COMPLETE

Nr. 01/18

The complete machining magazine

All eyes on:
The MILLTURN Experience

Dive into the versatile world of MILLTURN and be inspired by the innovative technologies and services

WFL MILLTURN TECHNOLOGIES

Linz drives change.

Linz, city of steel and capital of Upper Austria, living space and freedom. The inhabitants of the city enjoy the many facets of the green centre of life, as the work-life-balance is successfully exemplified. With a total of 203,012 residents, Linz is the third largest city in Austria and known for its specialities in the technical, reseaching and artisic fields. Linz drives change – are you ready?

Dear customers and readers,

„Nothing is more constant than change“ – Charles Darwin. This is the quote that appears on the opposite page of our new customer magazine „COMPLETE – The complete machining magazin“.

The world is characterised by constant change. Over the last few years in particular, the fact that the intensity of this change is increasing has been something none of us can avoid. Be it innovations in software and machine technology, production methods or materials. Everything is changing, and much more quickly than before.

At WFL we have set ourselves the goal of identifying changes quickly, and above all, proactively, so that you can always count on us as a strong partner in the field of complete machining.

In the first edition of our customer magazine „COMPLETE – The complete machining magazin“, we would like to give you a better understanding of WFL Millturn Technologies. Our customers are our biggest asset. With „COMPLETE“, we would like to fill you with „complete“ confidence in WFL, as well as providing you with insights into our products, technologies and the wider sector. Lastly, we also want to connect you with Austria as your partner country.

We are amongst the world's leading companies in machine tool construction. For this reason, it is important that we have a solid foundation in training and know-how. More than 30 years of experience provides us with unique opportunities to tailor multifunctional machines perfectly to every individual customer. Special requirements need special solutions. We have developed a modular machine concept for such challenging requirements, meaning that we have become a pioneer in complete machining.

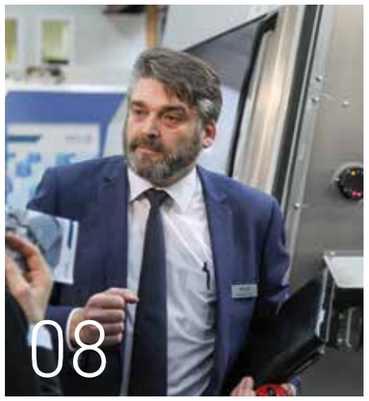
With „COMPLETE – The complete machining magazin“, we look forward to keeping you updated on all manner of company, technological and machining news!

The WFL management team

Kenneth Sundberg
Managing Director After Market Sales

Norbert Jungreithmayr
CEO

Günther Mayr
Managing Director Sales and Technics



WFL Millturn Technologies

About us

WFL Millturn Technologies GmbH & Co. KG is the leading supplier in the field of complete machining.WFL is the only manufacturer worldwide that concentrates exclusively on the production of multi-functional complete machining centres. In many high tech companies today, the trade name MILLTURN stands for the central machine tool for the production of complex components with the highest precision. The modular design of the MILLTURN centres and individual special solutions guarantee perfect adaptation to the relevant manufacturing task.With a MILLTURN, customers are not only purchasing a CNC machine that meets the very highest demands for quality and precision, they are also gaining an unbeatable competitive advantage.

30 years' experience in complete machining

Facts

Founded: 1993
Managing director: Mag. Norbert Jungreithmayr (CEO), Kenneth Sundberg
Sites: Europe, USA, Brazil, China, Russia
Branches & Agencies: Worldwide
Current employees: ~ 450 worldwide
Export ratio: > 95%

The most important industries of WFL:

- Aerospace
- Oil&Gas
- Energy
- Engineering
- Crankshafts
- Print
- Automotive
- Plastics
- Hydraulics and Pneumatics

A SPECIAL GLIMPSE
Tailored customer solutions are a speciality from WFLs application engineering department. The department concentrates on a wide spectrum from lead time calculations to individual process planning and reading of the customized data. On the following pages you will get to know the man behind the curtains.

A Koll for every season

This interview provides an insight into the world of WFL project development. **Reinhard Koll** reveals the secret to the success of so many processes and explains the skilful „pulling of strings“ behind the scenes. We discuss what the future may hold and how Koll‘s personal development and dreams have paved his way.

Work that is carried out behind the scenes of a project is often not recognised or is overshadowed by the end product. „A lot of preliminary work, discussions with customers, fine technical adjustments and countless little steps help WFL to achieve the perfect end product for delivery to the customer," says Reinhard Koll, head of application engineering. Since before WFL Millturn Technologies had even been founded (formerly being Voestalpine Steinel), Reinhard Koll and his team to this day keep this important cog in the WFL machinery turning and conduct all the pre-project work in line with the holistic „MILLTURN" concept. Special technical requirements are continuously incorporated into projects in order to ensure customer satisfaction.

We were lucky enough to be able to ask Reinhard Koll a couple of questions at the heart of WFL‘s base in Linz.

Mr. Koll, we would love to gain a small insight into your personal background and to learn a bit about where your love of machining comes from.
My father had always worked with metal throughout my childhood. He was a smith in his spare time, so I‘ve really had an interest in metalworking since before I could even pick up a hammer. I then looked for an apprenticeship in the metalworking sector and trained as a lathe operator. After a period of training and a few months working the night shift, in January 1985 I applied for a position as a technician at the voest demonstration centre and worked on the first MILLTURN machine. In 1991 a few of my projects came into fruition and I was made head of application engineering.

How much have things changed at WFL over the years?
Back then the field was new and ma-

TEAMWORK
A strong team on joint mission: customize each project as far as possible.

380

individual projects

Reinhard Koll and his team handle around 380 customized projects per year.

"We can safely say that Linz is the birth place of complete machining."

chine tool engineering was undergoing radical change. The new technology of multi-functional machines was ridiculed and people kept reverting back to traditional methods. At the time I'd often hear people say: "If I want to turn something, I'll buy a turning machine, and if I want to mill something, I'll buy a milling machine; everything else is just a toy." However, this criticism spurred us on and made us redouble our efforts. To cut a long story short, the first complete machining centres were way ahead of their time, so we can safely say that Linz is the birth place of complete machining. WFL is now a technology leader, so I'd say the hard work has paid off.

Were you a model student or a bit of a rebel at school?
I certainly wasn't a model student, just ask my parents. I'm sure both of them could still tell you a few funny stories. Learning just never used to be that important to me – I did what was necessary. The turning point for me was my apprenticeship; the interest was there so I found it easier to learn and I learned more quickly.

What does WFL mean to you?
WFL is a way of life. WFL continuously drives further development and improvement. For me, the idea of self-improvement, testing boundaries and pushing them even further has always been the essence of all things in life. Of course there are always complications, but with the right team you can tackle them together and help one another.

Reinhard Koll and his team – how are things planned and carried out?
Customer enquiries always come to me first. When delegating enquiries, both capacity and the employee's area of expertise are considered. Of course it may be the case that one employee has to process several enquiries at once, but we place a great deal of emphasis on teamwork. Despite a lot of work and stress, my team is extremely well-integrated and we tackle every task together.

Which details do you pay particular attention to?
First of all: the customer is KING. Working closely with the customer is our top priority. In this respect, we focus on honesty, accuracy and openness. This can be difficult in some cases, but up to now we have overcome every complex challenge. In such cases we focus on working together and try to offer the customer the best solution for their needs.

How do you balance your career, family and spare time with the stresses of day-to-day life?
You have to separate family and work – as fulfilling and inspiring as your job may be, your family should always come first! I make the most of every second with my family or my friends and I really enjoy this time. This is the only way I can recharge my batteries and be re-energised for the challenges faced on a daily basis.

Is there anything that you still want to do in life – what are the top 3 items on your "bucket list"?
My list is certainly pretty extensive, but the top 3 are quite clear: to experience Siberia in winter, to see an active Volcano in real life, and one very personal wish would be to go for a walk my brother-in-law up our local mountain. Unfortunately he has been in a wheelchair for some time following a serious bike accident. He can take a few steps but walking is not possible for him at the moment. It will be quite a while yet before we can fulfil this dream, but until then the "GIS" (the peak of our local mountain) will be eagerly awaiting us.

Where do you see yourself in 10 years?
Hmm... in 10 years I'll be 62 years young. Of course, my plan is to spend these 10 years at WFL. I will start passing tasks on to the next generation at some point, but sitting back and relaxing is certainly not an option for me, as further development is key for WFL and also for myself.

PROGRESS COMES NATURALLY
The fully automatic roundness and runout measurement guarantees the perfect tool quality. The acquired data may be analyzed and printed via LAN or directly at the machine.

COMPLETLY IN HIS ELEMENT
The fascination of a MILLTURNs various machining possibilities is unrivalled.

What does the future hold? What trends can we look forward to?
There is still a long way to go before we achieve our objectives in the field of complete machining. There are new challenges to be overcome every day, as countless new technologies and processes are being integrated into complete machining. Take automation and digitisation, for example. These polarising forces are being pushed worldwide to improve the economy and its liquidity. The cost-benefit factor will therefore play a considerable role in the future.

"WFL is a way of life. WFL continuously drives further development and improvement."

What goals are being set for 2025?
As the inventor of complete machining, at WFL we must remain on the ball and set the pace for 2025, but also find out where the limits are and set new benchmarks. Under no circumstances do we want to give up our technological lead; we want to expand it!

We would like to thank Mr. Koll for this exceptional interview and for giving us an interesting insight into the company.

All eyes on...

New edition of the M50 MILLTURN

by WFL Millturn Technologies

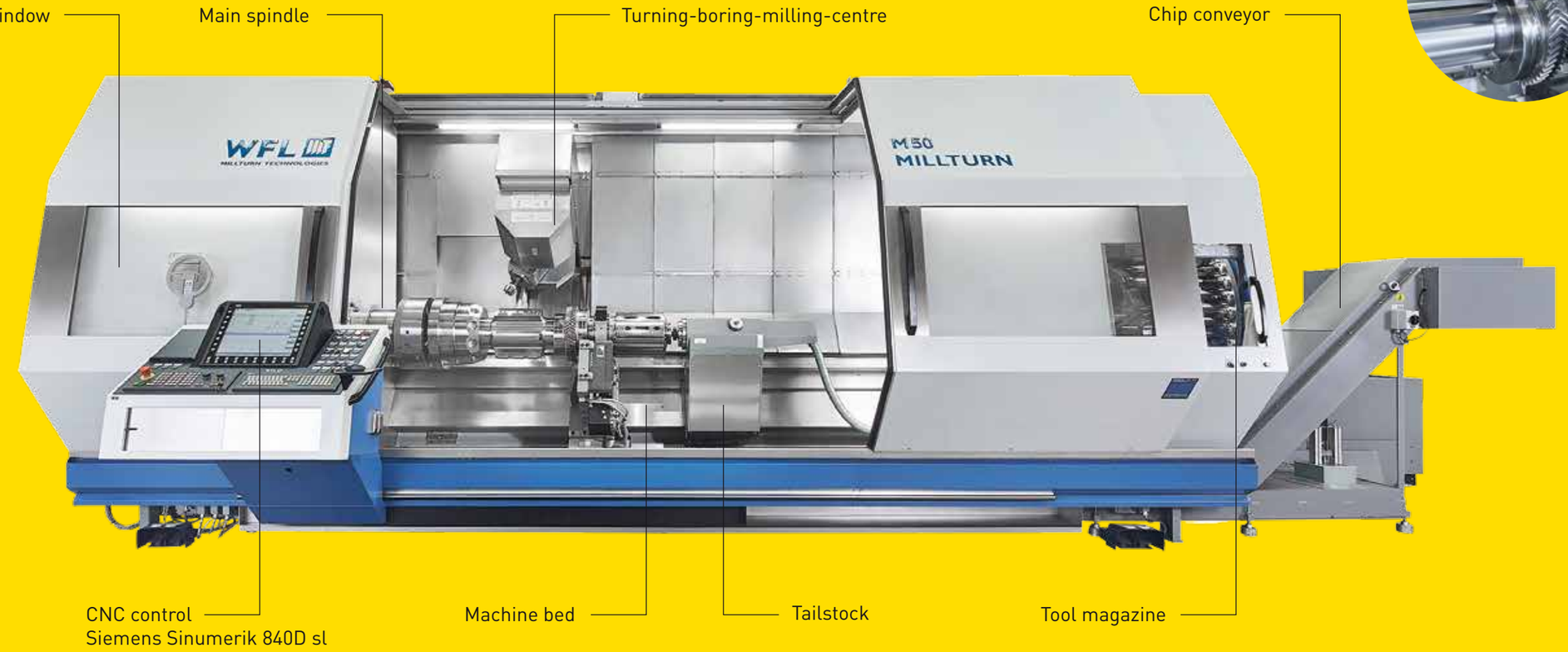
After the "remake" of the M40 and M60 MILLTURN series, it is now the M50's turn to be revamped. The new M50 will be presented to the public for the first time LIVE at the AMB in Stuttgart. With the new 6000 mm centre distance available as an option, WFL is able to offer even more efficient possibilities for machining long, thin shaft parts. The focus of the product presentation will be maximum machine performance.

New generation with greater centre distance and improved performance

All eyes on

New edition of the M50 MILLTURN

by WFL Millturn Technologies



Improved performance
There are innovations in the segment for machine sizes with a turning diameter of up to 670 mm: alongside the additional 6000 mm centre distance option, the fully developed, tried-and-tested M50 MILLTURN basic machine concept will also be provided with an optical and ergonomic finish. The focus lies on the machine's new design, which incorporates spin windows that are 50% larger and a horizontal magazine window that is extremely easy to handle. For the first time, the option for an M50-G MILLTURN with a counter spindle is also available. In combination with a tool turret or a further machining unit, work can be performed on both main spindles at the same time. Both machine options are available with the following centre distances: 1000 mm, 2000 mm, 3000 mm, 4500 mm and 6000 mm.

Optimised construction and ergonomics
Improvements in the detailed design of various machine components as well as an additional increase in reliability are the focus for the M50 MILLTURN: special attention was placed on improved, user-friendly access to the standard tool magazine (from the front via the large sliding windows). Furthermore, the larger viewing windows in the sliding doors provide a better view into the working area. Even the base machine is equipped with especially bright, daylight-like LED lights as standard.

Increased functionality
A separate pick-up magazine is also available for very long and/or heavy tools. The maximum tool length is 1600 mm. Another new feature is that the disc magazine can be extended to up to 200 stations. Direct access to all tool stations is still possible even when using this extended magazine option. New optical sensors that are extremely reliable have also been installed in the tool magazine for tool station-monitoring purposes.

Technical data		M50	M50-G left // right
Nominal center distance	mm	1000 / 2000 / 3000 / 4500 / 6000	1000 / 2000 / 3000 / 4500 / 6000
Swing - ø over Top slide	mm	670	670
Max. power, Turning spindle 40% (100%) duty cycle	kW	54 (37) / 55 (45) // 56 (40) / 80 (60)	54 (37) / 55 (45) // 56 (40) / 80 (60) /// 55 (45)
Max. torque, Turning spindle 40% (100%) duty cycle	Nm	2000 (1400) / 1830 (1500) // 3200 (2320) / 3600 (2740)	2000 (1400) / 1830 (1500) // 3200 (2320) / 3600 (2740) /// 1830 (1500)
Max. spindle speed, Turning spindle	min-1	3300 / 2500 // 2600 / 2600	3300 / 2500 // 2600 / 2600 /// 2500
Max. power, Miling spindle 40% (100%) duty cycle	kW	33 (27) // 40 (35)	33 (27) // 40 (35)
Max. torque, Milling spindle 40% (100%) duty cycle	Nm	284 (233) / 213 (175) // 480 (420) / 300 (263)	284 (233) / 213 (175) // 480 (420) / 300 (263)
Max. spindle speed, Milling spindle	min-1	9000 / 12000 / * // 5000 / 8000	9000 / 12000 / * // 5000 / 8000
Swiveling angle B - axis	degree	-110....+110	-110....+110

* other values available upon request

We love...

...Austria

Right at the heart of Europe lies a country that outsiders like to poke fun at. A country renowned for its stubborn resilience and torpid coffee-house culture. A country that throughout its history has endured as many upheavals as the snow-covered Alps. A country that attaches as much significance to its traditions as it does to its international reputation for changeability. No other country is as unique as Austria.

ACHENSEE
The lake, located in Tyrol, is known for its magnificent view and its ice-cold water.

GOSAUSEE
The crystal clear lake is often referred to as the most beautiful place in the Salzkammergut and offers an incredible marine life and crystal clear water.

MODERNISM AND TRADITION
Big cities following trends and traditional rural villages – that is what makes Austria special.

If you close your eyes and start thinking about what might be typically Austrian, then it won't be long before you hear the discreet clinking of coffee cups on saucers, become aware of the aroma of fresh cakes, pastries and jam, or the tempting smell of a freshly cooked schnitzel. Cities full of cultural highlights, such as the much-loved operas and classical concerts performed to the highest standards behind imposing baroque edifices. Historical arenas that evoke a range of emotions from visitors on account of the tragedies they have witnessed, or simply because of their beauty. All things that come to mind whenever people think about Austria. But the country has much more to offer apart from its wonderfully imperturbable culture or the combination of creaking wooden floorboards and rustling of old newspapers.

Austria is a multi-faceted country in which the generations wage an inconspicuous but bitter cultural struggle. No matter that the locals would rather not face it, but it's a fact that Austria is not immune to the constant pressure for change. This is evident in many areas of life, none more so than in Austrian coffee-house culture. It was this very culture that made the Alpine country world famous in 2011 when it was awarded world heritage status.

The unwavering coffee-house culture

The start of the coffee-house culture is steeped in legend; for many years, no one really knew when it all began. But now, with the help of historical documents and much painstaking research, the mystery has been solved. The first coffee house was opened by an Armenian in 1685. Shortly thereafter, the Greeks obtained the monopoly to serve coffee. The black gold went down very well amongst Austrian gentlemen and the well-known coffee-house culture began to emerge. For a long time, coffee was not ordered using today's familiar terms such as „Melange" or „kleiner Brauner", but by its colour. The salons became famous for their characteristically smoky atmospheres and the popular card or dice games that coffee drinkers amused themselves with as they whiled away the hours.

They developed steadily and unobtrusively over the centuries; many Austrian celebrities were avowed coffee-house philosophers, among them Gustav Klimt, Egon Schiele and Leon Trotzky. However, even they were unable to halt the march of time. The coffee houses started their sad decline in the 50s. The demise of the traditional culture was offset for a while by the emergence of modern espresso bars. Some of these cultural treasures have managed to successfully defend their preserves through to the modern day. With the rustic fixtures and fittings of the traditional coffee house, and a head waiter sporting a tailcoat, many visitors enjoy being transported back a couple of centuries whenever they cross the threshold of such an establishment.

> The first coffee house was opened by an Armenian in
>
> **1685**

The younger generation of Austrians has developed its very own style. Not for them the gloomy furnishings and gentlemen in tailcoats, but enthusiastic support for young, local entrepreneurs who have taken the plunge into self-employment and follow the latest trends. For Austrians, however, the coffee house will always remain a place where one can sit for hours over a single cup of coffee. Engrossed in a pseudo-philosophical discussion about one's neighbours or lost in thought while gazing deeply into the frothy milk. Notwithstanding the coffee culture of the towns and cities, which changes with the times, a quite different type of culture has evolved in the mountains and valleys of Austria.

The villages and their attachment to their traditions

Like Austria's towns and cities, its villages also harbour their own traditions. Some of these customs are fading quietly into the past, others are enjoying a remarkable comeback.

Many everyday heroes, who master their daily challenges attired "in a shirt or a blouse", have a secret passion (one that is perhaps not as secret as it might be). As soon as the working day is behind them, they strip off their respectable disguises and slip into their superhero outfit: the traditional costume of their music society. This is like a second skin to many Austrians and something of which they are very proud. The affinity that many young Austrians in particular exemplify is an important pillar of national culture. The traditional costume itself stands in stark contrast to the gaudy dirndls and "lederhosen" that visitors like to buy for events. Traditional costume in this sense has nothing to do with fashionable trends or glitter, it demonstrates very clearly the deep solidarity with the native country. However, this solidarity does not stand in the way of change, a change that has manifested itself in even the smallest villages in the remotest parts of the country. Players take up their cornets and flutes with a sense of pride, regardless of whether it's to play at a traditional festival in the village or at the hugely popular folk music festival, "Woodstock der Blasmusik" [the "Woodstock of brass band music"]. As soon as the call of the horn is heard, the brass band fans are up and on their way. It soon becomes clear to a visitor that this community is akin to a huge family that shares a common passion, one that is frequently enjoyed with friends and neighbours, and any number of Austrian specialities.

The Austrian's food and drink

Austria has much more to offer in addition to the familiar favourites of roast pork, schnitzel and apple strudel. Especially in the tranquil wine-growing areas. Wine-growing has a rich tradition in Austria, particularly in the eastern parts of the country. However, this tradition has also seen changes and improvements over the years. Prior to the 1980s, wine was mass-produced and sold in 2 litre bottles. More and more winegrowers then decided to put the emphasis on quality, a decision that has been amply rewarded. Their vines are now reaping the fruits of this success in the shape of international renown and a growth in the tourist trade.

> "The affinity that many young Austrians in particular exemplify is an important pillar of national culture."

However, anyone who enjoys a tipple of the finest red or white wines will be very familiar with the "Heuriger". The Heuriger culture in Austria is unique and extremely popular, as it is well known for its unpretentious and relaxed approach towards cooking. The "Buschenschank" was originally an open stall where growers sold their own wine. It quickly became apparent that anyone who wanted to drink more wine also needed something to eat in between times. An enormous range of regional, home-cooked meals were produced, each based on local recipes. The small but distinctive differences between the various "Bus-

FACTS
Population: 8,772,865
Size: 83,898.99 m²
Capital city: Vienna
Federal states: 9

WINE REGIONS
The hard work of harvesting pays off as soon as the exquisite wine is ready for testing.

"We love Austria, with all its traditional values and clichés. With all its highlights and grouchy locals. With all its culture and its latest trends."

chenschanken" were determined by the respective regions in which they were located. The best regional wines will be found in the traditional wine taverns, although there won't be any in a "Mostheuriger". These traditional taverns will only be found in the fruit growing areas, as what they specialise in is apple cider and perry (or juice for the youngsters). These specialities are particularly in demand in the states of Upper Austria and Lower Austria. What remains unquestioned is the tradition of the "Heuriger", local wine taverns in whose blossoming gardens Austrians like to spend a significant part of the summer. They are the glue that brings neighbours together to share the traditions and become part of the community, be it in the smallest villages or in the suburbs of the cities. In the centre of the country, where tradition, culture and scenery unite in the most beautiful fashion, lies the world of the complete machining centres of WFL Millturn Technologies.

HIDDEN GEMS

Jindrak
Traditional Austrian coffee house in Linz, Upper Austria

Schneiderbauer Mostheuriger
(Rufling 31, 4060 Leonding)
Classical tavern

Schokoladenmanufaktur Bachhalm
Bachhalm, a family-owned company, has been applying its creativity, passion and skill since 1928 to perfect the art of making chocolate.

Gmundner Keramikfabrik
Admire valuable and zany exhibition pieces from the last century of the company's history and experience clay, the raw material, with all your senses in the demonstration area.

Ars Electronica
A place, where tomorrows technology and fresh thinking are capitalized, is perfect to satisfy curiosity.

Seegrotte, Hinterbrühl, Austria
Located beneath a disused gypsum mine in the Austrian town of Hinterbrühl, the Seegrotte is a series of underground canals that make up Europe's largest subterranean lake and was created by the same flood that shut down the mine.

Grottenbahn, Linz
Advertised as a nostalgic ride for grown-up Austrians, the Linz Grottenbahn is a surreal 104-year-old Disney-esque ride through the world of European fairy tales.

All eyes on...

Turbine Blade Production

by WFL Millturn Technologies

In times of growing cost pressure it is necessary to consider which opportunities may be available for future progress.To do so, WFL is employing its long-standing expertise in complete machining. Today, strategies that are being continuously developed are required – not only in the aviation sector, but also in the energy technology sector and in the production of gas turbines, steam turbines, wind turbines or water turbines.

All eyes on

Complete machining of turbine blades

by WFL Millturn Technologies

Ø: 76 mm
(2,99 in)
L: 420 mm
(16,54 in)

1
clamping

96 min
machining
time

X20Cr13

M30-G
M35-G

Stability, flexibility and durability are our aims with regard to complete machining. These attributes are not only fulfilled, but they also form part of our corporate philosophy. WFL offers a range of solutions that meet these goals and understands the requirements of its customers.

Using an example, WFL provides more accurate insights into the complete machining of turbine blades. WFL promises excellent results in terms of precision and the required production speed.

The process:
The unfinished component of the turbine blade is clamped on both the main and counter spindles. Perfectly balanced synchronous operation means that there are no restrictions in terms of speed or acceleration. Machining, from pre-roughing through to deburring, is performed using a total of 14 tools, which are changed independently and fully automatically. In order to achieve the best results, making the best use of software is critical to ensuring synchronous operation. The WFL process monitoring controls the operation and prevents the overloading of tools and machine.
The extremely high precision of the MILLTURN complete machining centre makes high-quality results possible. Since the turbine blade can be machined from being clamped just once, the ingenious 5-axis operation promises considerable time savings with flexible production technology and maximum precision.

Advantages:
- Complete machining with a single clamping operation
- Constant cutting forces due to newly developed production strategy (less tool wear)
- Internal high-pressure coolant also enables the machining of high-alloy steels and super alloys
- Extremely quick and precise machining through synchronous spindle operation

PRECISE PREPERATION
The detailed drafting of the 5-axis-machining process ensures a smooth production of the turbine blades.

FIELD APPLICATION
Highly accurate manufacturing processes enable better efficiency with low maintenance effort.

TURBINE BLADE
after 96 minutes processing time with only one clamping the result is astonishing.

5

gear cutting solutions by WFL

Flanx-Hob
Gear hobbing, i.e. Flanx-Hob, 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-Spline
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 made larger, even with prismatic tool holders.

Flanx-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 production of gear teeth.

Flanx-Large Module
The Flanx-Large Module gearing solution is designed to manufacture large, involute spur gear teeth. This highly flexible process using standard tools is compatible with proportionally smaller machines and enables both hard and soft machining.

Flanx-Invo
The Flanx-Invo cycle is the result of the collaboration with Sandvik Coromant (InvoMillingTM 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.

FLYING HIGH...
only works when a smooth landing is secured. Landing gears are a technological masterpiece. But even the best landing gear is useless, when lacking perfectly functioning hydraulic systems. The company Jihlavan is specialized on these system and ensures the save retraction and deploy of landing gears.

Multi-functional miracle in practice

Over the following pages, we reveal the secrets of Jihlavan's success. With its decision to acquire the M30 MILLTURN multi-function machine, the manufacturer of hydraulic systems for aerospace and agricultural applications has laid a new cornerstone for the company.

Libor Babak
Produktionsleiter

The Czech company already has a M35 MILLTURN and is using its advanced features and unique technologies to shorten workflows. We spoke with production director Libor Babak, who gave us an insight into the company's production processes and future plans. He was eagerly anticipating our questions, his answers to which we're delighted to share with you now:

Mr. Babak, you've been with Jihlavan for some time now. Would you like to tell us a bit about the company?

The company was founded around 70 years ago. The modern, industrial culture that it embodied enabled us to carve out an important niche for ourselves in the market. We are a traditional manufacturer of hydraulic elements and precision components for the aerospace sector, mobile technologies and general applications. Since it was founded, Jihlavan has installed its hydraulic technology in more than 10,000 aircraft. Something of which we're very proud.

And something you should be proud of. Would you say that the manufacture of hydraulic components is the single core strength of the company?
No, I don't think you can say that, as another of our core strengths is the development of hydraulic equipment, especially actuators, which are used extensively in the aviation industry and vehicle control systems. This technological expertise means we can produce hydraulic components designed specifically to the requirements of major European and American customers. As you see, the manufacture of hydraulic components that we've developed in-house or produced in response to customer requests is just one of our core strengths.

Where else will one come across Jihlavan products?
As I said earlier, we are above all active in the field of hydraulic drive gears, landing doors and overall control of the hydraulic systems of aircraft. For example, components that we've developed and produced can be found in civil aircraft such as the L-410 Turbolet, L-39 Albatros and L-159 ALCA. In addition, we've manufactured actuators and hydraulic systems to the precise specifications and requirements of the Airbus A-350 and A-400, CASA and Cirrus.

You work mainly with companies that have extremely stringent quality requirements. What were the other parameters that made you buy the multi-function machine?
Our production numbers are actually quite low, but we're still turning them out. The consistent quality of the products was one of the main factors behind our decision to buy a complete machining centre. Moreover, the machining operations, such as turning, milling and grinding, are part and parcel of our production.

TWO MACHINES – ONE WORKPLACE
This positioning minimizes application errors and guarantees a fast and easy training for users.

ROLLED THREAD
Technical artistry combined with advanced research opens up new manufacturing possibilities.

M30 MILLTURN
The multi-functional miracle for metalworking. With its 20kW milling performance the smallest WFL machine can be defined as a real power pack.

"The outstanding ability to produce accurate and high-quality milling and machining results supported the purchasing decision."

We've seen in recent years that the use of a multi-function machine is the most rational choice in terms of efficiency and cost-effectiveness.

Have any of your existing machines or processes been replaced since you purchased a M30 MILLTURN complete machining centre?
None of our existing machines or processes has been replaced. The main reason for our decision to purchase our first MILLTURN was that new components were being designed in our R&D centre. The manufacture of these parts using conventional technologies was extremely difficult and inefficient, so we decided to invest in a complete machining centre.

Your company initially invested in an M35 MILLTURN and has now gone on to buy an M30 MILLTURN. What lay behind these decisions?
If one examines the commercial and technical factors closely, it soon becomes apparent that there are several comparable complete machining centres to the M30 MILLTURN on the market. However, there were some critical factors behind our decision to opt for the M30 MILLTURN. These factors in our case were firstly its outstanding ability to produce accurate and high-quality milling and machining results. Secondly, we'd purchased an M35 MILLTURN a few years ago and had had very satisfactory experiences in terms of both technology and customer service. In purchasing a second machine, we had to ensure that they were both totally compatible with regard to software, tools and spare parts. The machines are installed in our production line in such a way that operator training can be carried out quickly and easily. We've found that this significantly reduces any possible operator errors.

What technological options and benefits does a MILLTURN offer?
Well, here I have to emphasis the unique technology that we're using in conjunction with the M35 MILLTURN. This technology is specially adapted for the manufacturing of continuously rolled threads in piston rods. None of the specialist companies in the Czech Republic, Germany or Spain was able to carry out the complicated machining on the hard and solid material used in the piston rod. The M35 MILLTURN allows us to carry out this machining operation very easily. The special head is itself clamped in a prismatic tool holder supplied to us by WFL Millturn Technologies GmbH & Co. KG. Even under high loads, this tool has shown itself to be extremely robust and rigid, which enables us to use non-standard tools without too much trouble.

Back then, after the first machine was delivered, did you experience any production-related difficulties during the changeover?
We'd carried out all sorts of calculations and drawn up a list of our expectations before we purchased the machine. The yield was greater than expected just 4 months after the machine went into operation. This naturally had a positive impact on the commercial expectations placed on the machine as well as the anticipated return on investment. And thanks to the prompt response of WFL Millturn Technologies, neither was the reliability of the machine jeopardised when we had two minor defects. They had no effect on the planned start of the production with the machine.

Which software do you use to code the programs for your MILLTURN?
We use a package called SURFCAM to produce our programs. The postprocessor has been programmed internally. We also use a Distributed Numerical Control (DNC) network to communicate with the machine.

The Jihlavan success story goes back almost 70 years. What plans do you have for the years ahead?
Jihlavan has always placed a great deal of emphasis on traditions. To compete successfully in the future, we will be concentrating on optimising our current processes, particularly with regard to run times and the technology of the machines. To ensure this happens, we will continue to replace traditional CNC technologies with more efficient and automated machines.

Automation and digitisation are hot topics with regard to Industry 4.0. Have you already decided on and taken some action to prepare for Industry 4.0?
We are currently in the preparatory phase of implementing our planned Industry 4.0 measures. The bulk of our development and technology department is focussing on the creation and production of innovative technical systems for the next generation of Czech aircraft. These technologies will soon be ready, so starting with their implementation in 2019 is a realistic proposition.

We look forward to sharing these exciting developments with you and thank you very much for taking the time to talk to us.

All eyes on

WFL extended solutions

Satisfied customers become strong partners.

The perfect collaboration can only exist when there is an emphasis on reliability. With Extended Solutions by WFL, we promise our customers the right solution for every challenge. Our solution-oriented approach means that we can provide our customers with the best possible support throughout the entire life cycle of a MILLTURN product. WFL customers continue to receive the best support from our experts even after the purchase of their machine. Our wide range of service contracts and collective expert know-how allow us to keep all our promises – and without having to compromise.

WFL EXTENDED SOLUTIONS is the home of

Customer Services:
A highly qualified team of service engineers and a comprehensive selection of standard spare parts guarantee quick and efficient servicing.

Tooling Solutions:
In order to increase production, special tools have been developed for metalworking. Our customers benefit greatly from these developments and the increase in production value achieved as a result.

Manufacturing Solutions:
Every production process can be optimised through the use of forward-thinking technologies and software. WFL supports these procedures with process-optimised measures and advanced feasibility studies.

Retro-fit Solutions:
An extremely wide range of used machines means that we can offer attractive alternatives to the purchase of new machines. Our used machines are subjected to an internal revitalisation process and are updated to meet the latest standards. After the total revision the machines are “certified”.

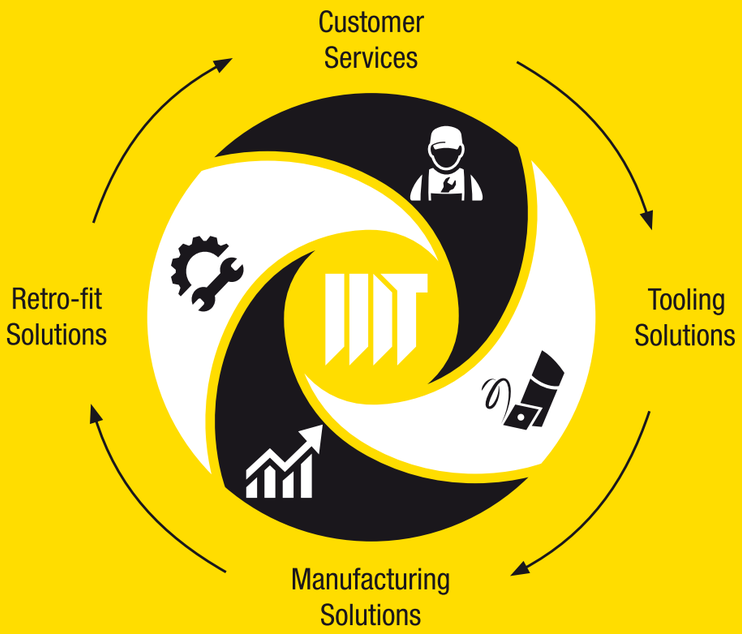
You can find further information on Extended Solutions here: www.wfl.at/extended-solutions

1,200
service call-outs per year

25,000
spare parts in stock

45
service engineers on-hand to help you

99%
customer satisfaction rate



5

key facts on complete machining

Maximum quality
Complex machining components are manufactured to the narrowest tolerances and with minimal clamping. In-process measurements guarantee and maintain existing levels of precision and stability.

Maximum flexibility
Shortened setup times and a reduction in clamping devices and special tools increase flexibility in terms of machining options. This allows for an efficient manufacturing process and technological optimisation.

Highest degree of utilisation
Several important factors come into play in achieving an increase in the degree of utilisation. The option to operate several machines is an important factor in keeping the work of personnel as efficient as possible. This efficient optimisation allows for a high level of machine utilisation with short downtimes.

Short lead times
Minimal clamping and few internal transport movements increase the efficiency of the production process significantly. Lead times are minimised due to short wait and handling times.

Highest level of productivity
The combination of maximum quality, maximum flexibility, maximum utilisation and short lead times results in the highest possible level of productivity. Decades of development are enabling metalworking companies to continuously increase production with the number of transitory items decreasing.

Etage Indústria e Comércio

Increased productivity in the machining of large parts

CENTRAL
The headquater of Etage Indústria e Comércio is located in the area around São Paolo. Today also the company Volkswagen is producing cars and commercial vehicles. As well as Daimler AG owns a factory for the Mercedes-Benz-trucks in Sao Paolo.

DYNAMIC
During the last 20 years, Etage has succeeded in achieving year-on-year average growth of 30%, which is exceptional for a company active in the machining industry.

Time is always a critical factor in the machining of large parts. With a view to achieving further improvements to both lead time and precision, Etage Indústria e Comércio Ltda. is placing its trust in a new complete machining centre from the Austrian company, WFL Millturn Technologies.

Etage Indústria e Comércio Ltda, which was founded in 1996 in São Bernardo do Campo, Brazil, specialises in the manufacturing of components for the steel industry, the oil and gas sector, the petrochemical industry and many other industrial sectors. Its focus lies in the supply of sophisticated parts manufactured from complex materials. Employing more than 100 workers, the company has developed into an important supplier for its customers. The family-run company sets itself apart from the competition with its broad range of services in particular, which enables it to provide competent support to its customers from the engineering phase, right through to the finished product.

With an operating area in excess of 7,000 m², 5,500 m² of which is pure production space, alongside all common types of tool steel, Etage primarily machines highly complex and hard-to-machine materials. "We have always seen ourselves as a complete service provider for our customers. It is of great importance to us that we gain a precise understanding of the requirements of our customers to enable us to offer them the best possible solution," explained Thomas Damm, Managing Director at Etage.

Ever since it was founded, the company has been experiencing constant growth. In order to satisfy the increasing demand while also ensuring sufficient future potential to enable customer orders to be processed, in 2016, Etage moved to new company premises. "It became necessary to adapt the production layout to meet the increasing demand. When you are planning for the future, which, for Etage, means looking at least ten years ahead, you must also create the conditions to enable it to happen," said Damm. "On top of that, it was clear to us that we also needed to make major changes to our machine infrastructure. The various markets that we serve have completely different requirements. In the oil and gas industries, we receive clear instructions with regard to how the parts are to be manufactured. However, in other markets, we are able to stand out from the competition by providing our customers with very specific suggestions regarding design and materials," added the Managing Director.

Specialist expertise regarding complex materials

During the last 20 years, Etage has succeeded in achieving average growth of 30% year on year, which is exceptional for a company active in the machining industry. "This seems impressive, but it also presents us with a particular challenge. We view our high degree of diversification within the market as the key to security and growth. Thanks to our presence on the market and our broad service portfolio, we have been able to position ourselves well and we have developed an excellent customer base. We have succeeded in building up a great deal of competence with regard to materials, which enables us to always offer our customers the best solution in each case," enthused Damm.

The subject of materials holds a special place in the heart of the Brazilians. Thanks to international partnerships spanning many years, a network has been created, which provides access to top-class material suppliers. "However, the machining of high-quality tools brings with it yet another challenge. The more complex the tools being machined, the better your understanding of the manufacturing process as a whole must be," explained the Managing Director, before going on to specify that: "When, like us, you primarily manufacture single parts or batches comprising no more than 10 items, it is essential that you have an extremely good understanding of the ways in which the material, machine, tool and programming interact with one another to ensure that the required part is able to be manufactured within the desired lead time".

Compliance with the lead time, coupled with the necessary precision, is, in many cases, the factor that decides whether or not a customer is satisfied with the ful-

filment of their order, explained Damm, knowingly.

It is the complete solution that counts

The Brazilian machining experts are well aware of the fact that a well-coordinated team of competent employees is an essential factor in remaining internationally competitive. However, they also cite the importance of appropriate machinery as a critical success factor.

"If you want to remain competitive on the global stage, you have to come up with ideas. The same applies with regard to machine infrastructure if you want to compete in the big leagues," declared Damm.

During the move to its new site, Etage therefore put a great deal of thought into its future machine concept. "It was clear to us that we would need to rely on the best equipment when it came to machinery too. We evaluated all of the options on the market to ascertain which solutions would be best suited to the performance of our tasks. Based on our previous experiences, we were aware that we were losing a lot of time in connection with set-up times and that we were therefore also having to put up with losses in total runtime. For that reason, we were looking specifically for a machining centre that would offer us the greatest possible potential in that area," reflected Damm.

During the course of that evaluation process, the company looked at various systems before finally coming to the conclusion that the MILLTURNs from WFL combined the greatest number of advantages in a single machine.

Combining machining operations

"We had some parts for which we used to perform the rough machining on a turning machine. For the drilling and milling operations, we needed to clamp the part to a different machine. After that, we had to continue machining it on a turning machine. The part was moved around the company several times, which brought with it a great deal of risk, as there was a chance that the part could become damaged. Not only that, but each clamping procedure that was performed had an impact on precision. And that's before we even mention set-up times," explained the Managing Director on the subject of past procedures.

INTEGRATED
The M120 MILLTURN has enabled Etage to ensure complete machining of parts with a single clamping procedure for the first time. Huge output from the smallest possible installation space.

The decision to use the M120 MILLTURN with a centre distance of 3 m was actually a compromise. "An M120 with a clamping length of 5 m would actually have offered us more flexibility. However, we were able to acquire the three-metre machine much more quickly. The faster availability was more important to us. However, we are already planning to invest in an M80 or an M85, for which we will select a model with a larger centre distance, which will allow us to also machine long parts efficiently (note: we are considering a clamping length of 4.5 to 6 m)," added Adriano Feitosa, Process Engineer at Etage. Feitosa also played a significant part in defining the requirements profile for the current machine. "The machine needed to provide a high output with high torque, while at the same time guaranteeing excellent precision. It needed to provide us with the possibility of machining different sized tools at the same time. It had to allow for simultaneous machining. We also wanted to be able to perform turning and milling using driven tools and a swivelling B-axis in order to reduce set-up times and, last but not least, we wanted simple programmes to cover a large number of different workpieces and a nice big tool magazine," he recalled.

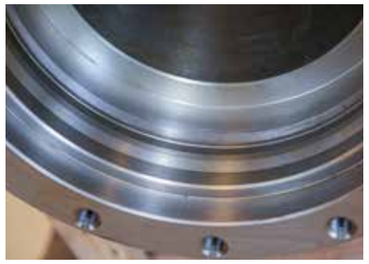
Uniform approach to control and programming

"In this regard, the WFL M120 MILLTURN turned out to be the ideal choice. We had a large number of machines at the company that used the Siemens control system. It was extremely helpful that the M120 was also equipped with a Siemens control system. We also made a strategic decision for the entire company when it came to programming. As part of this, all programming was switched over to Topsolid 7 in order to ensure a consistent concept across the entire company. As Topsolid is particularly well-suited to programming the MILLTURN machine, we were able to eliminate the interface issues that were present within the company and establish a homogenous complete solution," said Feitosa.

The switch to the new machine brought with it significant advantages, as evidenced by the impressive example provided by the process engineer. "We were able to achieve enormous reductions in the machining time of a part used in the oil and gas industry. Thanks to the WFL machine, several turning, drilling and milling operations, which we previously had to perform on separate machines, can now be efficiently handled with a single clamping procedure. As a result, the machining time has been reduced from 5 hours to just 50 minutes. When you also take account of the fact that changeover times can be completely eliminated and that the risk of damage during the transportation of parts between machines is no longer present, you can get a good idea of what exactly this means for us," enthused the process engineer.

EFFECTIVE
Thanks to its multi-tasking abilities, the M120 is capable of reducing the lead time for some parts from 5 hours to 50 minutes.

TEAM
The benefits of a MILLTURN can only be fully exploited by an outstanding team.



Seamless integration

The deployment of the new machine, which was brought into service shortly after the move to the new premises, has been described as seamless by Etage. "We are delighted that commissioning was so quick and problem-free. The training provided for the new machine and the support from WFL during the initial period really helped us become productive with the machine in next to no time. The WFL support team stood by our side and helped us to quickly become acquainted with the machine. The intensive discussions that were held with both the WFL commissioning team and the WFL technicians in the run-up to commissioning contributed to this. Thanks to the good preparation and a clear simulation, we are yet to experience any issues with the programming of our workpieces specifically. WFL did an excellent job in that regard," said Damm, praising the entire WFL team.

"All things considered, the performance of the M120 MILLTURN is rather impressive. It is like a plane that is being flown in zero visibility. When everything is well prepared, when all checks have been successfully carried out and when all processes have been properly performed, nothing can possibly go wrong. When the process steps are correctly followed, smooth running is guaranteed. What the machine is then able to achieve is impressive. In spite of its small installation area, the M120 MILLTURN offers the best possible degrees of precision and productivity for the rough machining of large parts right through to the precision machining of highly complex geometries in the 1/1000 millimetre range," concluded Feitosa on the subject of the performance range of the new machine.

All eyes on

F.A.S.T.

by WFL Millturn Technologies

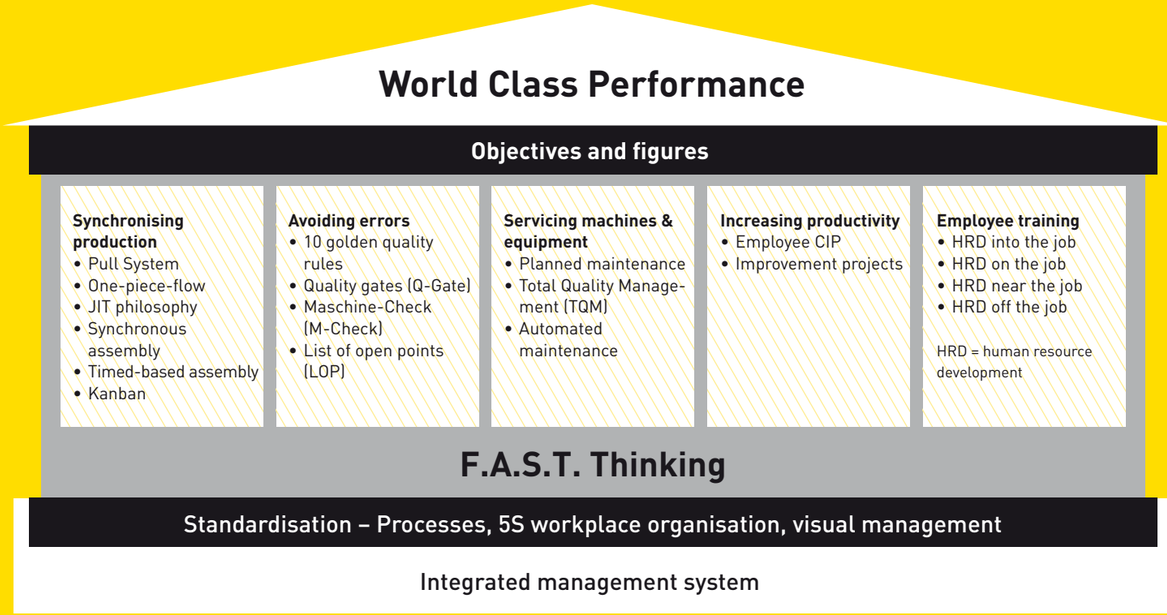
Companies are striving for changes that drive further development by means of a suitable strategy.
TQM (total quality management) is one of the first precursors to the lean management strategy on which the F.A.S.T. strategy developed by WFL is based. It was developed as a quality management strategy in the 1940s by the American William Edwards Deming, before being adopted and further developed by the Japanese automotive industry. In the1950s, Toyota unveiled the TPS (Toyota Production System) concept that prevents all types of waste and is based on two fundamental pillars: the just-in-time principle (= only produce what is required to fulfil customer orders) and the Jidoka principle (= quality must be built in to every process). Yet it was ultimately Volvo in the 1970s who were the first to introduce teamwork with the aim of boosting employee motivation. The next milestone in the development of the lean management strategy widely used today was in the 1980s with the introduction of CIP (Continual Improvement Process), which is still being used in many companies to this day. The „logical" further development of these improvement efforts led to the introduction of lean management in many companies in the 1990s – a corporate philosophy that is eliminating all redundant activities in production and management.
WFL has harnessed these strategic approaches in the development of F.A.S.T, the focus of which is not only to further hone and refine the WFL production system and the rendering of services, but also the attitude and behaviour of employees and managers.
These crucial factors in the future success of the company have been all brought together under the F.A.S.T. production system (see figure).
F.A.S.T. stands for Factory – Agile – Synchronous – Time-Based and is the driving force behind our optimisation efforts. It positively influences the behaviour of employees and managers, both on and off the shop floor.

„WFL is therefore increasing the efficiency of its value-added processes and improving its competitive position in times of change – times in which we must respond to changes increasingly quickly and more flexibly."

5S Workplace organisation

1. **Sort**
2. **Set in order**
3. **Shine**
4. **Standardize**
5. **Sustain**

F.A.S.T. Production system



The goal of F.A.S.T. is to achieve continuous improvement in all areas, in order to achieve World Class Performance (WCP). Our integrated production system (see figure) is a holistic approach that is guaranteed to permeate into all production structures and processes. F.A.S.T. is our way of working: design principles, methods and tools for planning, operation and permanent improvement – so that we will continue to be successful in the future.

FACTORY
High planning security and quality results in effective processes

AGILE
Defined responses to spontaneous changes guarantee flexibility

SYNCHRONOUS
Smoothly interlinked processes promise efficiency

TIME-BASED
Matching project timescales to the customer's cycles builds strong customer relationships

Maximum quality.
Considerable time savings.
Optimised production processes.
Ideal working conditions.
High workplace morale.

Production 4.0 –
The SMART approach

No, we aren't about to give you another new explanation of Industry 4.0. We will also not be asking whether industrial production can really be linked to modern communication and information technology, since that discussion is already being held. Put simply, this is a subject that has been talked to death in various panel discussions and seminars over the years. What is now important is to identify the SMARTest methods and how they can be implemented on the production line.

The vision of an autonomous production environment in which manufacturing systems are controlled through the Internet of things is no longer such a far-off pipe dream. The factor that above all determines whether „smart production" is a success is the communication between the product and the manufacturing system. But how do we know that the logical approach is also the smartest approach?

Clear objectives are essential before a successful „smart production" strategy can be developed. Detailed analyses of direct and indirect production processes are carried out to determine the level of networking required on the production line. Once this has been done, a start can be made on evaluating the potential available in the individual areas. It is advisable to consider the areas of activity on a case-by-case basis. Only then can the appropriate solutions, savings potential and the investment required be clearly defined.

Having identified the potential in the specific areas of the company, clear and unambiguous objectives must be drawn up. Objectives will only be suitable for a company if they are set in accordance with certain guidelines. On the one hand, the values must be realistic and quantifiable so that a transparent way of controlling the activities can be produced and operated. It is also vital that all the departments involved accept the objectives and agree that they are achievable within the specified time frame. Should one of the departments not concur, there is a risk that the whole process will be delayed or even collapse.

After the objectives have been defined, there are any number of ways in which processes can be optimised, some of which are described below:

SIEMENS MINDSPHERE
The cloud-based and open operating system for the IOT (Internet of Things) from Siemens permits the synchronous and direct connection of all available machines. The data that is generated helps when carrying out a detailed observation of the machines, in the acquisition of machine status data, and also brings about an increase in productivity, reliability and efficiency.

PAY PER USE
The requirements placed on a modern production facility nowadays are characterised by greater flexibility with ever smaller production batches. Pay per use financing allows users of WFL machines to significantly improve their cash-flow position by adjusting costs to match the revenues from sales. The hourly machine rate is agreed based on its expected level of usage. Siemens MindSphere enables the operational state of the machine to be captured in real time and billed fully automatically in line with the previously agreed hourly rate. The customer can now choose between long-term external funding of the investment, which can be extended following the initial period, or a short-term commercial rental solution, which might be more suitable for a one-off order. The machine can then simply be returned at the end of the agreement. This solution is only available in selected countries and for a restricted number of machine models.

CRASH GUARD STUDIO
The ultimate programming and simulation software for your machine. Visualising all programming steps in a 3D working area enables errors to be detected at an early stage and corrective measures taken, while the preliminary simulation guarantees shorter set-up times and gives the operator a programme that has already been tested for crashes. This highly versatile programme delivers quality improvements in terms of efficiency and machine safety.

WFL DATA ANALYZER
The complete manufacturing chain at a glance. In computing critical performance indicators, machine and process data, plus productivity and availability figures, the WFL Data Analyzer provides a decisive boost towards optimising your production processes. The integrated Alarm Assistant warns you in good time about any scheduled maintenance activities, error messages and what triggered them. This innovative software ensures that your machine delivers the highest levels of performance at all times.

TOOL TOUCH PAD
The independent loading/unloading of the tool magazine is now a reality. The innovative 15" Tool Touch Pad from WFL enables tools to be loaded/unloaded while machining is in progress, simplifying tool management as well as the operation of the machine. The Tool Touch Pad is particulary suitable for mid-sized and large MILLTURNs.

MILLTURN PRO
The ability to program the machine directly means that Millturn PRO is able to create and edit NC programs quickly and easily. Full flexibility is provided through the availability of an optional PC version. A feature that allows NC programs previously created in Crash Guard Studio to be edited directly on the interactive operator panel makes for more efficient working.

What does SMART mean?

- **Specific:**
  Defining potentials in specific company areas
- **Measurable:**
  Objectives must be quantifiable
- **Achievable:**
  All parties involved have accepted that the objectives can be achieved and responsibilities have been defined
- **Realistic:**
  Objectives must be realistic
- **Time-based:**
  Objectives have clear time constraints

Closer than you think

WFL is located all over the world

Events

January 24-28, 2019	IMTEX Bangalore	May 13-17, 2019	Metalloobrabotka Moscow
February 5-8, 2019	INTEC Leipzig	June 17-23, 2019	SIAE Le Bourget Paris
March 26-28, 2019	WFL Technological Meeting Linz	September 16-21, 2019	EMO Hannover
April 15-19, 2019	CIMT Beijing	October 1-5, 2019	MSV Brno
May 7-11, 2019	EXPOMAFE São Paolo	October 15-17, 2019	Gear Expo Detroit

Focal Point: WFL Branch in Wixom USA

Our customers are situated all over the world. The nearest WFL Millturn Technologies branch is right in your vicinity, thus guaranteeing a reliable partnership. With sales partners from 50 different countries and 7 WFL subsidiaries worldwide, we are a global enterprise with extensive resources. Find your local representative and contact us!

So that you can get to know WFL better, in each issue of COMPLETE we will be introducing one of our WFL branches. For this reason, we contacted the responsible branch managers and asked them about relevant topics that may be of interest to you.

WFL BRANCH IN WIXOM USA
Interview with Marcel Bollinger

What was the reasoning behind the move to the new site in the US?
In order to survive and grow on the North American market, being able to act as a local partner is essential. For WFL customers it is important that our employees provide them with quick and efficient support, be it with regard to servicing or staff training. By moving to the new premises we are making clear our intention to remain on the market and to support our customers in their successful further development.

What is special about the site in Wixom?
With the Wixom site, WFL is increasing its reach throughout North America. Proximity to customers and reduced response times simplify the coordination of aftermarket sales and the spare parts supply while also supporting application engineering. This ensures flawless cooperation between the customer and WFL. We are also planning to conduct and present machine demonstrations and process-related work in Wixom in the near future.

What is your preferred target market?
Our customers are companies with special machining requirements and high quality standards. Our MILLTURN systems are the specialists for the machining of complex, precision workpieces, often in just one clamping operation. We offer our customers advanced technologies, software that simplifies processes (programming, simulation and collision protection) and a stable partnership.

Please, tell us a bit about yourself!
It all started back in the early seventies, when I began my career in machine tools at George Fischer AG in Schaffhausen, Switzerland. After many years working in field sales within Europe, I applied for a long-term position at the Houston branch in Texas.
After a few successful years, I was given the opportunity to move to the Quotations department and then to switch to the role of General Manager at the North American site. At that time the branch had been relocated to Michigan due to a company takeover, and subsequently also represented Boehringer crankshaft machines for the automotive industry. After more than 25 exciting and inspiring years in the crankshaft industry, on a warm autumn day in 2017 I decided that it was time for a change. I found my next adventure in WFL Millturn Technologies and I now head things up at the site in Wixom, Michigan.

QUESTIONS I COMMENTS I IDEAS?
You have questions regarding our products, technologies or chipping? We are looking forward to your mail at **marketing@wfl.at**

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

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