer's system and takes care of the entire cycle. For example, loading and unloading workpieces, tool changes, clamping device changes, linear gantries, area gantries and much more. If the technology in question is one we don't already have in our range, we are guaranteed to have an expert on hand who can support us in its implementation.

How does collaboration work between FRAI and WFL and which hurdles need to be overcome when working together on projects?

Collaboration between WFL and FRAI did not start with the acquisition. So not all processes were new to us.



COLLABORATION
 Collaboration between FRAI and WFL brings nothing but benefits to customers.

»There is a shortage of employees in all industries. This is why all roads lead to automation.«

From our point of view, it works extremely well and the interfaces between the companies are becoming better and better. A major advantage for customers is that when they buy a turnkey solution from us, the process has already been tried and tested in Linz under real conditions. Examples of this include chip removal by means of additional flushing processes, drainage in the machine, collecting cooling lubricant in the area surrounding the robot or gantry robot.

Automation is "THE" topic of the future; are there already innovations that are set to have a huge impact on production and manufacturing?

Wherever you look, there is a shortage of employees in all industries. This will continue to be the case over the com-

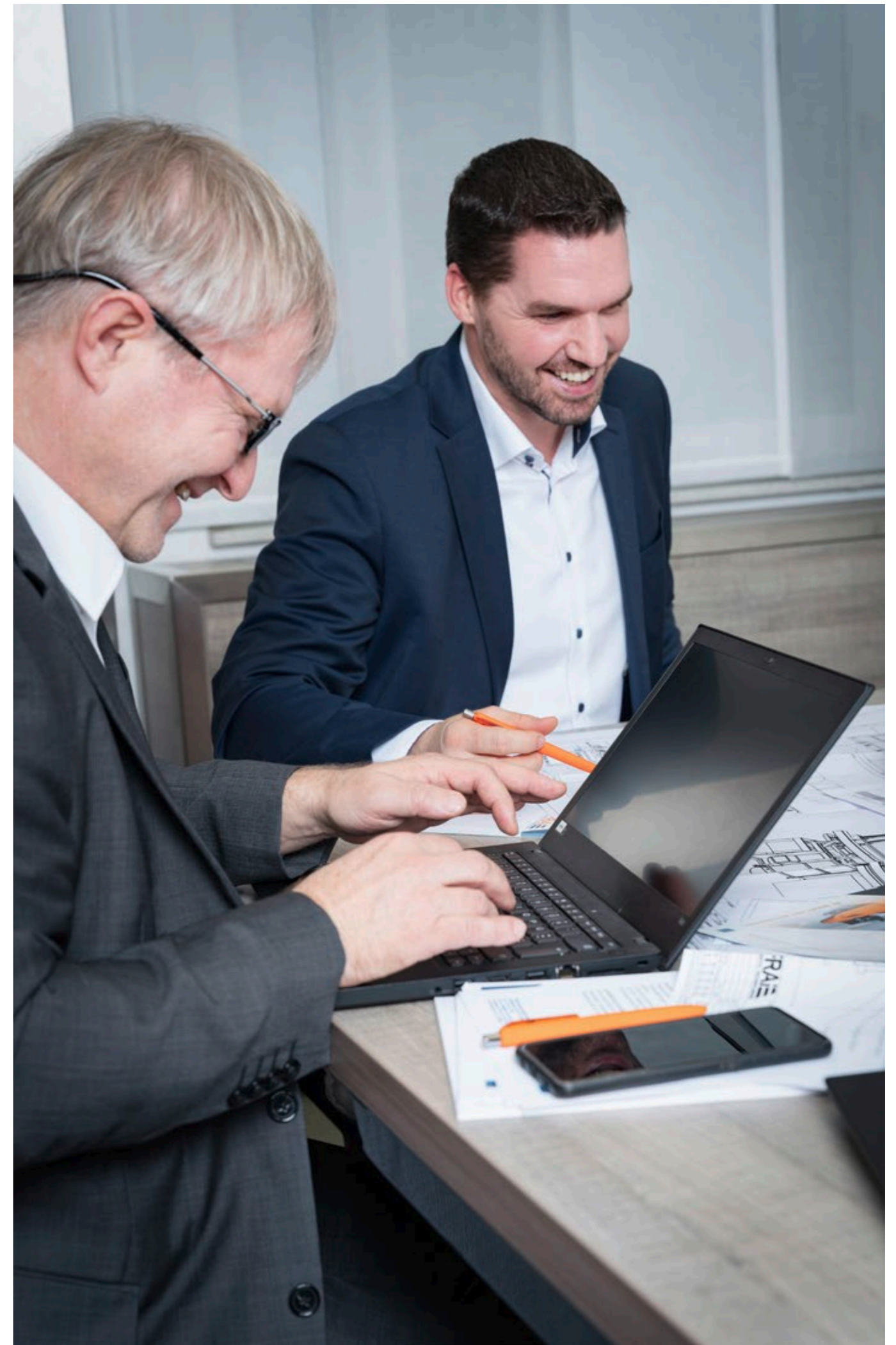
ing years. This is why all roads lead to automation. Higher-level host-computer-controlled systems are increasingly finding their way into the production halls of our end customers as a way of countering the shortage of personnel. AGVs (Automated Guided Vehicles) are also being increasingly used to safeguard the internal flow of materials. Automation solutions are becoming more complex and more likely to be equipped with camera solutions in order to offer greater flexibility in production. Loading and unloading workpieces, changing clamping devices, changing grippers, etc. are tasks performed by every good automation cell. In future, however, it should also be possible to change the cutting plates on the tools to enable production to continue over the weekend with fewer personnel. This con-

cept is still in its infancy, but is something we are looking to develop going forward.

The world changes rapidly, particularly in the field of automation. AI is definitely a hot topic here. Are there measures/ideas that are being pushed forward?

A lot has happened in the field of camera technology over the past three years and suppliers are increasingly using AI-based systems here. We want to focus on these first and foremost, as we are already able to identify the considerable added value they would bring to our end customers and ourselves.

As CEO of FRAI, you must be familiar with stressful situations and a high level of responsibility. How do you deal with these and how do you recharge your bat-





teries or replenish your energy?

For me, it's important to remain calm in any situation, and to analyse the situation before proceeding to deal with it. Panicking often results in errors, which must be kept to a minimum. Family has top priority for me. My family gives me strength in every life situation and I am firmly convinced that, with a strong family unit, you can move mountains. I also enjoy cooking to unwind. I cook with love and it really helps me shed the stresses of the working day.

To what extent does your job require "nerves of steel"?

There are always situations in which you need to take a deep breath but again here it's important to analyse the situation first and then make the right decisions.

How would you describe your day-to-day work?

Unfortunately, I don't have a typically structured working day. What does happen every day, however, is my morning tour, when I greet all the staff and obtain an overview of the current situation. Twice a week we coordinate the status of production and every Monday we discuss individual projects to ensure everyone is on the same page and we're not in for too many surprises. All of this is quite flexible, of course, and depends on the current situation.



PROFILE

Name: **ING. DIPL.-WIRT.-ING. (FH) FRANZ PLASONIG**

Age: 39

Home town: Linz

Education:

- HTL - Wolfsberg specialising in automation technology, graduated in 2006
- Part-time degree in industrial engineering at the Mittweida University of Applied Sciences, graduated in 2019

Career:

- 2008 – 2011 Design engineer for industrial deburring and cleaning systems for powertrain components at Valiant-TMS
- 2011 – 2013 Person responsible for the design of industrial deburring and cleaning systems for powertrain components at Valiant-TMS
- 2013 – 2015 Head of design for industrial deburring and cleaning systems for powertrain components at Valiant-TMS
- 2015 – 2019 Head of process technology for powertrain washers at Valiant-TMS
- 06/2019 – 04/2021 CEO of Pixelrunner GmbH
- Since 05/2021 CEO of FRAI Elektromaschinenbau GmbH



COORDINATION

The exchange of information between specialist departments is regularly on the agenda.

All eyes on...

Complete machining of chuck parts

Vertical vs. horizontal complete machining?

The complete machining of chuck parts from the aerospace industry is one of the core competences of WFL. For chuck parts where the diameters are often the same as or considerably larger than the workpiece length, WFL has been able to gain quite an advantage over the years. The most suitable chuck parts include discs and rings. The latest developments have enabled the complete machining of chuck parts with a diameter of up to 2000 mm.



All eyes on

Complete machining of chuck parts

by WFL MILLTURN Technologies

When it comes to the machining of chuck parts, most production specialists immediately think of vertical machining. It's true that the vertical machining of chuck parts, particularly ring- and disc-shaped parts, offers a few advantages. Above all, the convenient loading and unloading of workpieces. Chip removal in vertical machining is often problematic, however, whereby chips and cooling lubricant often remain in the workpiece and disrupt the machining process. This is where horizontal machining creates considerably better conditions.

The most important issues when it comes to producing complex chuck parts usually not only relate to the machining itself but to the loading and alignment of the parts in the clamping device. The vertical setup and alignment of the parts are also an important condition of horizontal machining. WFL has embraced this concept and challenge and is developing innovative complete solutions for the horizontal complete machining of chuck parts, which has many strengths in comparison with vertical machining.

The innovative WFL solution for the horizontal complete machining of chuck parts:

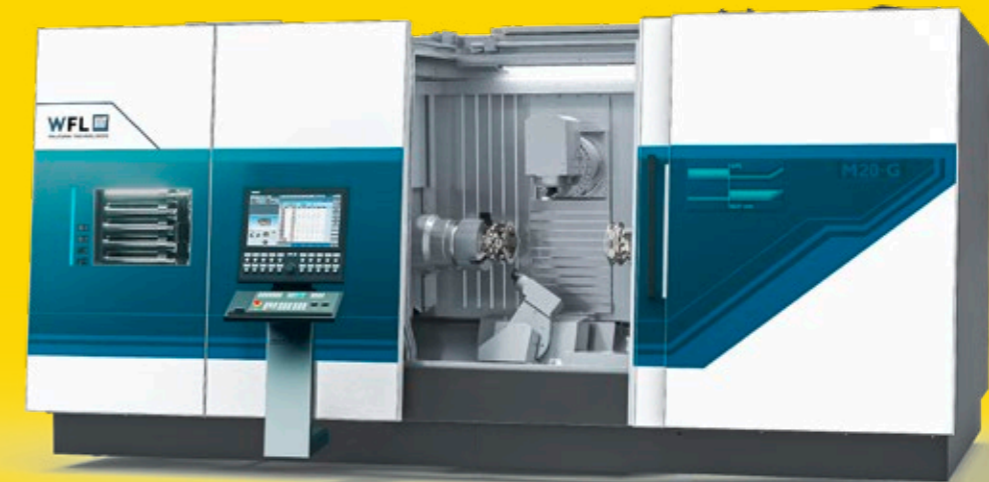
Based on a high-precision, rigid and fully variable clamping system. Clamping devices such as workpiece-specific pallets, power chucks, clamping mandrels and collet chucks can be manually or automatically changed as required. With this solution, the workpiece is clamped and aligned on the clamping pallet on a vertical external clamping table or setup station. The setup station is equipped with exactly the same interface as the headstock in the form of a stable short taper mounting with a high degree of repeat accuracy. The clamping device including the workpiece can be changed automatically. Alternatively, when using power chucks, the workpieces can be changed directly into the chuck by the robot and the workpieces can also be transferred to the counter spindle, thus enabling full 6-sided machining.

This automation solution from WFL enables extremely stable clamping with a high degree of repeat accuracy. This concept also practically eliminates the need for clamping device setup times in the machine.

The benefits are clear – quick and, above all, precise changing of the equipment including the workpiece in the machine.

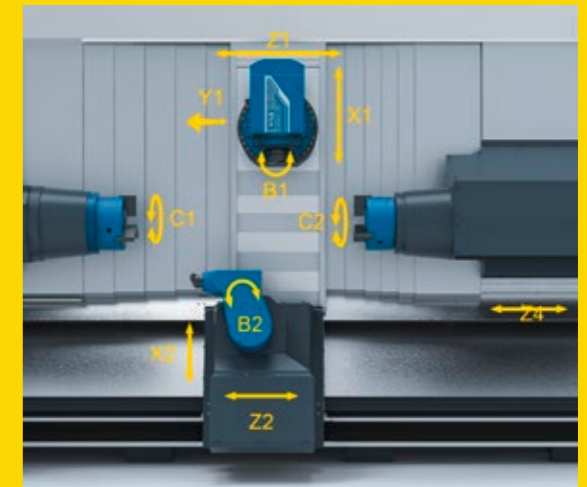
The advantages of the horizontal machining of power chucks at a glance:

- Simple and efficient clamping of workpieces
- Higher efficiency thanks to setup in parallel to machining time
- Maximum flexibility thanks to optimum preparation outside the machine (parts can be prepared in parallel to machining time and stored in temporary storage)
- Optimum chip flow thanks to horizontal machining
- Higher productivity thanks to 4-axis machining with a turning-boring-milling unit and tool turret or a single tool holder on the lower system
- When the chuck parts are transferred to the counter spindle, machining is possible on the rear
- Flexible change between pallets and hydraulic power chucks
- Option to use the prismatic tool system on virtually all WFL machines, e.g. when using special tools or heavy internal machining tools



The special characteristic of the M20 MILLTURN when it comes to machining chuck parts:

With the new M20 MILLTURN, the lower system also features a turning-machining unit with B-axis and automatic tool change. Particularly when metal-cutting demanding materials (stainless steel, titanium, HRSA, etc.) with a high degree of tool wear, it is therefore possible to work fully automatically without interruption for very long periods of time. Thanks to the external tool magazine, a larger tool stock is available. The unproductive downtime required in order to retrofit the turret tools is completely eliminated.



Example M20 with the use of two tools with B-axis turning
Single tool holder (EWT) above
Single tool holder (EWT) below

The combination of these advantages results in a significant increase in productivity when machining chuck parts:

- External setup and alignment of the workpieces on the setup station
- Automatic change of clamping devices and workpieces by robot
- Significant reduction in machining time thanks to the second single tool holder
- No downtimes for setting up the workpieces or tools (EWT) below

A production increase of up to 80% can thereby be achieved during turning.



OUR TRADITION IS OUR FOUNDATION

For 60 years, AUMA has been developing and manufacturing electrical actuators and valve gear units and is now one of the world's leading manufacturers in the industry.

Lead time reduced by 50%

AUMA Drives is an internationally renowned system provider of customised gear unit and drive solutions. For decades, AUMA Drives has been producing gear units of the highest quality. The use of state-of-the-art equipment is essential. Production in Coswig received reinforcement in December 2022 in the form of a WFL MILLTURN machine.

AUMA Riester GmbH & Co. KG is adopting a single-brand strategy to unify its divisions: AUMA Water, AUMA Power, AUMA Oil & Gas, AUMA Drives and AUMA Industry. The divisions relate to the markets that the company operates in, and the synergies between these areas are exploited in procurement as well as in development, design and engineering. The subsidiary AUMA Drives GmbH is based in Coswig. There are a total of 200 employees at this site – 150 in production and 60 in indirect areas.

As a developer and manufacturer of gear unit solutions, AUMA Drives brings several decades of experience to the AUMA Group. The company's history spans all the way back to 1896 and led the former gear unit factory Coswig (GFC) to become part of the Group in 1991. The AUMA Group, based in Müllheim, recognised the potential of the high-quality worm gears

from Saxony in relation to their own product portfolio and beyond. The Group acquired the company, which was renamed GFC AntriebsSysteme GmbH in 2005. With its rebranding as AUMA Drives, the company's integration into the AUMA Group was finally complete. It is thanks to Werner Riester that gear unit production was moved from Müllheim to Coswig. He had a special interest in specialised gear units, which is why there has been so much work and progress in this area.

The product life cycle is a unique selling point at AUMA. From the feasibility study through to commissioning, every single stage is covered. The customer's product idea is first taken into development, followed by the creation of a product concept, before a prototype is then produced and analysed. Once quality and production planning is complete, it is on to parts procurement. Labelling and traceability are becoming increasingly important. In-

deed, it is essential in CSP (concentrated solar power), because 80,000 drives are delivered in this area, for example. If three plants are not working in a solar field, traceability allows you to determine where these parts are so that you can repair and reinstall them. This provides transparency. "It all works using QR codes and is traceable," explains Marko Kost, Technical Support Team Leader at AUMA Drives. "In the event of a gear unit failure, for example if a worm shaft is faulty, and you know that it is a material defect, then you can look in the relevant material batch and identify precisely which gear units are involved and therefore need to be replaced. We do this for all standard parts that are in the powertrain or at the express request of the customer."

The part is checked again at the installation stage to make sure that it is genuinely ready for outbound logistics. Then it is on to the final inspection and outbound

logistics. Disposal is another important factor that is increasingly on customers' minds (material decomposition, shredders, etc.). "We are really proud to be able to say that we cover all aspects of this. We are also supported in this area by our management system. We are certified in accordance with the ISO 14001 environmental management standard," says Kost.

Extensive range of products

Development, metal cutting, installation, testing and quality management are all carried out at AUMA's Coswig site. "When it comes to gear unit hardware, we are essentially the development centre for the entire AUMA Group. We cover everything to do with the mechanics of the gear units," explains the Technical Support team leader. The worm shaft, worm gear and housing are the most important parts made at AUMA Drives (A items) and are located in the powertrain. These are the main components and main area of expertise of AUMA Drives.

"Customised solutions" is more than a buzzword at AUMA Drives. Instead, it is

a promise with which all development steps are aligned. This is because "customised solutions" require clearly structured processes during the design and development of gear units and drive systems – from the initial project sketches to the finished product. The objective is to develop a product whose performance and efficiency becomes the customer's competitive advantage. With this in mind, every customer project at AUMA Drives goes through several stages, each of which are carried out in-house.

The machines within the AUMA Group are developed and procured by a cross-Group project team. In the case of the M40X-G, this was a project team consisting of "Coordinator and Project Manager" Mr Jochen Pfeiffer, turning machine specialist from the AUMA Riester plant in Ostfildern, the Production Manager and Shift Manager for turning from Coswig, Central Purchasing from the AUMA Riester plant in Müllheim and Marko Kost, person responsible for the project for Coswig. Fundamental to the entire project was the collaboration with Mr Pfeiffer, who made an important contribution to the success of the project.

Complete machining of large parts

The AUMA Group is well positioned internationally. The Asian market is major focal point for the company, with a production plant there as well as in India and the USA. It even has an assembly plant in China. The market for escalators is particularly big in that region. AUMA currently has 32 machines in Coswig, including a turning-boring-milling centre – the M40X-G MILLTURN from WFL, in fact. Four-axis turning-boring-milling centres are used to manufacture the housings. The gear unit housings are also machined here.

For the worm shaft, there is a dedicated turning area. "We have added to our arsenal here with a turning-boring-milling centre as a complete machining centre. We also have straightforward turning machines. We still use special gear-cutting machines for the further machining of the worm shafts. The only way to achieve the required level of quality in the gear tooth profile is through grinding. We use profile grinding machines for this. We turn the worm gears and machine them further on gear-hobbing machines," explains Kost.



M40X-G MILLTURN
Michael Müller, Regional Sales Manager at WFL (left), and Marko Kost, Technical Support Team Leader at AUMA Drives, in front of the M40X-G MILLTURN.



PERFECT TEETH
The product life cycle is a unique selling point at AUMA. From the feasibility study through to commissioning, every single stage is covered in house.



»The machining process was developed in cooperation with WFL beforehand«

WORM SHAFT
The M40X-G MILLTURN from WFL is designed specifically for worm shafts. The lead time for the parts has been halved thanks to this new acquisition.

All machining steps for the components except the blank shape and heat treatment stages are carried out in Coswig.

Large worm shafts are produced on the WFL machine. AUMA's high-performance worm gear units can be found in concrete mixing plants, among other applications. Kost provides an insight into the original machining process: "The process for manufacturing this shaft part used to involve a lot of individual steps: pre-turning, pre-milling the gearing – grinding the gearing is an extremely expensive process. Then it was time for the heat treatment: the part has to be annealed because clampings are released during the machining process and the components become warped. After that, it was on to the finish turning of the shafts. We would pre-grind the gearing and finally carry out the heat treatment and case hardening before re-clamping the shaft on the turning machine. Both sides were turned and slots were then milled before moving the part to yet another machine for the finish grinding of the gearing. Finally, we carried out the finish grinding of the seats externally in the cylindrical grinding machine.

That's a lot of individual processes with an extremely long lead time." With the new machine from WFL, the worm shaft can now be pre-turned completely in just one clamping operation. The gearing is pre-machined, which means that there is no longer any need to pre-grind it. The shaft goes from the machine straight to case hardening. Once this has been completed, the rest of the machining process, right through to the finished worm shaft, continues in the M40X-G.

Other than the case hardening, the finish grinding of the gearing is the only remaining process still carried out on another machine. All other processes are carried out on the WFL. Kost is delighted with the savings that they have already made: "We have reduced the set-up time by 50%. The machining time has been reduced by 15–20%, but we can see more potential here. The lead time has been halved. We still have the external hardening process, which sometimes prevents us from being flexible. But thanks to the WFL, we can now deliver quickly if a super urgent order comes in."

Securing a competitive advantage

The machine is designed specifically for the worm shafts, but there are already plans under way to machine the sleeves that are fitted in the gear unit. These sleeves provide the output drive in the gear unit. At AUMA, the customer chooses the output drive. "For example, we can install a shaft, but the holes are often specified by the customer. We have already done this with internal gears too – we are very much guided by the customer in this area," reports Kost. When it comes to the range of parts in general, Kost tells us that the development and design teams are delighted too: "It's a big win for them as well, as they can include elements in their new developments that wouldn't previously have been technically possible. And as long as that production stays in house, then it means a competitive advantage for us as well." Batch sizes from 1 to 24 are produced by AUMA Drives on the WFL at its Coswig site. "Due to the small batch sizes, it was extremely important to us that the machine is easy to set up. That's why we have a large tool magazine, so that we can set



up in parallel to machining time. We have permanently mounted, modern power chucks with quick jaw change system on the main and counter spindles. We sometimes use face drivers for special machining during the finishing process, and we can attach these face drivers to the jaw chuck so that we are under way in no time," says Kost. It was important to AUMA Drives to have a machine that was suitable for producing the worm shafts and sleeves, which is where the WFL machine came in.

Complete machining capability

"When you talk about automation nowadays, it actually already exists in the form of complete machining. The operator simply presses the start button and we then get a complete, finished part at the end of the process. So that was already a straightforward piece of automation for us," says Kost. It's not just the professional analysis of the parts production process that impressed, however. "We were extremely excited about the performance – about what the machine offers in terms of machining performance. And the fact that we didn't have to make any compromises on accuracy. We have a very narrow tolerance range, in some cases down to IT6, which we now machine completely using the in-process radio transmission probe by means of turning. We used to always be told that we had to grind to achieve this, but actually we can get the same result by turning. That's a massive competitive advantage for us. And of course the design with

the slant bed – that's critical for stability," underlines the Team Leader.

Measuring in the machine

The measurement technology in the WFL machine offers several benefits, predominantly in terms of lead time. Kost sees this as a huge advantage: "Producing the gearing on the shaft was made possible by a special cycle developed specifically for us. The programmers enter the data, but that used to be a huge challenge for us. During programming, it was always necessary to draw the tooth and then simulate it in the program. WFL has developed a specific programming cycle for us for this process, so we can now modify the gearing in the CAM system directly at the machine. You simply enter the gearing data and then mill or turn. The whole process runs extremely smoothly. It really was a fantastic collaboration. We can also measure the gearing with a radio transmission probe and then finish it." AUMA Drives uses the machine's measurement technology to do this. The shaft's concentric running is also measured on the machine without turning the shaft. "That's really great, because the part can stay in the machine the whole time," says Kost.

All data at a glance

AUMA uses WFL's 3D simulation software CrashGuard Studio for simulations. CrashGuard (a patented collision prevention system) is used on the machine to prevent collisions. TopSolid is used for

programming at AUMA as it has been in use for a long time and employees are extremely familiar with the software. Nevertheless, due to the small batch sizes involved, the company wants to find a way to simplify the procedure so that the operators at the machine can respond to certain processes. Kost explains the problem: "When you have an external CAM system, it is always difficult because the operator can hardly make any changes to the machine's program. That's why we want to find a solution that will enable the operator to carry out programming in the machine control system. For example, if they want to change three allowances to two." AUMA uses a wide range of tools for digitalisation. For example, the company tracks the energy consumption of its machines. As for future projects, Kost already has a few ideas: "We definitely want to make further progress with programming and simulations, as that will save us run-in time. We need to be using the machine efficiently. Also, three machines are going to be removed from the production area in Coswig thanks to the new M40X-G. There is a growing space for machines that come with automation. And everyone always needs space. We are also expecting to grow. I can well imagine doing more of our work with turning-boring-milling centres and getting rid of the special machines. That will save a lot of time. Above all, it is important to have a reliable partner, and we know without a doubt that we have that in WFL."

facts

- Company headquarters in Müllheim (DE)
- Founded in 1964/An idea becomes a plan
- More than 2,800 employees
- 30 sites worldwide
- info@auma.com



All eyes on...

Flanx – The WFL gearing solutions

Flanx-Measure under the microscope

From filigree internal gears with high accuracy requirements to large external gears that require high roughing efficiency. Thanks to the extensive experience and development assets it has gained over many years, WFL offers the right technological solution for every type of gear cutting. Are you already making the most of our expertise in gearing solutions to generate more added value in your company? The critical features when manufacturing gearing are high quality standards, profile accuracy and machining solutions that offer both reliability and flexibility.

Flanx combines the development of software as well as hardware solutions for integrating complete gearing solutions into a WFL machine.



All eyes on

The WFL Flanx software cycles are designed as follows:



Flanx-Spline – Shaping internal and external gears

Flanx-Spline is suitable for the straight or even helical shaping of external and internal gears. Conventional slotting tools are used here too, which can also be implemented with prismatic clamp holders. The graphically supported programming simplifies use and achieves the same level of quality as special gear hobbing machines.



Flanx-Large Module – Milling large gearing in a single-part process

The Flanx-Large Module (Flanx-LM) WFL gearing solution is designed to manufacture large, involute Hirth serrations. This highly flexible process using standard tools is compatible with small machines and enables both hard and soft machining.



Flanx-Hob - Gear hobbing

Gear hobbing is used for straight and helical external gears (cylindrical or crowned). In addition, Flanx-Hob comes with "radius end", "conical" and "variable feed" special solutions. Flanx-Hob uses conventional gear hobbing cutters - either solid carbide cutters or with cutting inserts. Flanx-Hob is designed in such a way that it can be used with any conventional gear hobbing cutter available on the tool market. Graphic support also simplifies programming.



Flanx-Gear Skiving - Gear skiving

Flanx-Gear Skiving is a hob peeling process for the highly efficient production of short external and internal gears with synchronised operation of the main and milling spindles. High cutting speeds allow for quick gearing production. This cycle is therefore an extremely useful application and ensures maximum productivity and efficiency in the MILLTURN. Flanx-Gear Skiving is used in many different industries – particularly in the automotive industry.



Flanx-Invo – Milling with the InvoMilling™ milling tool

The Flanx-Invo cycle is the result of the collaboration with Sandvik Coromant (InvoMilling™ by Sandvik Coromant) and is used to mill the involute forms of tooth flanks without an undercut. It is a flexible process that allows short machining times to be achieved from a tool operating at a very high feed rate. WFL achieves the highest level of machining efficiency here thanks to the application of CrashGuard and CrashGuard Studio in process integration. This hybrid technology from WFL and Sandvik Coromant also ensures the levels of quality of a gear hobbing machine as a minimum.



Flanx-Measure

Flanx-Measure is a complete software solution for scanning and measuring all relevant parameters, such as tooth shape, tooth thickness, pitch or concentric running. Essentially, all features that can be measured on a special measuring machine are now also directly measured in the MILLTURN. The results are visualised and displayed on the control panel. They can also be printed out as a measuring protocol. The data is also used for feedback to the machine control. This enables tools to be optimised and refined in order to achieve the desired and required accuracy.

The various WFL Flanx hardware solutions

The turning-boring-milling unit has a few additional functions that are essential for milling work. The tool spindle can be released from the spindle bearings and the spindle can be hydraulically clamped so that the bearings are not compromised during machining. This is a major advantage in terms of the durability of the bearings. The machine also features a cooled ball screw on the Z-axis, which prevents localised overheating.

The B-axis is also decisive when it comes to the manufacture of gearing solutions. The machine can index or clamp the B-axis

and reaches an extremely high holding force. The MILLTURN therefore provides an extremely stable and efficient way of producing gearing with the B-axis. A further technological feature is the WFL prismatic clamp holder for gear hobbing tools. This prismatic clamp holder is hydraulically clamped to the underside of the turning-boring-milling unit by means of a special interface. This gear hobbing device can be used to securely and precisely clamp hobs with a diameter of 160 mm and a length of 254 mm, i.e. relatively large hobs. The hobs are clamped in the spindle of this device without backlash, which enables a faster changeover if the tool needs to be replaced due to wear.



TECtalks – Flanx interview with Christian Jagersberger

As a pioneer in complete machining, WFL offers the following advantages when it comes to gearing tasks:

- Comprehensive gearing expertise
- Flexible and user-friendly gearing software solutions
- Advanced, reliable and automatically exchangeable tool solutions
- Closed-loop measurement solutions, including for gearing
- Greater flexibility thanks to various machining options
- Reduction in special tools
- Reduced lead times
- Better machine utilisation (special machines are often poorly utilised)
- Higher productivity, minimally manned or unmanned shifts

ANTIQUITY

In the fourth century BC, Celtic fortifications were built. In the first century AD, the Romans built a fort and called it Lentia.



MIDDLE AGES

799: First documented mention as "Linz". Royal market and customs town, sometimes even a royal seat of the Holy Roman Empire of the German Nation.



EARLY MODERN PERIOD

After the Thirty Years' War, the city was reconstructed in the Baroque style. In 1672, Christian Sint established the 'Wollzeugfabrik' (wool factory), Austria's first textile factory.



18TH-19TH CENTURY

Steam navigation, horse-drawn railway in 1832, industrialisation in 1850, shipbuilding, locomotive construction, metal processing.



20TH CENTURY

Linz becomes a city, a university and cultural city and a key place of business.



21ST CENTURY

City of Culture 2009. Convention city, tourist hotspot, site of research and development.



PILGRIMAGE CHURCH PÖSTLINGBERG
The church was built towards the end of the early modern period. The construction work began in 1742 and was completed in 1774 with the construction of the facade.

Linz in the Early Modern period

With the turn of the 16th century, the developments of the Early Modern period spread throughout Europe. In contrast to the Late Middle Ages, when political power was concentrated in territorial royal seats such as Linz in Upper Austria, a counter-movement emerged from Italy in the Early Modern period.

The new ideal was for the aristocracy to lead leisurely lives on their estates, which were cultivated for wine-growing or sheep farming. During the Renaissance, aristocrats who held themselves in high regard owned ostentatious show gardens and animal parks – from fish ponds all the way through to exotic animals. These gardens were not only places for social gatherings, but were also used for retreats and political negotiations. Those with career ambitions sought to get close to the prince and often left their estates to be managed by caretakers.

Linz as an important centre of trade

As we discovered in the last Complete edition's feature on the Middle Ages, both

Linz markets - St. Bartholomew's market and the brother parish fair market - were established as international fairs very early in the Early Modern period. During this time, the Reprisals Law contributed significantly to the importance of the Linz markets. This law developed through to 1785 on the basis of the Miles and Garnishment Law of 1362. This law stated that all citizens of a city could be held liable for the debts of a fellow citizen. This meant that the fairs of a city subject to the Reprisals Law became a welcome payment deadline as they brought with them a certain payment security. But what exactly did this mean for the citizens of a city? From today's perspective, it is inconceivable that any fellow citizen of a debtor could also be held accountable until the debt was paid. As was to be expected, this

ruling resulted in long-lasting disputes, which is why it was abandoned in several centres of trade – much earlier than in Linz. The Linz markets demonstrated their flair and established their position as international fairs right through to the 18th century. Stallholders traded a vast array of colourful goods. A pot-pourri of foods such as honey, salt, grains and wine, but also iron and hides were popular goods. Interestingly, in contrast to the Viennese markets, which dealt in regional trade, the Linz markets were dedicated almost exclusively to overseas trade. As a result, state trade barriers had a particularly harsh impact on Linz as a market and trading post. This was felt keenly in the present day's federal states of Upper and Lower Austria throughout the 17th and 18th centuries. Customs tariffs rose



CITY PARISH CHURCH

Construction of the city parish church: triple-nave building with a broad pitched roof and choir belfry. The side naves were added between 1687 and 1694.



FORMER SPINNING MILL OF THE WOOL FACTORY

Part of the former spinning mill remains standing to this day [address: Untere Donaulände 66, 4020 Linz]. The remaining buildings, home to parts of the tobacco factory, were demolished in 1969.

dramatically in several stages, which meant that trading volumes dropped significantly as a result of new transport routes. During the Early Modern period, the Linz trading scene became increasingly attractive to Bohemian traders, who flocked to the city and obtained citizenship. German traders even established their own trading houses in Linz, and subsidiaries of Italian trading houses sprouted out of the ground. Around 150 of these houses were established in Linz before the outbreak of the Thirty Years' War.

Austria's first textile factory in Linz

After the Thirty Years' War, which lasted from 1618 to 1648, Linz was reconstructed in the Baroque style. New monastic foundations for religious orders made up the majority of such buildings. With the foundation of the Linz "Wollzeugfabrik" (wool

factory) in 1672, Linz became a powerful industrial centre as well as an important Austrian market and trading post. Countless products made from sheep's wool and, later, fine scarves made from cotton and cashmere as well as rugs could be found in the product portfolio. During peak periods in the 18th century, more than 1,000 people were employed on site in the factory. At the same time, 50,000 to 60,000 spinners in Bohemia and Austria produced various raw materials for the wool factory from what we would now call the "home office". Founded by Christian Sint as Austria's first textile factory, it was nationalised during the 18th century. After the factory was shut down in 1850, the Linz tobacco factory was built on one area of the site, which is still a feature of the Linz cityscape with its modern design. Despite massive protests, the factory was completely demolished in 1969. Only one building - the former spinning mill - still

stands on the Untere Donaulände 66 [see image "Former spinning mill of the wool factory"].

The buildings of the Early Modern period in Linz

In addition to the wool factory, many new buildings were erected in Linz during the Early Modern period, many of which are still standing and perform important functions. Take, for example, the construction of the Landhaus between 1564 and 1571.

The building materials required for this were procured from the surrounding area - granite from Mauthausen, iron from Steyr and marble from Salzburg. The foundation stone was laid by order of the Jesuits in 1669 and construction of the Ignatiuskirche (Church of Ignatius) - today's Old Cathedral near Linz's main



IGNATIUSKIRCHE

Construction of the Ignatiuskirche (Old Cathedral) by the Jesuits. The building was consecrated in 1678.

square - continued until 1676 [see image "Ignatiuskirche"]. The current city parish church on the Pfarrplatz originated as a single-nave building which was built in 1207. During the Early Modern period, specifically from 1649 to 1653, this building, which had been extended over time, was replaced by a new building in the Baroque style. The famous Ursulinenkirche (Ursuline Church), with its huge cloister complex, harks back to the Ursulines who had settled in the city during the Early Modern period.



EDITOR'S TIPS

In the **Nordico Stadtmuseum**, you can learn all about the history of Linz. Alongside the permanent exhibitions which provide insights into the city's history, the Nordico Stadtmuseum features temporary exhibitions on various topics.

"Linz in brief": The new exhibition focuses on the condensed history of the city. The ground floor of the Nordico, which was specially converted for this exhibition, is the only place in Linz where you can learn about the history of the city in eight concise chapters. Experience 2500 years of Linz at speed! The new format presents the city's defining moments using various media and shows its development from a Celtic settlement to a provincial capital, from an inter-regional transport hub to an industrial centre and finally to a self-defined city of culture.

The **Linz Palace Museum** features 10,000 m² of exhibition space, providing an extensive insight into the natural, cultural and art history of northern Austria from the dawn of time until the 21st century.

Archives of the city of Linz: Since 8 July 2015, part of the foyer of the old town hall has showcased Linz history from its beginnings up to the present, covering politics, social history, daily life, culture and the economy.

Discover media art and contemporary history: Explore the diverse city of Linz on a **guided tour** or one of the many special themed tours on offer. The present and past await. To find out more, visit www.linztourismus.at



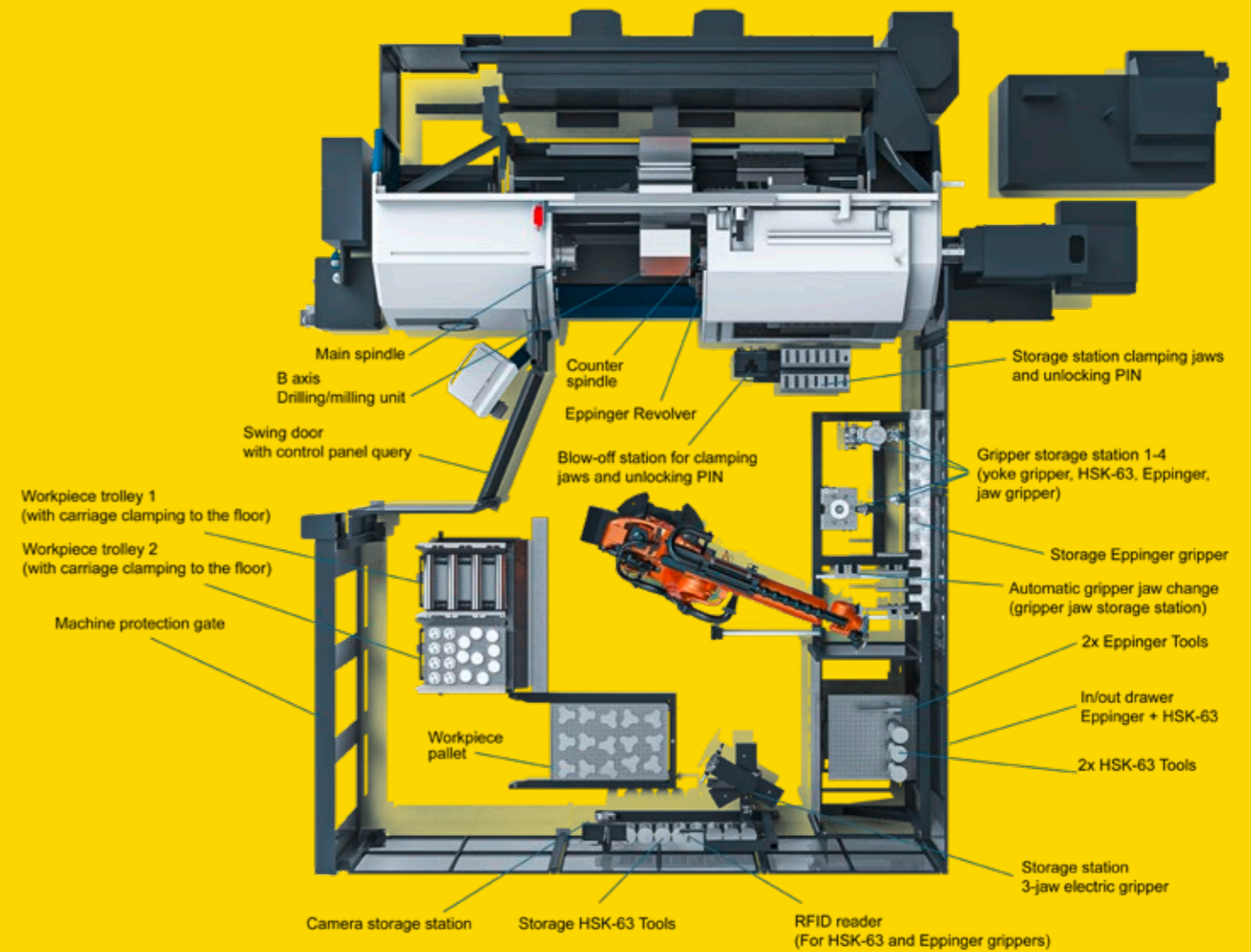
All eyes on

Automation with articulated robots

by WFL MILLTURN Technologies

Human and machine – this partnership is not only important today, but is also set to shape the future. Robotics and AI have become integral components of production and industry. All the more reason to ensure that this symbiosis between human and machine is a harmonious one. With its wide range of automation solutions, FRAI Robotic Solutions offers the perfect tools for the path to "autonomous" production.

The various automation solutions, whether articulated robots, gantry robots, integrated loading systems or even mobile robot automations, enable the development of optimum processes. At this year's Technology Meeting, WFL will be presenting a very special solution together with FRAI and giving insights into the breadth of automation. Automation will be demonstrated using an automated M35-G MILLTURN with articulated robot.

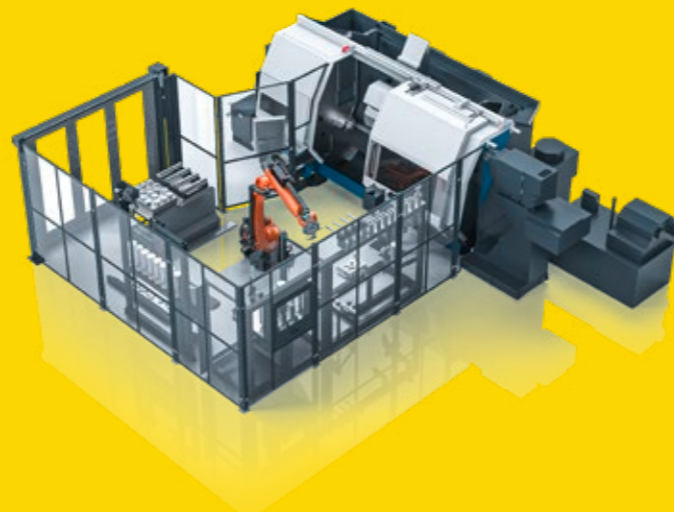


This solution is a fully automated cell with

- Automatic gripper exchange of a total of 4 grippers
- Tool change (HSK 63)
- Gripper deposit station
- In-process measurements
- Gripper jaw change
- Camera for part position and position recognition
- Tool loading and unloading
- Tool turret loading and unloading
- Jaw change, tool storage places and much more.

The USPs of the system:

- Component recognition via 2D camera
- Automatic gripper exchange
- Servo gripper
- Jaw change
- Tool change on HSK 63 and in future change on the Baruffaldi tool turret
- Cell computer
- Different storage systems (transport trolleys and pallet spaces)



Find out more at the
WFL Technology Meeting
2024 (5 – 7 March 2024)
or at www.wfl.at
or www.frai.at



Incorporating complete machining

For more than 100 years, WALDRICH COBURG has been manufacturing large, powerful gantry machining centres and gantry grinding machines that are used in a wide range of industries. And when we say large, we mean large.

The passage widths of these machines extend to 14 m and the passage heights to max. 12 m. Workpieces weighing up to 400 tonnes are machined and the machining centres boast a performance of up to 300 kW. So they are real Goliaths amongst machine tools.

WALDRICH COBURG machines are used in the most diverse branches of industry, including the automotive industry, aerospace, the energy industry and general production. Services ranging from general service to applications engineering, production support and contract manufacturing round off WALDRICH COBURG's portfolio. Examples of more specific applications include large marine diesel engines or drive screws for marine engines. Chassis components are produced for the aerospace industry as well as various press moulds for tool and mould construction. Some rail con-

struction and freight train machines have also already been replaced in the vehicle construction industry.

Mechanical engineering in a class of its own

WALDRICH COBURG works principally at project business level. An average of around 20 to 30 projects are implemented each year, most of which are delivered to Europe. The Benelux countries as well as Italy and France are extremely strong markets for the company. In terms of industry technology, the aerospace sector is booming and the markets in the USA and China are on the rise.

The projects are extremely labour- and time-intensive. A complete project can last up to 24 months from the initial customer contact or project planning through to handover and acceptance of the machine. A few months ago, the M50

MILLTURN with a centre distance of 3000 mm entered production at WALDRICH COBURG. It is now used to produce drive components for additional units. Gear wheels, milling spindles and swivel units are further components that are machined on the new turning-boring-milling centre. These are the three product groups that are currently produced on

“Lead times have been significantly reduced”

the machine in different variants. The various power chuck and shaft parts measure up to 670 mm in diameter and max. 3000 mm in length and batch sizes range from two to four pieces. The MILLTURN is already being put to good use with this range of parts.



NEW ADDITION

WALDRICH COBURG is celebrating the incorporation of complete machining with an M50 MILLTURN/3000 mm, equipped with a main drive with an output of 35 kW/420 Nm. Its maximum speed is 6000 rpm. Turning, milling, drilling, gear cutting, deep hole drilling and internal machining are possible at all angles. Thanks to the interpolation of up to 5 axes, practically any geometric contour can be machined.

“During the procurement process, we placed great emphasis on finding a powerful machine combined with innovative solutions to ensure we could implement a smooth machining process. That was the most important factor for us when it came to making our decision,” says Helmut Wall, Head of Production at WALDRICH COBURG.

“Before being able to undertake complete machining with the WFL, we worked with individual machines where we executed one work process or one work step, then moved on to the next machine. This made the machining process extremely tedious. Lead times were considerably longer than they are now,” explains Helmut Wall.

Efficient complete machining

WALDRICH COBURG currently combines multi-step production with complete machining, as the throughput for some

components needs to be retained due to the good machine utilisation. Lead times have been reduced by one third with the new M50 MILLTURN, which has had an extremely positive impact – production is faster, more efficient and, above all, cheaper. A fantastic achievement! The machine is generally capable of achieving higher performance. WALDRICH COBURG is currently at the start of its learning curve, but this is set to change in the near future.

Before deciding on the MILLTURN from WFL, a detailed catalogue of requirements was drawn up. Much research was carried out into the technological capabilities of such a machine. This was one of the most important aspects for WALDRICH COBURG. The machine had to combine turning, milling, drilling and gear cutting in a single machine. The company was impressed by the technology and innovative strength of the machine. Based on the component di-

mensions involved in machining, it immediately became clear that an M50 MILLTURN with a centre distance of 3000 mm was required. “For us, complete machining is the key to meeting the demands of modern metalworking, the large number of variants and short delivery times as well as the special quality requirements of our customers. This formed the basis for our decision to purchase. It was also important to us that the machine runs reliably. This is why we decided to use the iControl process monitoring function. A fantastic additional feature that further supports the process and allows us to become even more flexible when it comes to simulations,” explains Helmut Wall.

Numerous components are currently produced on the MILLTURN. After machining, these are re-treated and some are sent for heat treatment, gas nitriding, hardening and finally precision grinding. The workpieces are programmed exclu-



PRODUCTION

Drive components for additional units are produced on the new WFL. Further workpieces include gear wheels, milling spindles and swivel units. The image shows a housing being machined, predominantly using turning and milling technologies.



OPERATION

A drive shaft workpiece is machined by means of gear hobbing with Flanx-Hob, the WFL cycle for external gear cutting.

“For us, complete machining is the key to meeting the demands of our customers.”

sively in-house at WALDRICH COBURG. They are programmed by the Process Engineering team both with Siemens NX and sometimes on the machines themselves. In future, everything is set to be programmed by the Process Engineering team so as to keep the machine free for production.

Complete machining and, as such, WFL, is still uncharted territory for WALDRICH COBURG, but the company is quickly getting to grips with this type of machining and the various turning, drilling, milling and gear cutting technologies. Several machine operators and programmers are currently working in shifts on the WFL.

A sustainable future

In a rapidly developing market environment, automation, digitalisation and sustainability are important considerations for the future of WALDRICH COBURG. A strategy team is working on various topics that will be implemented in future.

Sustainability has been an important theme for some time. Around six years ago, the company invested in a combined heat and power plant by way of ending its dependence on oil. Photovoltaic panels were also installed on all flat roofs of the assembly and production halls. This means that the company sustainably generates its own heat and electricity.

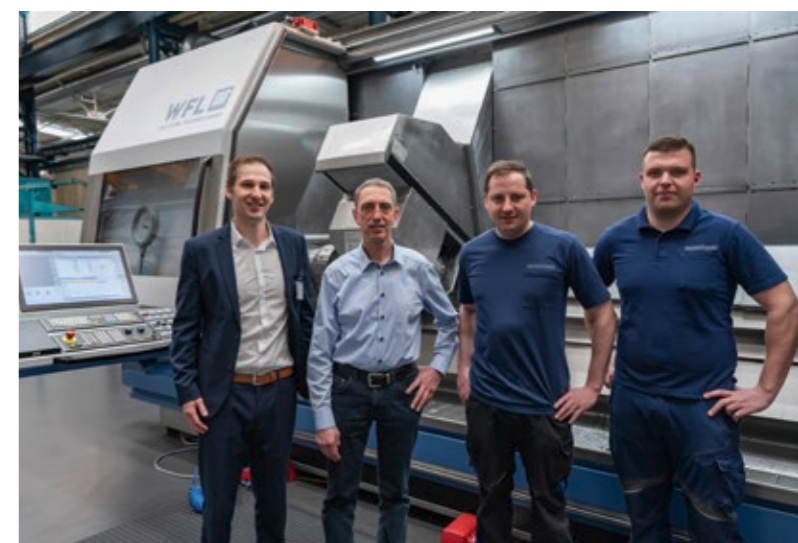
The carbon footprint of the machines has also been put under the microscope. WALDRICH COBURG is currently developing a range of solutions. It is investigating the use of exhaust air and the prevention of heat build-up at the machines, amongst other approaches.



DIVERSITY

The comprehensive range of machining possibilities requires a large number of tools. This machine design features a reliable 107x disc magazine. Tools with dimensions of 500 mm in length and 160 mm in diameter are used here.

WALDRICH COBURG



COLLABORATION

The project team involved in the introduction of the M50 MILLTURN at WALDRICH COBURG. Head of Production Helmut Wall is convinced that this turning-milling centre has strengthened the production site. From left to right: Andreas Lehner, Sales Manager at WFL, Helmut Wall, Head of Production at WALDRICH COBURG, and Managers Sebastian Höllein and Julian Frotscher.

facts

- In 1920, engineers Adolf Waldrich and Emil Hardt founded the company Globuswerke
- WALDRICH COBURG currently employs 540 members of staff
- WALDRICH COBURG is renowned for its expertise and innovation in large machine tool assembly
- Its core competence is the production of high-precision, large machining centres for milling, grinding and turning for customers across the globe
- WALDRICH COBURG has a global sales and service network



All eyes on

M30/M35 MILLTURN – The small one for everything!

Introducing the "small but powerful" WFL powerhouses – from the M30 to the M35, all the way through to the M20 MILLTURN. In the next two Complete editions, we will be turning our full attention to the smaller MILLTURNS in the WFL range. Discover everything you need to know about the technological highlights and their USPs.



The M30 – the classic and one of the most popular and successful WFL machines. With the development of the M30 MILLTURN, the focus was on detailed improvements to the design of various machine components and further increases in reliability.



The M35 – WFL's multi-talented machine for complex shafts and chuck parts. With a speed of 12,000 rpm, machining is effortless.

M30/M35 MILLTURN – the WFL multi-talented machine for complex shaft and chuck parts.

- Modular machine concept for customer-specific manufacturing solutions
- Solid slant bed made from grey cast iron
- Functionality of a turning machine, a 5-axis turning-boring-milling centre and a gear hobbing or deep hole drilling machine
- Detailed improvements to the design of various machine components and increased reliability
- 4-axis turning, workpiece transfer and 6-sided machining with counter spindle variant (M30-G, M35-G MILLTURN)

Highlights M30 and M35 MILLTURN

- Optimised ease of maintenance thanks to improved access to the extendible hydraulics unit and "separate" cooling unit, the newly designed guide rail covers and improved access to the tool magazine
- Minimal distances from the machining point to the guide-ways
- Perfectly equipped for gear cutting operations with the Flanx-Plus machining package
- Reduction in tool costs, increased productivity and workpiece quality thanks to process monitoring via WFL iControl: this displays current axis loads and protects the machine against damage with a learning mode.
- Optimum view of the working area thanks to larger screens in the machine housing
- User-friendly thanks to LED lamps integrated in the working area - for improved and, above all, durable lighting.
- Efficient and effortless creation of NC programs using the graphically interactive MILLTURN PRO programming editor
- Ergonomic industrial design. The screen can be swivelled by hand.
- Early detection of errors, maximum precision and safety as well as minimised downtimes thanks to innovative rotor scanning methods



4-axis turning



5-axis machining



6-sided machining



80 bar high coolant pressure



In-process measurement



max. Tool length
M30/M30-G: 450mm;
M35/M35-G: 450/600mm



Workpiece transfer
to counter spindle



Application examples

M30/M35 MILLTURN – Complex shafts and chuck parts



Workpiece: Rotor
Machine: M30
Material: Steel
Dimensions: Ø = 253 mm, L = 652 mm



Workpiece: Spindle
Machine: M35-G
Material: Steel
Dimensions: Ø = 100mm, L = 500 mm



Workpiece: Crankshaft
Machine: M30-G
Material: Steel
Dimensions: Ø = 120 mm, L = 560 mm



Workpiece: Blisk Hub
Machine: M30-G
Material: Steel
Dimensions: Ø = 300 mm, L = 150 mm



Workpiece: Crankshaft
Machine: M30
Material: Steel
Dimensions: Ø = 110 mm, L = 600 mm



Workpiece: Disc Hub
Machine: M30-G
Material: Steel
Dimensions: Ø = 216 mm, L = 250 mm

Facts and figures

	M30 MILLTURN	M30-G MILLTURN (With counter spindle) left // right	M35 MILLTURN	M35-G MILLTURN (With counter spindle) left // right
Working range Centre distance Turning diameter Workpiece weight	Up to 2000mm Up to 520mm Up to 1000KG	Up to 1800mm Up to 520mm Up to 1000KG	Up to 2000mm Up to 520mm Up to 1000KG	Up to 1800 (1680) mm Up to 520mm Up to 1000KG
Tool Max. weight Max. length	15Kg 450mm	15Kg 450mm	15Kg 450mm	15Kg 600mm
Disc magazine storage locations	40 / 80 tools	-	40 / 80 / 120 tools	-
Headstock design left // right:	Power P (100% / S6-40%): 32 / 44 kW Torque M (100% / S6-40%): 610 / 840 Nm Maximum speed: 4000 U/min	Power P (100% / S6-40%): 32 / 44 kW // 32 / 44 kW Torque M (100% / S6-40%): 610 / 840 Nm // 610 / 840 Nm Maximum speed: 4000 // 4000 U/min Optionally available with counter spindle	Power P (100% / S6-40%): 32 / 44 kW // 37 / 54 kW Torque M (100% / S6-40%): 610 / 840 Nm // 1100 / 1600 Nm Maximum speed: 4000 / 3300 U/min	32 / 44 kW , 37/ 54 kW // 32/ 44 kW Torque M (100% / S6-40%): 610 / 840 Nm, 1100 / 1600 Nm, 610 / 840 Maximum speed: 4000 / 3300 // 4000 4000 / 3300 // 4000 U/ min Optionally available with counter spindle
Turning-boring-milling unit (upper tool holder) *) Power max., 40% (100%) duty cycle	20 (15) kW	20 (15) kW	33 (27) kW	33 (27) kW
Max. speed	6000/9000/12,000 rpm	6000/9000/12000 rpm	9000/12000 rpm	9000/12000 rpm
Max. torque at the spindle, 40% (100%) duty cycle	250 (190) / 165 (125) / 125 (95) Nm	250 (190) / 165 (125) / 125 (95) Nm	284 (233) / 213 (175) Nm	284 (233) / 213 (175) Nm



Manufacturing Solutions – Second-hand machines fit for the future

Refurbished and Retrofit – machines from the past made fit for the future.

With WFL, you have found a partner who can offer you unique solutions. Not only for new machines, but also with the MILLTURN second-hand machine market. Whether it's a reliable but old M65 that has served its purpose or the new generation making its way into the production hall, there comes a time when an all-round replacement or upgrade becomes necessary. In other words, a MILLTURN can be a real competitive advantage, even after several years of use. Thanks to its stable construction, your MILLTURN will have a solid foundation even after decades of operation and can therefore easily be retrofitted or converted. The retrofit program from WFL Manufacturing Solutions offers a cost-effective and environmentally friendly alternative to buying new.

Tested quality from a single source

A retrofit project at WFL is precisely defined. Customers receive a complete concept with consultation, technology support, commissioning and training. A separate organisational unit has even been set up specifically for this purpose.

For machines that are being retrofitted, for example, the main components such as the linear guideways, drives or the tool changer as well as parts of the turning-boring-milling unit are replaced to improve the overall condition of the machine. This process is executed with a huge amount of expertise and the result is a machine in top condition, which will continue to run impeccably for many more years and guarantee a high level of productivity.

*„As for the future,
your task is not
to foresee it,
but to enable it“*

Antoine de Saint-Exupery

Retrofit instead of buying new

The cost factor represents one of the biggest advantages of a machine overhaul:

a 40% to 70% lower investment can be expected in comparison with a brand new machine. WFL is also extremely flexible when it comes to commercial offers: the machine can also be leased. The use of modern components and features, such as new lighting (Ergonomic Light Concept), an expanded tool magazine or the automation of certain functions also contribute to greater sustainability and efficiency. In appropriate cases, the electrical components of the machine can also be replaced, an area which WFL is strongly promoting.

Sustainable and durable

In a fast-paced throwaway society, both sustainability and durability are major themes that are becoming increasingly important. Environmentally friendly production and a green mindset are top priorities in the WFL Refurbished and Retrofit models. As many parts as possible are recycled, which benefits not only our planet, but also the overall cost factor.



Total Life Cycle



The advantages of second-hand machines

- Cheaper compared to a new machine
- Shorter delivery times for a refurbished second-hand compared to a new machine
- Special requests can generally be incorporated
- Project is specifically tailored to customer requirements - from a technical and machine perspective as well as with regard to services (such as training, technical application support, etc.)
- Second-hand machine in the context of a sustainability mindset by extending the service life of the machine
- High level of expertise and competence amongst in-house employees
- New machining possibilities thanks to the new control system generation
- Improved availability of spare parts

General retrofit

- WFL guarantees that a second-hand machine will have a geometrical state that is comparable with a new machine
- Mechanical overhaul
- Upgrade to the latest control system generation
- Reconstruction based on the design of a new machine
- Recommissioning (same as for a new machine)
- Detailed assessment of (process-critical) components

Open doors at WFL Millturn Technologies

From March 5th to 7th, the WFL headquarter in Linz opens its doors and welcomes visitors and exhibitors at the Technology Meeting 2024. On three days, you can find out more about the industry's current trends and developments on an exhibition area of more than 4,000 m². And you get your first-hand WFL experience getting to know the world's leading manufacturer in the field of complete machining. Amongst other things, the focus of the technology meeting will be on the presentation of automation solutions of WFL's partner and subsidiary FRAI. Visitors can experience the full range of machining possibilities in live demonstrations on machines of all sizes - from the M20 to the M150 MILLTURN.

A special highlight will be WFL's latest family member: the M20 MILLTURN. With two additional centre distances of two and three meters, it will also be available for longer shaft parts in the future. The application range for the M20 is almost unlimited. It covers demanding and complex machining tasks from the aerospace, automotive, engineering and plastics industries. The optional individual tool carrier with B-axis for turning on the lower system is unique. This means that the machine has two B-axes and machining can be carried out in all required angular positions on both spindles at the same time. Like the upper system, the bottom tool carrier is used on the main and counter spindle. Both B-axes can also be swivelled during a machining operation and interpolated with other axes if required. The machine also masters 5-axis interpolation easily.

MILLTURNS' Intelligent Machining Solutions

The M80X MILLTURN with 4500mm machining length and 1000mm turning diameter is also presented at the technology meeting and will be equipped with a prismatic tool for grinding and a vibration damped Silent ToolsTM Plus boring bar. Visitors can experience live machining of a gear shaft with 80mm diameter and 1824mm length. During this machining, gearings are manufactured by using WFL Flanx cycles. In the medium-sized series, WFL demonstrates live machining on a Power Generation Shaft and the machining of turbine blades as well as fir tree and generator shaft profiles on a M50 MILLTURN / 3000mm.

These are particularly important machining operations in the energy sector that can be easily handled with a MILLTURN. Since the middle of the year 2023, all machines have been equipped with the new user interface Sinumerik ONE by Siemens. The new machine control impresses with its modern and intuitive design. The integrated SIMATIC S7-1500F PLC allows for PLC cycle times up to 10 times faster than the previous PLC. Sinumerik ONE optimises machining speed, contour accuracy and machining quality with innovative technology functions. It makes machine tools more productive and therefore faster, more flexible and more efficient.

Automatic quick-change system - What's it all about?

QuickChange is the innovative WFL solution for the horizontal complete machining of chuck parts which is based on a high-precision and fully variable clamping system. Depending on the requirements, clamping devices, such as pallets, chucks, clamping mandrels or, if necessary, face drivers, can be changed between machine, clamping unit and temporary storages fully automatically. With this solution, clamping and aligning of the workpiece on the clamping palette is carried out on a vertical, external clamping table or set-up station. The latter is designed as a stable short taper accommodation with high repeatability and is therefore equipped with the same interface as the headstock. The clamping devices, including the workpiece, can be changed automatically. Alternatively, when using clamping chucks, a robot can be used to transfer the workpieces directly to the chuck or the counter spindle. This enables complete 6-sided machining. The advantages of the quick and precise change of the devices including the workpieces are demonstrated on a M80 MILLTURN.

Smart Automation Solutions

WFL subsidiary FRAI Robotic Technologies offers comprehensive concepts with gantry robots and robot cells with the greatest possible customer benefit and the highest level of quality. From the initial concept development of an automated system, through realisation and commissioning, to system maintenance, FRAI Robotic Technologies is your partner when it comes to au-

tomation solutions. By using innovative developments, they can meet the constantly growing customer-specific requirements with intelligent automation concepts. The combination of FRAI standard components and high-quality purchased elements enables the production of flexible solutions, from small batches to highly productive series production.

At the technology meeting WFL shows the innovative articulated robot in a robot cell, as one of the most flexible automation types for production machines and processes. Regardless of limited access to the machine, complex movement sequences, short cycle times or other additional tasks (deburring, cleaning, orientation, turning, etc.), the articulated robot will always find its way. Its mobility makes it a universally applicable handling system for assembly and machining tasks.

With the focus on automation, another attraction will be the live demonstration of a mobile robot on an AGV (Automated Guided Vehicle). Anyone who hasn't had the chance to visit EMO Hannover, can experience how the robots picks up chuck parts and tools from the warehouse and places them on the AGV live at the technology meeting. An HSK-63 gripper as well as a Barufaldi tool turret with an EPPINGER QUICKLOCK tool clamping system for automatic tool change at the tool turret are available for tools.

myWFL – Operational Data Acquisition

The presentation of the software for operational data acquisition myWFL Cockpit will be another highlight at the technology meeting. Machine and program states over time, productivity and technical availability are visualised on the machine control, on a PC or on a mobile device using a browser. This means that the user is always perfectly informed about the productivity of the machine.

The energy consumption meter myWFL Energy is integrated in myWFL Cockpit and records the current performance data as well as the energy and compressed air consumption per workpiece. The Condition Monitoring Cycle continuously logs the condition of the axes and spindles during a measuring run. The data is then stored on the machine control. Possible changes can be easily detected and conveniently displayed thanks to the Condition Monitoring Viewer.

With the latest tool called myWFL Health Check, the machine geometry is checked by semi-automatic measurement of the B-axis and tailstock as well as the main and counter spindle. The software also includes cycles and test equipment for measuring and logging the geometry. myWFL Health Check can be used and retrofitted on all machine types and controls, regardless of whether the machine is equipped with a pick-up magazine, a prismatic tool changer or an automatic tool control. The entire programme takes about 25 minutes. Long-term trends can be identified thanks to the integrated measurement data logging.

With myWFL you never lose track of the big picture, and you can exploit the optimisation potential for the smart factory. The software not only has a user-friendly visualisation, but also improves machine utilisation. All data in the production environ-

ment is collected and analysed to achieve higher productivity. Shorter production times and a more effective organisation of smart factory processes therefore go hand in hand. A significant advantage.



M80X MILLTURN with 4500mm centre distance – machining of a gear shaft. Experience live machining of a gear shaft with Ø 800mm, a length of 1,824 mm and a weight of 2,280 kg.



Mobile Robot Automation: Live demonstration of tool change and workpiece change with a mobile robot.



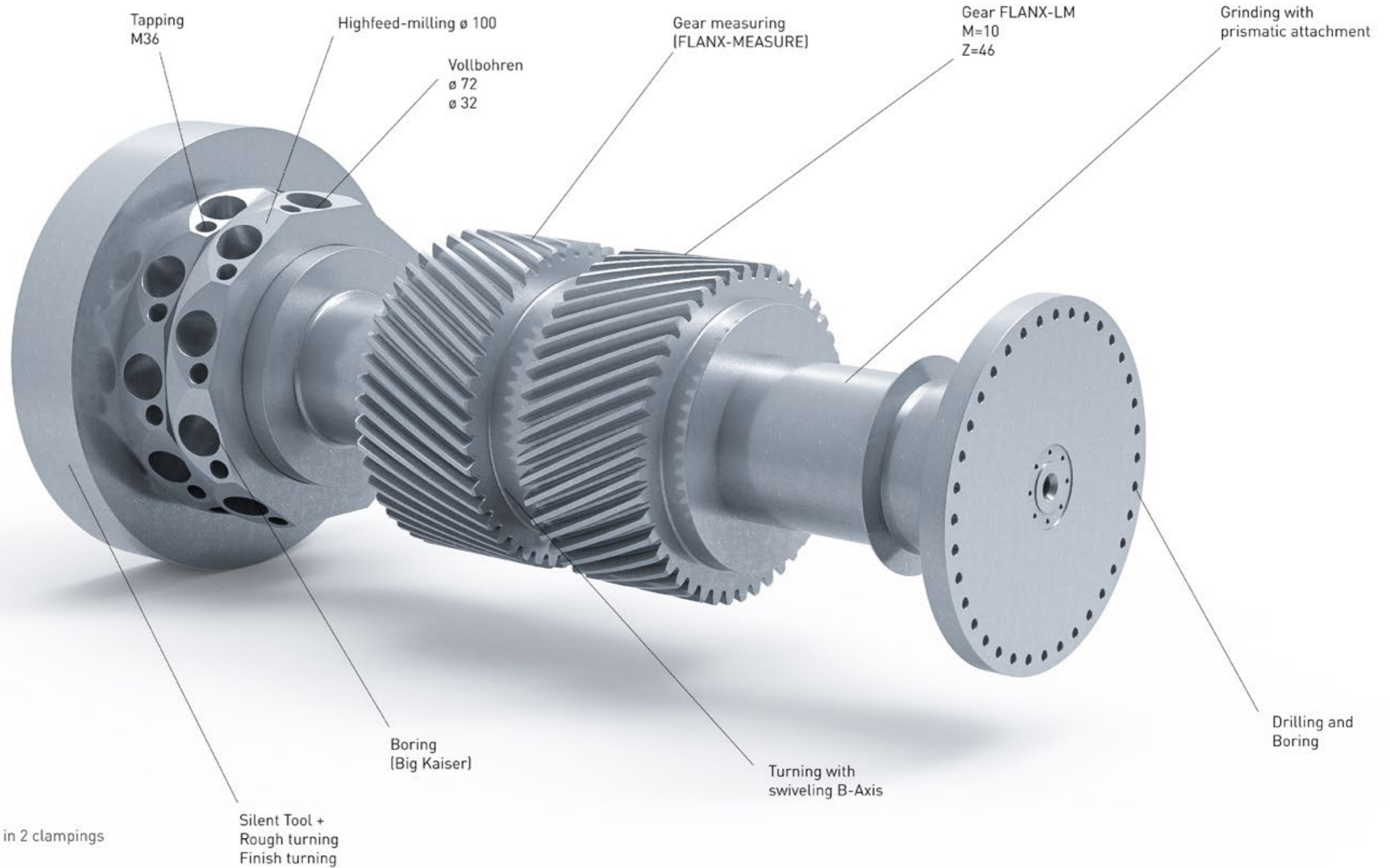
myWFL: With myWFL you never lose track of the big picture, and you can exploit the optimization potential for production.



TECtalks
Technology worth spreading
by WFL, Millium Technology

**TECHNOLOGY UND INNOVATION
ARE OUR PASSION**

M80 MILLTURN GEAR SHAFT



FACTS

ϕ : 800 mm
Length : 1824 mm
Weight : 2280 kg
Material : 42CrMo4
Complete machined in 2 clampings

» **QUESTIONS | COMMENTS | IDEAS?**

You have questions regarding our products, technologies or machining? We are looking forward to your mail at office@wfl.at

» **FACTS COMPLETE**

Our customer magazine „COMPLETE“ is available in German and English. Additionally a download link can be found on our homepage.



Imprint

Publisher:

WFL MILLTURN
Technologies GmbH & Co.KG
A-4030 Linz, Währingerstraße 36,
Austria
www.wfl.at

Responsible for publication:

Sabine Steinkellner

Chief editor:

Birgit Bachinger

Editorial team: Sabine Steinkellner,
Gregor Luckeneder, Sarah Hagmann,
Melanie Mai

Concept & design:

Nordis – Agentur für Kommunikation

Graphics & images:

Sarah Hagmann, Gregor Luckeneder,
shutterstock

