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THE MAGAZINE OF
OTTO BIHLER
MASCHINENFABRIK
GMBH & CO. KG
2012

EFFICIENCY AS A FACTOR OF SUCCESS

◀ **Cover picture**

Efficiency has played a major role in all walks of life since time immemorial. Only by using existing resources as efficiently as possible can new potential be harnessed. Coupling this with innovative process technologies leads to new levels of development and prospects for success – such as the invention of the hand axe which, at the time, set new standards in evolutionary history.

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the magazine of
Otto Bihler Maschinenfabrik
GmbH & Co. KG

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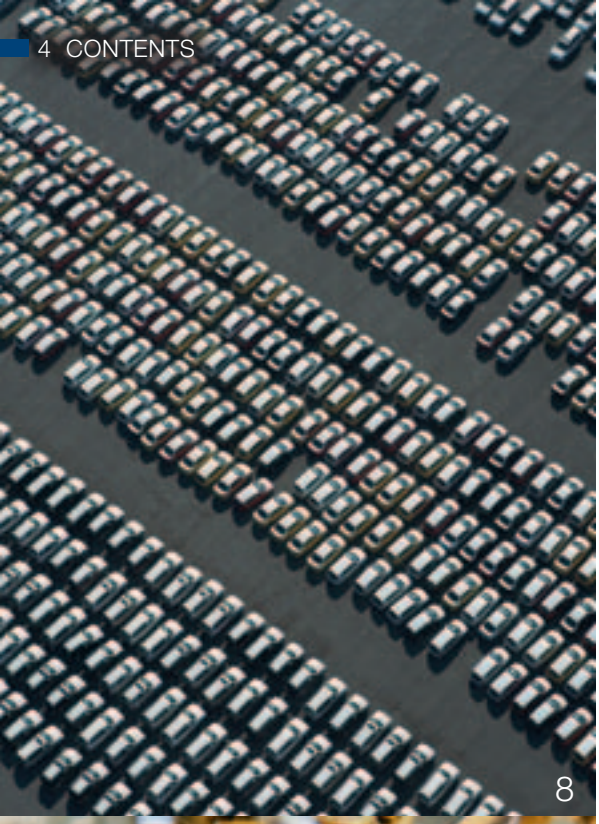
Dear readers,

The manifold changes taking place in today's global markets and resulting aggressive competitive pressure call for new approaches and strategies to secure both company success and jobs in the long term.
The main focus is on the need to increase the efficiency of production flows, reduce material consumption through intelligent solutions, and boost the performance of existing production lines. Only by identifying and consistently exploiting existing potential can productivity be increased and resource consumption minimized. In addition, combining this potential with innovative tooling concepts can improve manufacturing flexibility enormously, enabling a company to cope with a huge range of batch sizes at any time. Bihler has been offering highly productive, German-made cutting-edge technology in this field for close on 60 years. Every day, more than 900 employees in Germany and abroad do their utmost to ensure that you achieve success in production – with maximum efficiency and added value.

We invite you to invest in state-of-the-art plant and equipment from Bihler and benefit from our know-how acquired over many decades. In a close-knit, trusting partnership, we work with you to develop bespoke manufacturing solutions that combine materials efficiency with automation to add value and deliver optimum production efficiency. At the same time, we offer you manifold options for enhancing the efficiency of your existing systems. You will benefit from productivity increases of up to 50 percent and considerably reduced tooling times, thus boosting your manufacturing capacity. And with Bihler's comprehensive service and support, you can rest assured that you will be able to meet all the demands of the market now and in years to come.
In this edition of our customer magazine, we show you how technology from Bihler can make your production processes more efficient. Learn how SIEMENS has managed to more than double its productivity of switches, how our GRM-NC production system can make the tooling process quick, simple and reproducible at the touch of a button, and which crucial advantages our BIMERIC NC production and assembly system has to offer. Plus three of our customers explain how our technology has helped them stay ahead of the competition for decades and equipped them perfectly to meet the challenges of the future. Happy reading!

Mathias Bihler



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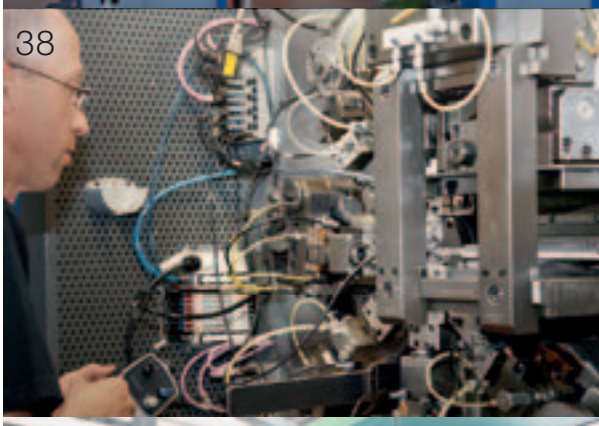

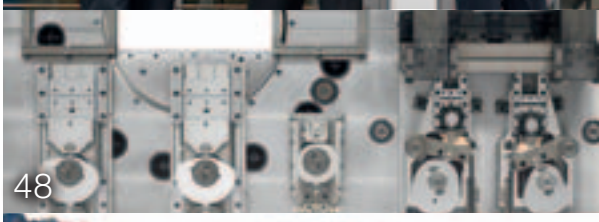

60 YEARS OF BIHLER

A TRUE SUCCESS STORY

There's lots to celebrate in 2013. It will be exactly 60 years since aircraft mechanic Otto Bihler decided to go it alone and set up his own company. Shortly afterwards Bihler developed the RM 25, the world's first stamping and forming machine. This novel machine quickly became a bestseller; but the little factory in Füssen was far too small and the company soon relocated to larger premises in Halblech, where innovative, market-oriented machine systems and over 12,000 automated manufacturing solutions have been developed for customers all over the world during the past six decades.

Strong partnerships with customers

The slogan for this year's 2013 BihlerTEC company exhibition is "60 years of Bihler – a true success story". Mathias Bihler: "On behalf of all our employees, I would like to thank our loyal customers for the excellent cooperation over the years. The interesting tasks you have set us have challenged us time and again to scale ever greater technological heights. " The entire Bihler team is already looking forward to its new challenges." ■

BNX HIGH-TECH SOFTWARE FROM BIHLER

CONTINUED DEVELOPMENT SECURES OUR MARKET POSITION

"Through continued development we are able to meet the high demands placed on the quality of Bihler's high-tech software. This allows us to secure existing market shares and harness new potential," says Peter Bertling, Head of CAx Consulting & Sales.

Designing wire geometries

Bihler can offer its customers an innovative further development for the design of wire geometries based on its bNX software. Complex wire contours can be created parametrically and then modified as required via interfaces. "Creating 3D contours has become child's play," said one customer during a product briefing. Depending on how certain parameters are set (C factor, spring-back, etc.), the wire is displayed simultaneously at each successive step in the processing sequence. Even "simple" wire geometries that have been imported via STEP, for example, can be post-modeled parametrically. Thus, using the "3D Forming Study" application, complex wire geometries can be processed in addition to flat strips and cylindrical objects.

New nesting functions in the strip layout

New nesting functions complement the strip layout. Functions to rotate, displace and mirror plate arrangements have also been developed. enabling Bihler's tools and follow-on composite tools to be optimally configured.

Adapting and optimizing tools

The high-tech software supports users in adapting and optimizing new and existing tools on the GRM-NC production system. The NC movements are configured in the operational chart. Monitoring of NC capacity utilization values allows functional problems to be identified in good time and research into possible performance-enhancing measures undertaken in advance. Functionality can be verified via simulations, and it is also possible to output NC travel profiles and setup values. ■

Even complex wire geometries are easy to create and modify using bNX.

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PECM PROCESSES

HAVE YOU USED PECM TODAY?

PECM stands for Precision Electro-Chemical Machining, a revolutionary processing technology that Bihler has been using since October 2011. The company decided to create a dedicated PECM application, development and demonstration center in its toolmaking area. "Bihler is now in a position to manufacture any kind of high-precision multi-cutting punch, shouldered cutting matrix, stamp and cavity much faster than before with excellent surface quality, and even with undercuts and recesses. PECM is the future of machining, and is set to establish itself as a key processing technology in many branches of industry. It has already been shown that the technology harbors great potential for the cost-effective processing of active elements in the metalworking and plastics industries," says Dirk Edler von Graeve, Head of PECM Development/Sales. "Our objective is to standardize PECM technology so that we can manufacture components for punching and forming technology, for the plastics industry and for other areas of industry much more cost-effectively."

A highly cost-effective processing method

"More cost-effectively because processing times are significantly reduced and components are not subjected to thermal or mechanical stress during processing, so the service life of the active tooling components (cutting punches, stamps, sliders, cavities) is prolonged, electrodes are not subjected to wear and tear, and large runs can be reproduced one-to-one with a high degree of precision," says Dirk Edler von Graeve.

PECM is set to become the standard

A knowledge manual is currently being drafted in the course of application and development work and this will be made available to customers who use PECM technology. In addition, Bihler has developed and constructed an X-Y table and innovative, precise holding and clamping systems. "System accessories like these are essential if PECM technology is to gain a foothold in our high-precision industry. But we're sure it is going to do just that!" says a confident Dirk Edler von Graeve. ■

Up and running since October 2012: the PECM Center with Benno Groß, Dirk Edler von Graeve and Matthias Keller (from left to right).

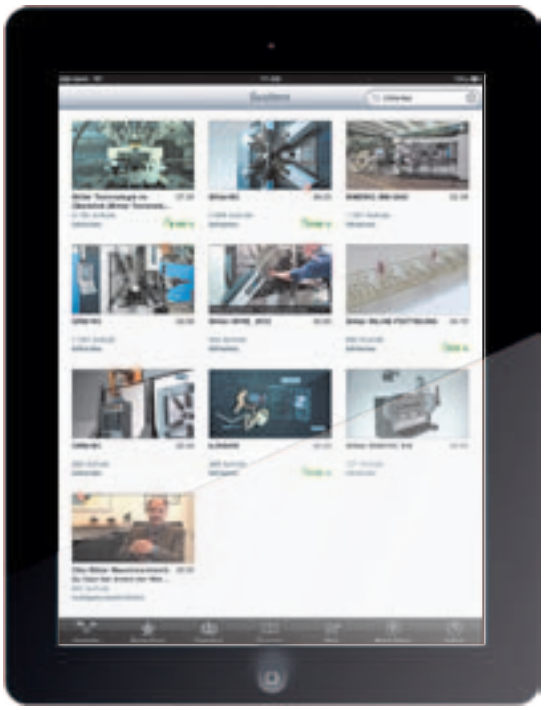
YOUTUBE

TECHNOLOGY IN MOTION

It's always fascinating to see a Bihler machine in operation. And now you can do just that straight from your own PC. Simply search for "Bihlertec" on YouTube and enjoy the latest videos on Bihler's new portal.

Bihler on your smartphone

If that's not fast enough, simply use your smartphone to scan the QR code on this page and prepare to be impressed by the strengths of the new GRM-NC and BIMERIC BM NC systems, and the versatility of Bihler's technology. Have fun! ■



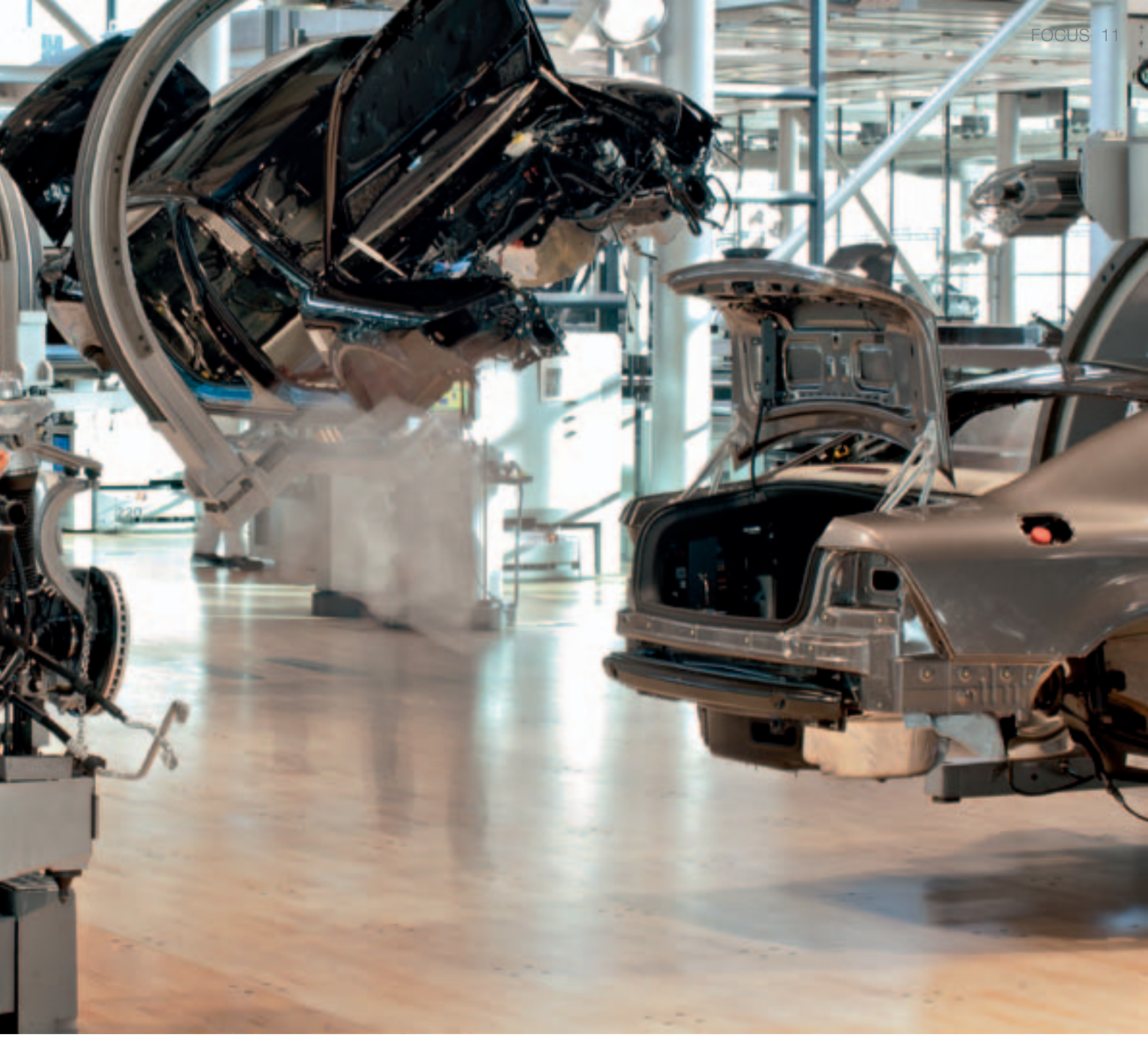
Bihler technology in sound and vision: the Bihlertec portal on YouTube..

SURVIVING IN THE FACE OF GLOBAL COMPETITION

THE HUMAN FACTOR

EFFICIENCY AS A FACTOR OF SUCCESS

Increasing productivity, reducing resource consumption, improving manufacturing flexibility – for metal-working companies in particular, these are essential methods by which efficiency can be improved and thus the key to operating successfully in the global marketplace. Otto Bihler Maschinenfabrik shows how measures like these can be implemented successfully along the entire value added chain. When developing innovative technologies and high-performance manufacturing solutions, the company has always relied on its own innovative strength and by definition, therefore, on its workforce. For one thing is clear: humans are the key factor governing the efficiency and ultimately the success of a company.



Automobile production is a global economic indicator and heavily dependent on the global marketplace. Manufacturing efficiency is a key factor in successful market positioning.

Since the start of industrialization, Germany's manufacturing industry has always been crucial to the economy as a whole. Even today, many areas of the economy depend either directly or indirectly on production technology; all told, more than two thirds of Germany's economic output is coupled to the manufacturing sector. Recent years, however, have seen a profound and sustained structural shift in the global economy that calls for new, innovative strategies and methods for enhancing efficiency and increasing value added along the entire production chain.

And the potential for driving efficiency in production is considerable. According to a recent study by the Fraunhofer Institute for Systems and Innovation Research (ISI), energy savings of 15 percent on average could be made by using efficiency ►

technology that is already available, and this measure alone could reduce energy bills in the manufacturing industry by some five billion euros. A study by the German Materials Efficiency Agency (demea) has produced similar results: companies could save an average of 220,000 euros a year if they used materials and energy more efficiently.

Options for improving efficiency

There's no shortage of ways in which energy, raw materials, technology and human resources can be used more efficiently. One method involves modifying existing processes to enable companies to manufacture their goods more cost-effectively using available resources. This measure can incorporate the strategic reorientation of product and technology development, along with the virtualization of product creation along the entire value added chain.

In addition, companies can deploy innovative technologies and novel manufacturing processes to increase flexibility in production and enhance the quality of both processes and products. A change in product characteristics, e.g. increasing the functional density of components, also harbors considerable potential for long-term increases in efficiency.

The human factor

But the measures discussed above will only work if they are set in a coherent overall context and follow holistic approaches. First and foremost, highly qualified employees are needed to enhance efficiency successfully. This calls for the ongoing training of staff as well as an appropriate corporate structure. Otto Bihler Maschinenfabrik recognized this long ago. "The human factor is crucial; it is the mainstay of our success and that of our customers," explains Mathias Bihler. "Our own workforce harbors the biggest potential for improving efficiency in the company. It is the bedrock of our innovative strength, the force that allows us and our customers to survive in the face of global competition."

Expanding our skill set through sustained investment

This is why Otto Bihler Maschinenfabrik has long been committed to improving the qualifications and training of its staff. At the same time, the company has been investing continuously in innovative manufacturing technologies and intelligent production processes, even when it comes to manufacturing its own systems and tools. An example of this approach is the new PemTec technology, which enables highly reproducible tool components to be manufactured even more cost-effectively. And Bihler's customers stand to profit from this in their turn, because spare parts, among other things, are then cheaper to procure.

All in all, customers stand to benefit from highly efficient, cost-effective stamping and forming machine which maintain a perfect balance between maximum productivity and minimal material consumption, low tool abrasion and optimum availability, while guaranteeing maximum manufacturing flexibility. This applies in particular to the new Bihler systems, which are generally geared to maximum productivity and thus always guarantee maximum production efficiency in themselves.

Efficiency in practice

For this reason, optimizing existing systems is a particularly effective way of delivering sustained increases in efficiency. This can be achieved, for example, via the use of modified, customized tools, as in the case of a Bihler RM 40K installed at one of our customers, where a radial gripper

Efficiency is a crucial determinant along the entire value added chain. It is the only means of cutting costs and resources and increasing productivity flexibly, while maintaining consistency in manufacturing quality.

feed, new material guides and customized bending and cutting tools have helped to more than double machine throughput. As a result, the customer is able to complete the job much quicker than before and take on new tasks with the free capacity.

Bihler also uses innovative manufacturing technologies to harness potential in the field of resource and raw-material rationalization – a measure that promises quick returns in the light of ever-increasing commodity prices. One such example is the development of a plate for adjusting a window closing mechanism for a customer. In this case, the punching procedure previously used was replaced by an integrated process for stamping, perforating, compressing, tapping and screw insertion, which has enabled material consumption to be reduced by an extraordinary 73 percent.

Bihler's technologies for reducing tooling times also harbor considerable efficiency-enhancing potential. The GRM 80R NC, for example, can help save a considerable amount of time during tooling thanks to its NC controller technology and an NC tolerance of around 1/100 mm for the machine modules. Whereas a mechanically controlled system could take an average of eight hours to tool due to the need to replace the cam, set up the tool and carry out fine-tuning, a GRM 80R NC can be retooled in just 58 minutes.

Comprehensive service and support

Besides all these solutions aimed at enhancing efficiency, Otto Bihler Maschinenfabrik also invests in the expansion of its extensive service and support offering. For this reason, Bihler recently extended the availability of its telephone hotline. This will create added security and further increase the performance capabilities of local customers.

This service not only helps to resolve current issues, but extends across the entire process chain. "Starting from the engineering of a component, we provide our customers with support along the entire value added chain in the form of technical advice, trials, manufacture of sample parts and process verification," explains Bernd Haußmann, Head of Development, Design and Production. "After considering the design of a component in terms of its industrial production, we implement the project as a single-source supplier." This is followed by training of the customer's own personnel. If necessary, further optimization measures can be introduced via the customer support team as and when required.

Well equipped for global competition

This high level of universal expertise in consulting and service is as unique to Otto Bihler Maschinenfabrik as it is typical of a company which, along with other solutions in the field of efficiency enhancement, can thereby provide its customers with a substantial competitive edge. Thus both Otto Bihler Maschinenfabrik and its customers are perfectly placed to meet current and future market requirements.

According to Mathias Bihler, "Increasing globalization and pressure from the competition mean that the need to become more efficient is assuming increasing importance as a factor in market success. Implementing measures to enhance efficiency calls for a certain willingness to accept risk. But a company that takes the bull by the horns and is prepared to develop its innovative strength by consistently investing in people and machinery will be able to position itself successfully in the market both now and in years to come." ■

Contactors and circuit breakers have been manufactured for over 100 years. But even long-established processes harbor potential for increasing efficiency.

INCREASING PRODUCTIVITY?

With the help of Bihler's BIMERIC BW 4500, Siemens AG's Parts Technical Center in Amberg has managed to more than double its component productivity.

SIEMENS AG'S PARTS TECHNICAL CENTER IN AMBERG

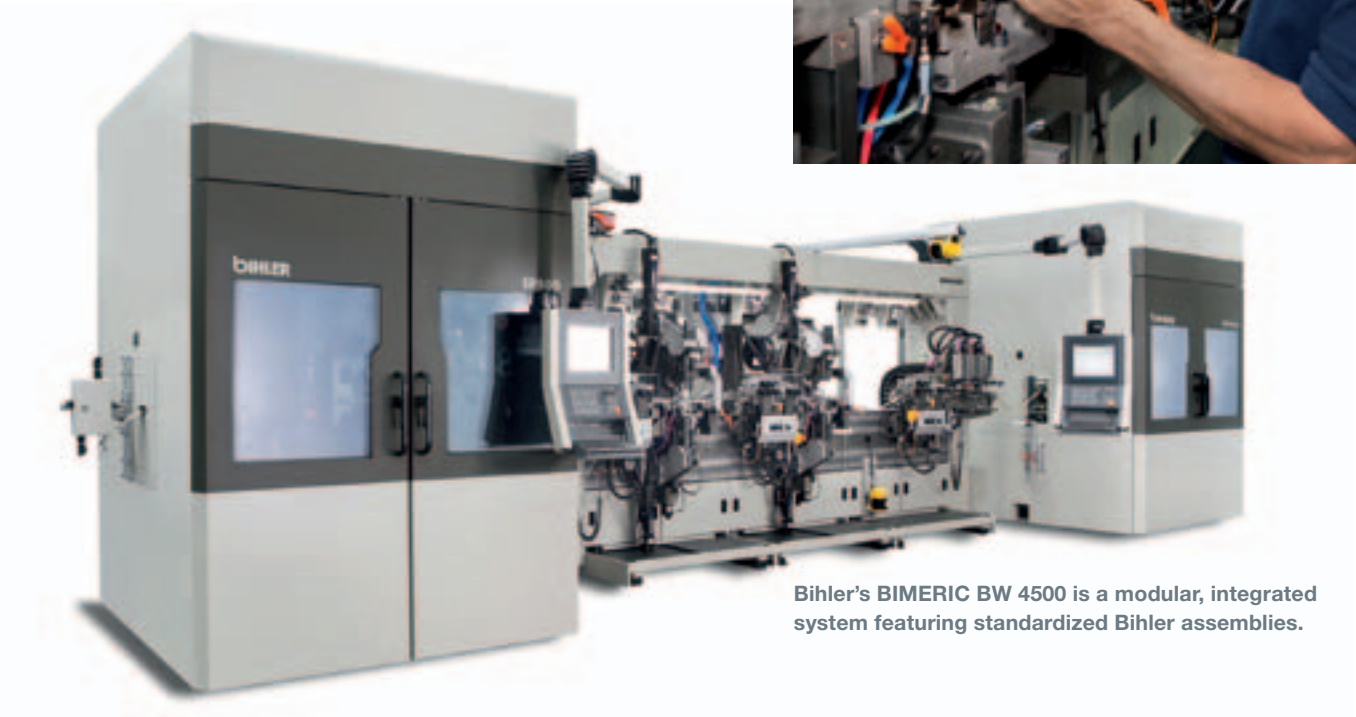
PRODUCTIVITY MORE THAN DOUBLED!

Even long-established processes harbor potential for increasing efficiency. The ability to harness this potential responsibly with the aid of innovative technologies and excellent know-how has long been a recipe for success at Siemens AG, for instance at its Parts Technical Center at the Amberg manufacturing plant, where a Bihler BIMERIC BW 4500 was recently installed to manufacture switch contacts for SIRIUS contactors and circuit breakers. The system has more than doubled productivity, simplified production and enhanced manufacturing quality.

In the past, the production of switch contacts for contactors and circuit breakers at the Parts Technical Center in Amberg was quite a laid-back affair. Between 100 and 150 contacts – all perfectly punched, welded and tapped – would leave the conveyor belt each minute.

Today, you would be hard pressed even to identify the parts as they race by on the machine. As many as 400 a minute drop into the collecting boxes at the end of the production line – that's more than twice as many as before. "Even if contactors and circuit breakers have been manufactured for over 100 years, ►

Bihler's systems know-how played a major role in securing the success of the project.



Bihler's BIMERIC BW 4500 is a modular, integrated system featuring standardized Bihler assemblies.

the production processes still harbor considerable savings potential," reckons Franz Mende, Head of the Siemens Parts Technical Center. "And we are harnessing this potential using product innovations which benefit the customer and secure our future position as the world's best."

An integrated punching, welding and tapping system

In the case of switch contacts, the innovation in question is Bihler's BIMERIC BW 4500. This modular, integrated system for manufacturing contact components for use in industrial switching technology comprises standard Bihler assemblies. They include the BIMERIC NC system, two SP 500 servo presses and integrated process modules for resistance welding, soldering, and thread forming. At the Parts Technical Center in Amberg, Bihler's BIMERIC BW 4500 spools the metal strip from the coil into the first press, punches the contours there, then welds the switch contacts on before forming the associated thread. In the second press, the switching elements are finished and then separated from the strip before landing in the container.

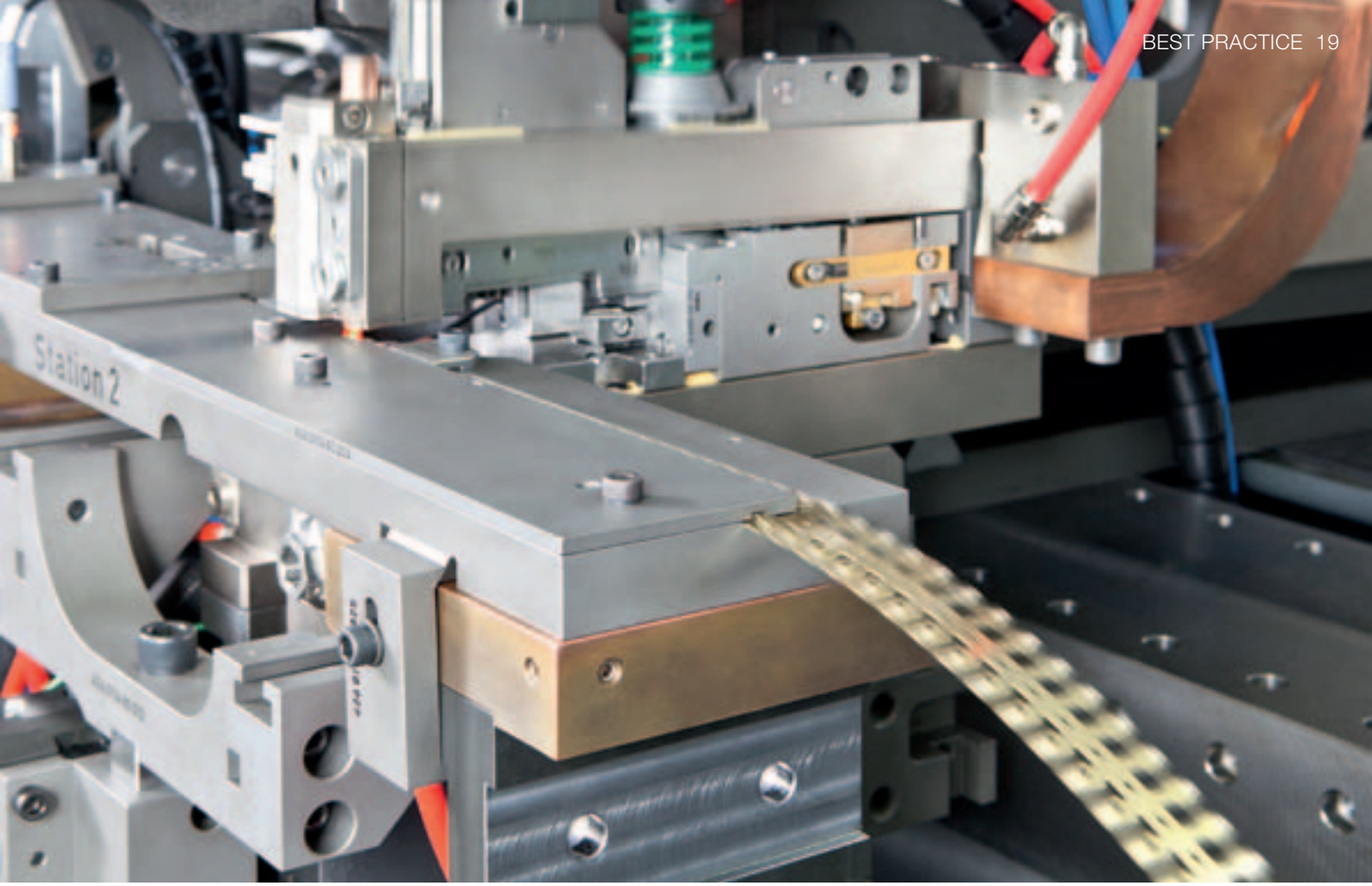
Highly efficient manufacturing in perfect quality

"Bihler's BIMERIC BW 4500 has enabled us to made a real technological advance in the manufacture of switch contacts," says Al-

Franz Mende,
Head of the Siemens Parts Technical Center

Alfred Schnellinger,
Development Punching Tools

Wolfgang Birner,
Technology Planning Connectivity



Not only has the Bihler system helped raise productivity from 150 to 400 parts a minute, but the innovative controller allows the entire machine to be operated from a single point.

fred Schnellinger of Development Punching Tools. "Not only have we raised productivity from 150 to 400 parts a minute, but the controller also lets us operate the entire machine from a single point – from punching, welding and tapping, to finishing of the components." The standardized user interface of the VariControl VC1 controller provides the requisite level of operating convenience. "What's more, end-to-end process and quality control on the system guarantees the perfect quality of components as well as a highly efficient manufacturing process," adds Wolfgang Birner from Technology Planning Connectivity.

Award-winning production

The particularly high quality of the components manufactured on Bihler's BIMERIC BW 4500 is a reflection of the top-notch products and systems made by Siemens and developed by over 750 engineers and scientists at the Amberg location alone. And the company's success has been documented by the numerous top awards received in this area, such as "Factory of the Year" (2007), the "Bavarian Award for Quality" (2010) and "Best Factory" (2011). "In order to drive technological progress, it is essential that we cooperate with external partners, especially in the case of large projects like the new Bihler system," explains Franz Mende. This is why Otto Bihler Maschinenfabrik was closely integrated in the project throughout, from the initial idea right up to commissioning.

Combined know-how as a key factor of success

"A decisive factor of success was the ability to combine our knowledge of products and processes with the systems know-how of Bihler – a longstanding partner with sector-wide experience and a portfolio of solutions for diverse application areas," says Franz Mende. Then there are the various training programs offered by Otto Bihler Maschinenfabrik, for example those covering the operation of Bihler's new BIMERIC BW 4500. This means that the machine can be deployed worldwide while always offering the same productivity gains. This is why Siemens has installed a second, identical Bihler BIMERIC BW 4500 at its Suzhou location in China, while at the same time submitting an order with Otto Bihler Maschinenfabrik for the next systems to handle new products, once again with an eye to achieving a significant technological advance in terms of functionality and productivity – fully in keeping with the Technical Center's slogan: "If you stop being better, you stop being good at what you do." ■

SIEMENS

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EVOLUTION OR EXTINCTION

IS THE EVOLUTION OF ORGANISMS EFFICIENT?

Ongoing development is a fundamental principle of nature. This applies to the development of living creatures in particular: variation and targeted selection can result in successful new forms of life. Prof. Dr. Ulrich Kutschera explains to *b. on top* how evolution works and how efficient it is.

PROF. DR. ULRICH KUTSCHERA

Prof. Dr. Ulrich Kutschera is an evolutionary biologist who researches and teaches at the University of Kassel and as a Visiting Professor in Stanford, USA. He is also Chairman of the Evolutionary Biology working group in the German Life Sciences Association (VBIO). His research focuses among other things on the analysis of symbiosis and cell growth. At a more general level his work also deals with scientific theory and evolution.

b. on top: Does evolution result mainly from the pressure to adapt, or is it also the "search" for efficient means of living and surviving?

Prof. Dr. Ulrich Kutschera: By evolution we mean the ability of organisms which have come together to form reproductive communities – such as plants and animals – to assume different forms in the course of successive generations. It is essentially a reaction to our constantly changing environment. Populations characterized by an excess of births over deaths either adapt, i.e. evolve, or they become extinct like the dinosaurs, which were unable to survive a vast environmental catastrophe following volcanic eruptions and a meteorite strike 65 million years ago. Early mammals such as snakes, on the other hand, were able to hide away and their progeny have survived to this day. Organisms survive if they have the ability to adapt. So whatever continues to function continues to live. These evolutionary solutions aren't always particularly efficient, however.

b. on top: **b. on top: Which evolutionary mechanisms are essentially effective?**

Prof. Dr. Ulrich Kutschera: New variants are created in every generation in the course of sexual reproduction. This variability is enhanced within populations by germ line mutations. Those random variants that have adapted survive, reproduce, and ultimately represent the gene pool of the next generation. For animals and plants, this mechanism of variation and directional selection is the most important mechanism of evolution, as has been verified on umpteen occasions. But the dynamic Earth – we're talking plate tectonics here – is also a central factor thanks to the destruction and creation of new habitats. This concept harks back as far as the works of Charles Darwin and Alfred R. Wallace in 1858.

b. on top: **In the field of technology, innovation often seems to be attributed to the "evolution" of particular devices or assemblies. Can the term be used in this context?**

Prof. Dr. Ulrich Kutschera: It is certainly correct to talk about the evolution of things like car models or clocks. These are also cases in which variation and selection result in the creation of new, often more complex models in the course of generations, while other design types die out.

b. on top: **What about bionics? Can nature's evolutionary "achievements" really be harnessed to an as yet unpredictable extent with a view to enhancing technology and rendering it more efficient?**

Prof. Dr. Ulrich Kutschera: As the first primordial bacterial cells started to evolve around 3,500 million years ago and the process is still taking place today, evolved structures are evidently good models for technology, and there is certainly a future in bionics. Evolutionary biotechnology has a big future ahead of it too. Optimization processes in line with the variation-selection principle can be used to synthesize new substances, as happens in our constantly evolving natural world.

b. on top: **Can the development of mankind into a thinking, reflective, even efficient creature be described as an evolutionary process? And thus shouldn't we ultimately describe the efficiency we demand of our intellectual and manual products (machines), given our constant efforts to improve them, as evolution too?**

Prof. Dr. Ulrich Kutschera: Human evolution, also known as hominization, has been well documented by fossil forms, although there are still gaps in our knowledge. We are large two-legged mammals that have adapted to the savannah. Our complex brains were originally used primarily to detect and defend against predators. Similarly, technical systems can be regarded as evolved, adapted constructs of human beings, although we should take care to avoid using the term "higher development". We destructive humans are no "higher" than our closest relatives, the chimpanzees. These jungle primates do not destroy their environment. Without us destructive humans, chimpanzees could continue to exist as a species, as a part of nature, over innumerable generations. ■

IT'S NOT ENOUGH SIMPLY TO BE ABLE TO SAIL WELL.

«THE CREW MUST BE IN TUNE WITH THE BOAT»

Skipper Ken Read has sailed in all the oceans of the world. He is passionate about competing as well as about sailing in general. But a whole host of different factors have to be taken into account if success is to be achieved. Read spoke to *b. on top* about the challenges of offshore racing and the efficiency of team and materials.

KEN READ

American Ken Read, 51, is considered to be one of the world's most accomplished sailors. He has twice been named "United States Rolex Yachtsman of the Year". Read was skipper of "Il Mostro", the PUMA sportswear company's yacht that took part in the 2008-2009 Volvo Ocean Race, and he again skippered "Mar Mostro" for PUMA in the 2011-12 edition of the round-the-world race.

b. on top: What motivates you to keep participating in such a long – and dangerous – race?

Ken Read: I'm passionate about sailing and I'm very competitive. I started off in small boats and raced against my friends. Over time I got better and better and the boats got bigger and bigger – sailing is now my profession.

b. on top: What sort of qualifications does a skipper need to have?

Ken Read: Above all you need experience – not just in competitive sailing, but also in leading a crew to get the best results. At the same time you also have to have business skills. As the skipper, I'm CEO of PUMA Ocean Racing and I'm responsible for the overall budget. That's where my business background as former Vice President of the world's biggest sailmaker is a great help. I sometimes joke with the crew: they say we're taking part in a regatta. I say this is first and foremost a commercial venture in the form of a regatta.

b. on top: What's important for creating an efficient, and consequently successful, yacht crew?

Ken Read: Two things are vital: talent, of course, plus the chemistry has

to be right. Talent is when you can demonstrate that you've got what it takes to match up to the best yacht crews in the world and get every possible ounce of speed out of your boat. The right chemistry between the crew is also essential because there are eleven of you living on board 24 hours a day in the most difficult conditions for months at a time: there are no home comforts, it's cramped, wet and either freezing cold or scorching hot – and the food is abominable too! You simply have to get on well together.

b. on top: As skipper, how do you ensure the crew members work well together and perform all their various jobs efficiently?

Ken Read: Before the race itself, we train together for over a year. That enables us to get to know one other and how we function as a team, not just when conditions are optimal, but also in critical situations. After all, everyone is able to perform at least OK when things are going well, but not necessarily when adversity strikes.

b. on top: What skills does one need to sign on with a professional yacht like the "Mar Mostro"?

Ken Read: Well, you need to be able to sail of course. As well as helms and sheet trimmers, simply experienced sailors who can sail a boat fast are needed. But – and that's what makes our sport different from "normal" sailing – they also have to be good handymen as well: we require engineers, electricians, sailmakers, carpenters etc., because we have to carry out repairs ourselves. If anything breaks or fails, we need to be able not only to fix it, but to fix it so that the boat can carry on sailing optimally. It's not enough simply to be able to sail well.

b. on top: A competition like the Volvo Ocean Race presents extreme challenges – above all for the materials used. How do you construct a boat able to meet these challenges?

Ken Read: An ocean-going yacht is hi-tech at its purest. Most components, hull, mast, etc. are made of carbon fiber and are optimized for speed. Speed is everything – in fair winds or foul, you need to keep sailing just as fast. So the yacht must be light, but at the same time still strong enough to be able to survive a hurricane intact. It also has to be sailed well by the crew. Efficiency is the perfect interaction between crew, yacht, sails and mast. The crew must be in tune with the boat.

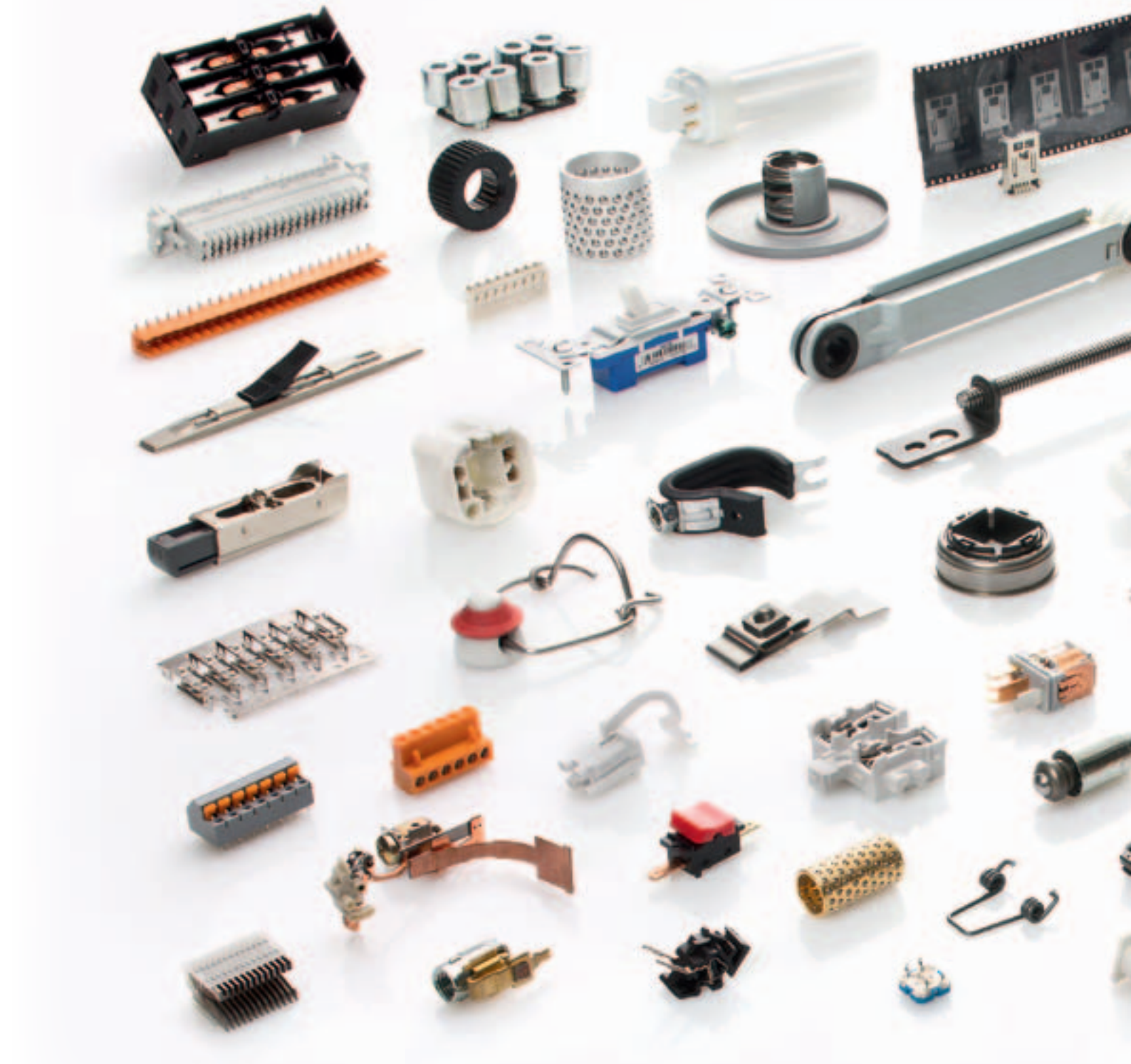
b. on top: Were you involved in the construction of the "Mar Mostro" at all?

Ken Read: Yes, the whole crew was involved in both the design and construction process. Everyone had their own area of expertise to look after. One was responsible for the mast and sails, another for the hull, etc. That's also important, because you then not only bring your own experience to bear, you also know the boat intimately from the keel up. So if there's any damage, you know exactly what needs to be done.

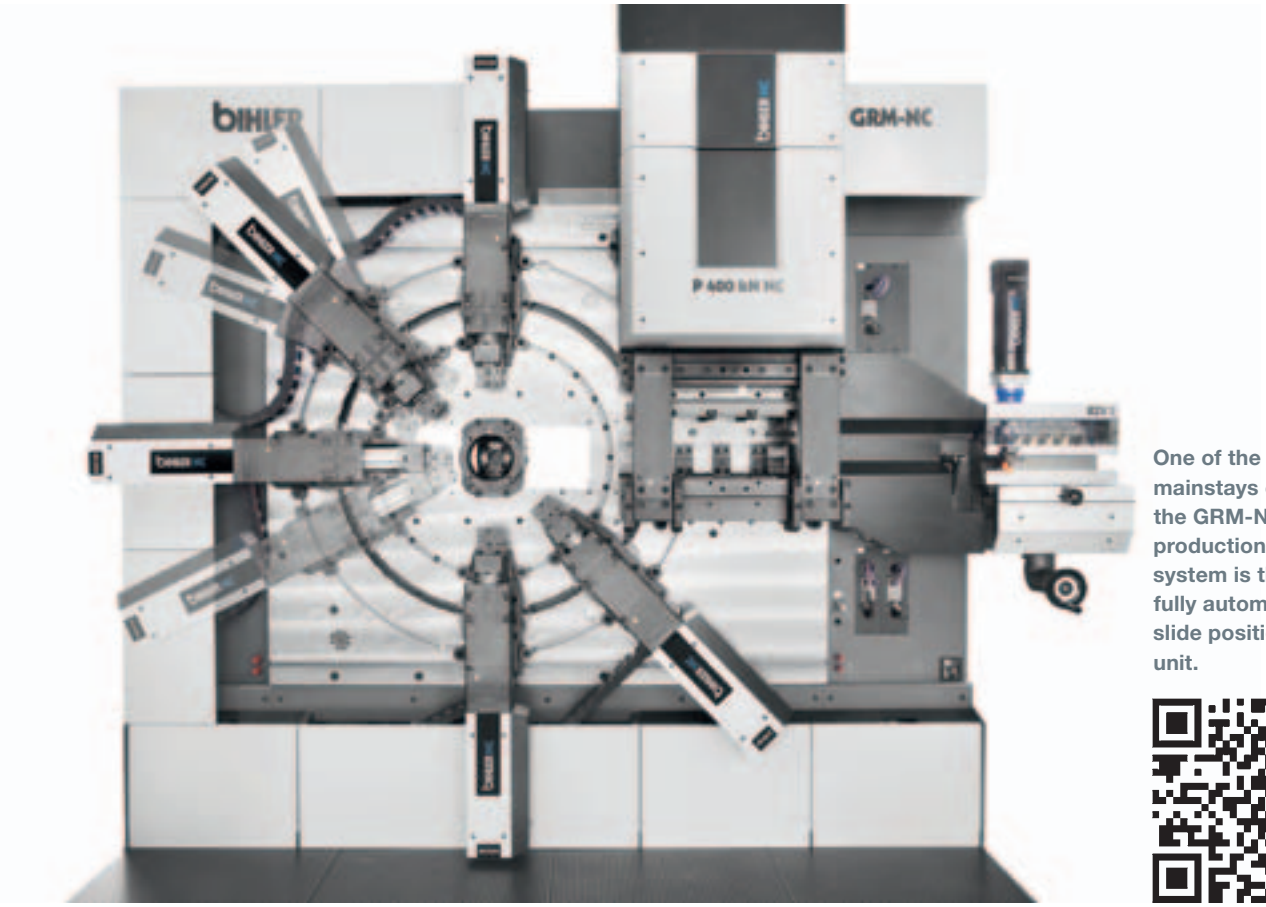
b. on top: Will you be representing PUMA again in the next Volvo Ocean Race?

Ken Read: I don't know yet. But I've still got some time to make up my mind whether I want to continue racing or resume my business career. ■

IMPROVING EFFICIENCY WITH BIHLER'S NC TECHNOLOGY



Bihler's NC technology offers a variety of ways to enhance efficiency in the production environment – from the simple wire-formed part to complex hybrid connectors.



One of the mainstays of the GRM-NC production system is the fully automatic slide positioning unit.

TOOLING AT THE TOUCH OF A BUTTON

NEW GRM-NC PRODUCTION SYSTEM

Time is money, especially in the supplies industry. Bihler's remit when it came to developing a new generation of automatic NC stamping and forming machines was to minimize the valuable time lost in cases where frequent retooling and assembly operations are required. The first member of the new family is the GRM-NC, which enables what were previously especially time-consuming and labor-intensive tooling operations to be dealt with in minutes at the touch of a button.

Extremely fast retooling

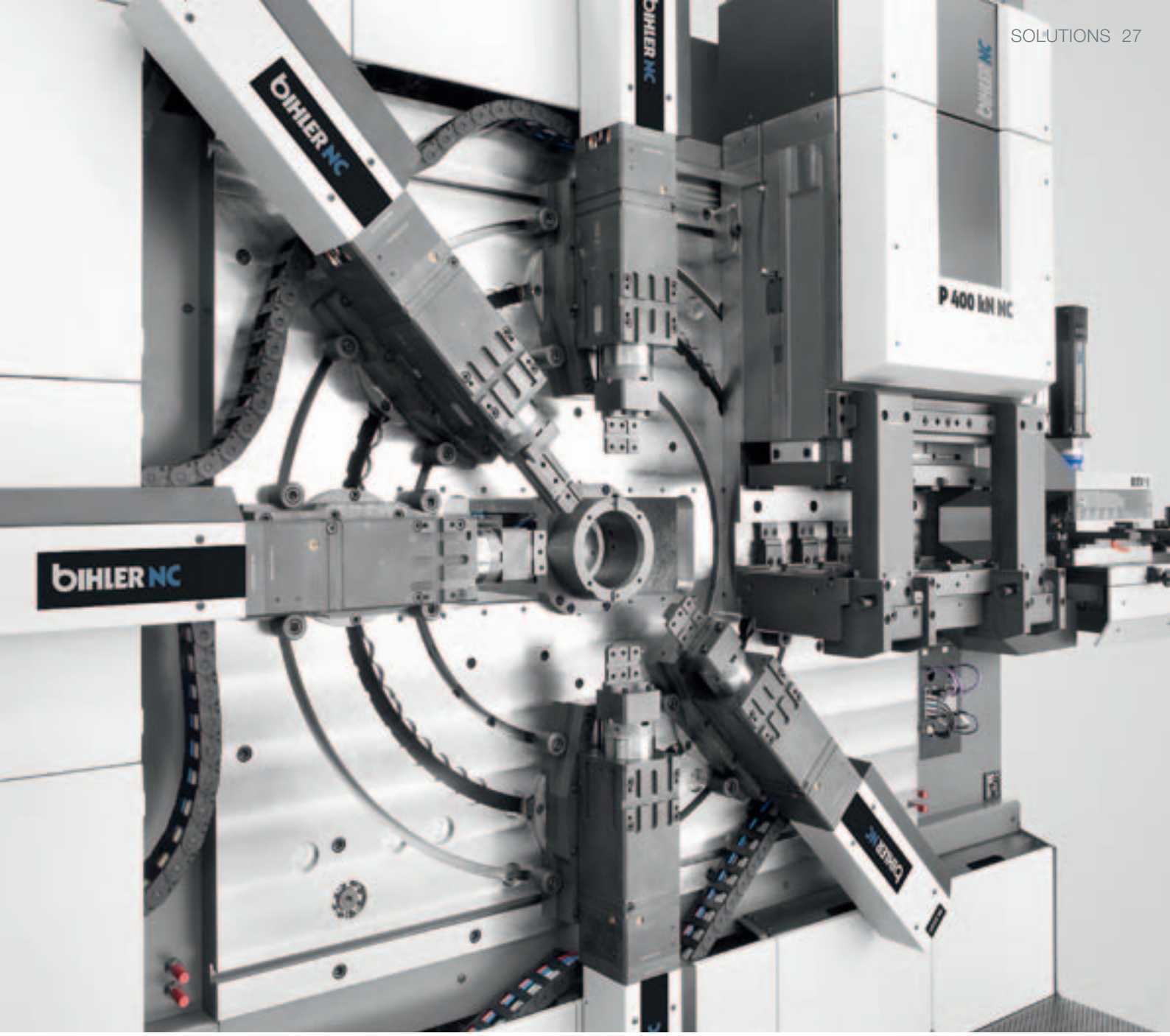
"We presented the GRM-NC for the first time at WIRE 2012," says Bernd Haußmann, Head of Development, Design and Production. "Specialist industry visitors were treated to a "live" demonstration of how quickly and simply retooling from a wire component to a strip component (a completely different geometrical structure) can be carried out. The entire retooling operation took less than an hour. Before, it would have taken 8 times as long."

Innovative NC slide positioning unit

Several technical refinements in the machine are responsible for the short tooling times. The specialists at WIRE 2012 were particularly impressed by the fully automatic slide positioning unit: all the NC slide units move into their new positions as if by magic. Bernd Haußmann: "The positions of the slide units are stored in the tooling program on initial setup. Exactly the same positions can be reproduced time after time whenever they are called up or following a tool change." What's more, all NC processing units are equipped with quick-change systems for the active tooling components.

Reduced tool costs

The significantly lower tool costs compared with tools on mechanically operated machines are another crucial benefit provided



by the GRM-NC system. Tools can be designed more simply, and any optimizations can be made directly via programming. There is no more need for labor-intensive mechanical adjustment, and additional costs no longer have to be factored in for cam manufacture, assembly and setup.

Tool compatibility with the GRM 50/80

Suppliers using Bihler's GRM 50 and GRM 80 machines stand to benefit from several interesting options with the new NC stamping and forming machine. Most of the tools from these two machines can be fully adapted and optimized on the GRM-NC. "Those who now migrate their existing GRM 50/80 tools to the GRM-NC in response to ever smaller production runs and the growing number of product variants will gain a competitive edge," says Haußmann. "As well as replacing several mechanical machines, the NC machine provides much greater manufacturing flexibility, optimum response times, enhanced product quality and greater productivity."

Easy to operate

For the machine operator, cutting-edge control technology is like having a second pair of hands. Thanks to the VariControl VC 1, machines can be set up quickly and simply without an external programming device. The operator is supported in all the necessary tasks by a bespoke menu system, coupled with an online diagnostic and help system featuring graphics and videos which can be stored.

Fast payback

Bernd Haußmann: "The new GRM-NC opens up interesting fields of application to users in their manufacturing operations. The simple handling, fast response to customers' short-term demands and excellent quality of the manufactured components in particular ensure that the system provides a quick return on investment." ■

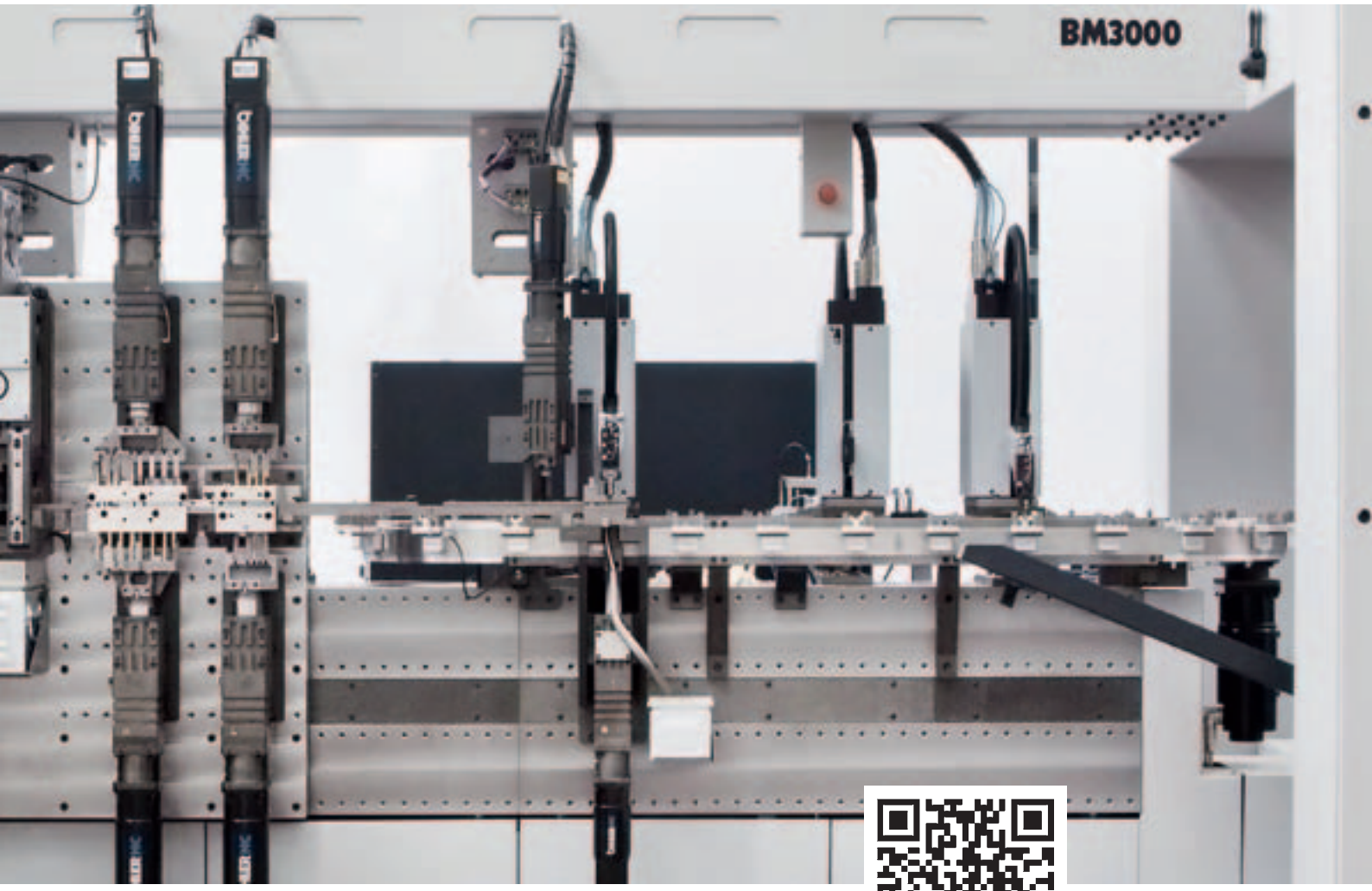
HIGH-END SYSTEM FOR HIGHLY EFFICIENT END-TO-END SOLUTIONS

BIMERIC NC PRODUCTION AND ASSEMBLY SYSTEM

The new GRM-NC currently has to share the limelight with the BIMERIC system. "The award-winning NC production and assembly system has gained a firm foothold in the market since it was first presented at EuroBLECH 2010, and has helped many users to achieve much greater value added in their production operations," says a delighted Bernd Haußmann.

Standard system with a wide range of uses

Even the standard BIMERIC BM 3000 version supports an extremely wide range of components and complex assemblies efficiently and cost-effectively – and all without the need to convert machine units when migrating between products. "If additional process steps are required for a particular production task, the user simply resorts to Bihler's modular system of NC building blocks," says Haußmann. These provide a wide range of standardized process modules for all



The BIMERIC BM 3000 NC production and assembly system can handle a diverse array of components and complex assemblies efficiently and cost-effectively.

applications in the areas of forming, assembly, handling and joining technology.

Open interfaces for external components

Even components provided by third parties, such as industrial robots and feed systems, and enhanced processes which include plastic molding and laser and ultrasonic welding can be freely integrated into manufacturing processes thanks to the open interfaces of the central VariControl machine and process controller. "The BIMERIC has an extremely broad application range: it can be used as a straightforward production system, a dedicated assembly system or as a combined production and assembly system. Even Bihler's stamping and forming machines can be coupled to the BIMERIC in order to tackle more complex tasks," says Bernd Haußmann.

Fast and simple tooling

The BIMERIC also fares well in terms of tooling times. "Leading-edge NC technology from Bihler guarantees fast, simple, reproducible system tooling," emphasizes Haußmann. "All unit movements can easily be programmed into the VariControl VC 1 and called up again at the touch of a button when a tool needs to be changed." Quick-change systems fitted on all machine units guarantee fast and reliable tool removal and switching. The outstanding accessibility of all modules makes tooling and maintenance operations simpler than ever.

New prospects: follow-on composite technology + BIMERIC

The BIMERIC can be coupled with the new Bihler SP 500 servo press for highly efficient assembly manufacture. Freely programmable work stroke and stroke position adjustment, combined with the considerable installation area available in the servo press mean that new and existing follow-on composite tools can be integrated quickly and simply. "This innovative combination of servo press and NC machine solves

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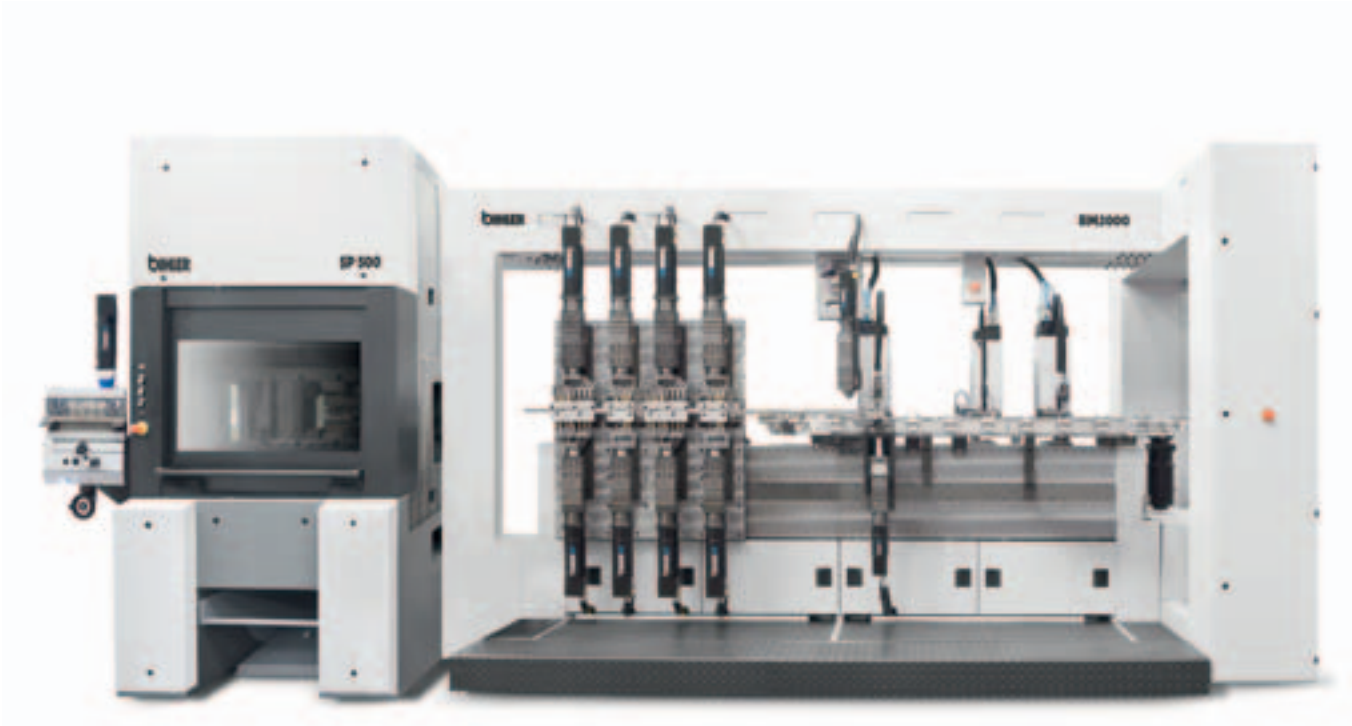

Coupling the BIMERIC to the SP 500 servo press: end-to-end production on a single system, from semi-finished all the way to finished component, helps streamline the process chain and optimize logistics management.

the problem posed by the sequential manufacture of assemblies using follow-on composite technology," explains Haußmann. "Normally, individual parts cut and punched on presses in a highly productive operation would have to be moved and fed back into the machine in a separate, time-consuming process before they could be processed further."

End-to-end component handling

But with the BIMERIC concept, prefabricated components from the SP 500 can be further processed directly on the carrier strip without any logistical intermediate stages. End-to-end component handling from the raw material to the end product streamlines the process chain, simplifies logistics, saves time and money, and guarantees the consistently high quality of the manufactured products. Bernd Haußmann: "The BIMERIC concept allows users to maintain and enhance their competitive position – both now and in the future." ■

The machine unit movements stored in the central VariControl controller enable quick and simple tooling at the touch of a button.

UNIVERSAL NC MODULAR SYSTEM

The three basic modules of the NC system

● Basic machine body
The modular, basic platform of the BIMERIC. Several machine bodies (length 1,500 mm) can be combined flexibly to meet specific project requirements. Pattern drilling permits the simple, precise positioning of the NC modules.

● Process modules
A wide range of high-performance NC process modules for all applications in the areas of forming, assembly, handling and joining technology. The modules of external users can also be integrated in production processes.

● Controller
Bihler's centralized VariControl VC 1 machine and process controller ensures that the BIMERIC can be operated simply and reliably.

CONTACT

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BIHLER INSIDE

Products and assemblies manufactured on Bihler systems can be found in virtually all walks of life and are bywords for quality, safety and reliability. Whether the product in question is an energy-saving light bulb or an electric razor, efficiency is the name of the game as regards production and application alike.

MAXIMUM ENERGY SAVING

Compact fluorescent lamps, better known as energy-saving light bulbs, have raised the bar in terms of energy efficiency and quality. And that's not surprising if you consider that they use around 80 percent less energy than conventional light bulbs. Just as efficient as the bulb itself is its production on Bihler's flexible FMS 2500 assembly system that is capable of running off 120 bulbs a minute. 10, 13, 18 or 26-watt bulbs can be produced in a flexible and – thanks to rapid tooling – highly available manufacturing process. ■

EFFECTIVE ANCHORING

Modern buildings often come with prefabricated facade elements that have especially high insulating properties or are even capable of generating electricity themselves via integrated solar panels. Heavy-duty expanding-wedge anchors are used to fix the elements in place. The expanding wedge secures the anchor and its load (the element) into the building wall – a system that is as simple as it is efficient. The same applies to the production of anchors on the Bihler Multicenter MC 82. The stamping and forming machine supports a wide variety of process technologies on a single system and, at 150 segment anchors, guarantees optimum productivity too. ■

MINIMAL FRICTIONAL LOSS

In a combustion engine, the job of the cam follower is to transfer energy from the cam in the camshaft to the intake or exhaust valves. Particularly efficient are roller cam followers, which act as bearings at the point of contact with the camshaft. This reduces friction in the valve train by around 30 percent. One of the machines used to manufacture cam followers is Bihler's flexible FMS 2500 assembly system. In a fully automated assembly line, the FMS 2500 supports the rapid and cost-effective production and assembly of components as complex as the roller cam follower – at a production rate of around 100 components per minute. ■

EFFICIENCY YOU CAN SEE

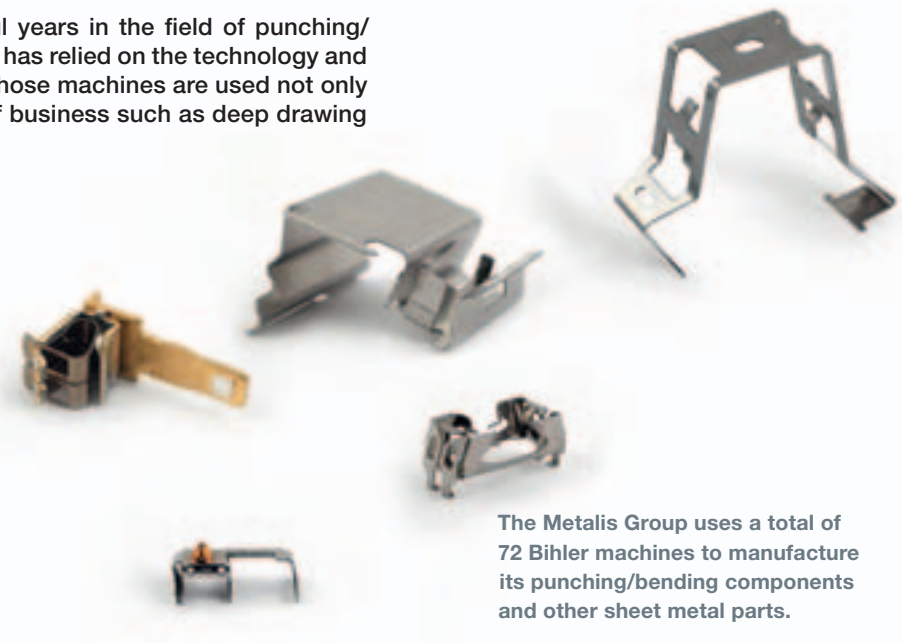
The heart and soul of any electric razor is the swivel head, which is also extremely complex in design. Bihler's BZ 2 processing centers can be used to manufacture components of this kind. Designed for universal application, these machines are characterized by top-of-the-range productive output, maximum process reliability and excellent manufacturing quality. The modular machine concept can be customized to individual machine sizes and equipped with additional operations. The BZ 2 thus supports the cost-effective manufacture not only of punched and formed parts, but also of complete assemblies like the swivel heads, 40 to 45 of which leave the conveyor belt fully assembled. ■

METALIS GROUP, FRANCE

LEVERAGING NEW OPPORTUNITIES WITH BIHLER

The Metalis Group can look back on 75 successful years in the field of punching/bending technology. For many years now, the Group has relied on the technology and expertise offered by Otto Bihler Maschinenfabrik, whose machines are used not only for traditional metalworking, but also in new lines of business such as deep drawing and plastic molding.

The certificate documents the 50-year partnership between Metalis and Bihler.



The Metalis Group uses a total of 72 Bihler machines to manufacture its punching/bending components and other sheet metal parts.

In April, Metalis Holding celebrated its 75th anniversary. The Group has specialized in precision punching, precision forming, deep drawing and plastic over-molding of complex sheet-metal components. Its product portfolio includes leaf springs, precision-stamped components, finished components and assemblies from a single tool, precision deep-drawn components, and components for the electrical connection and radio frequency industries. Production runs can be as large as 220 million units per year or take the form of medium-sized and small runs with less than 10,000 units per year and the products can range from anti-vibration leaf springs for automotive disc brakes to complex connectors for electronic devices. Metalis products are used not only in the automotive and construction industries, but also in the fields of energy, medical equipment and communication equipment.

Close partnership over more than 50 years

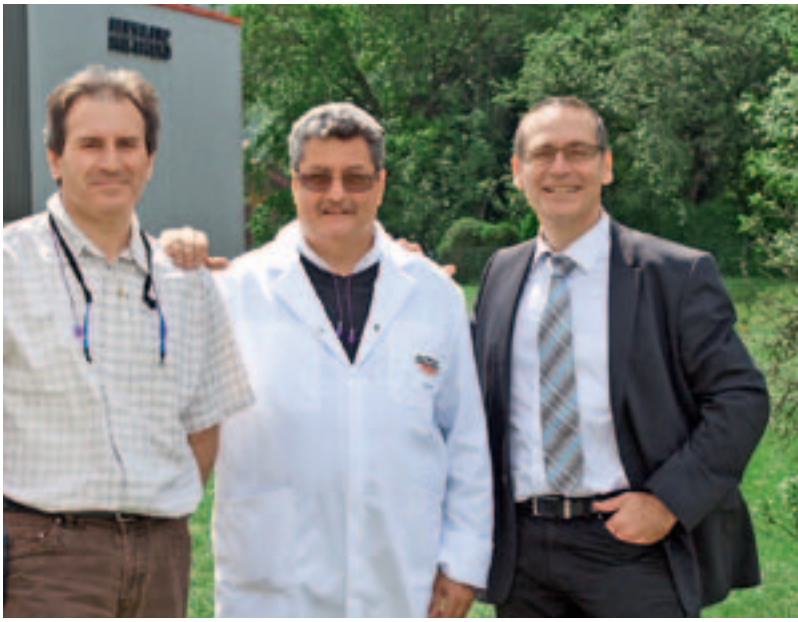
The Metalis Group, a subsidiary of AALBERTS Industries Group, is globally active and currently employs 800 people at 8 locations in 5 countries. The company can boast decades of success not only in the metalworking industry, but also in recently developed lines of business such as deep drawing or plastic injection. Pierre Petitjean, CEO of Metalis Group explains: "Our success is based not only on our global footprint and on our enthusiasm for technology, but also on our continuous wish to innovate. And to make dreams become realities, we need strong, reliable, trustworthy partners like Otto Bihler Maschinenfabrik. In 2012, we are celebrating not only our own 75th anniversary but also the 50th anniversary of our partnership with Bihler. Our meeting with Mr. Otto Bihler in the early 1960s has been a cornerstone of our corporate success and the close collaboration with Bihler will continue to be crucial in the years ahead."

Custom processing options

It was in 1962 that Bihler supplied the first RM25 for manufacturing spring steel strips for toys. Today, the Metalis Group has a total of 72 Bihler machines in operation, including models such as the RM 40, GRM 50, GRM 80 and GRM 100, along with the MC 42 and MC 82. "For us, the Bihler machines have always provided a tried and tested, high-performance basis that allows us a great deal of flexibility in tooling and can be combined with special applications such as laser processing. At the same time, they permit us to change tools rapidly. These factors ensure the efficiency that is necessary during production," says Mario Camozzi, Technical Manager at the Pont de Roide plant. "Another benefit is that the Bihler machines can be optimally adjusted to suit the extremely hard spring steel strips with varying material parameters that are processed here. The possibility of machining the metal in the direction of rolling also ensures minimum material consumption and final products of a particularly high quality."

Heading for global expansion

Pierre Petitjean: "We are looking forward to the future eagerly and are on a sound footing with respect to innovation, ongoing development and expansion. We are also able to offer the support services that are becoming increasingly important for our customers." For this reason, the company is increasingly manufacturing its products locally, close to its customers; for instance in Poland, Slovakia, India, China or Turkey, where another Metalis plant is due to be opened next year. And here also, the Metalis Group will again follow the traditional recipe for success and deploy the tried and tested Bihler technology in the new location. ■



Pierre Petitjean, CEO Metalis, Franck Ribet, Plant Manager at Pont de Roide and Mario Camozzi, Technical Manager at the Pont de Roide plant (from right to left).

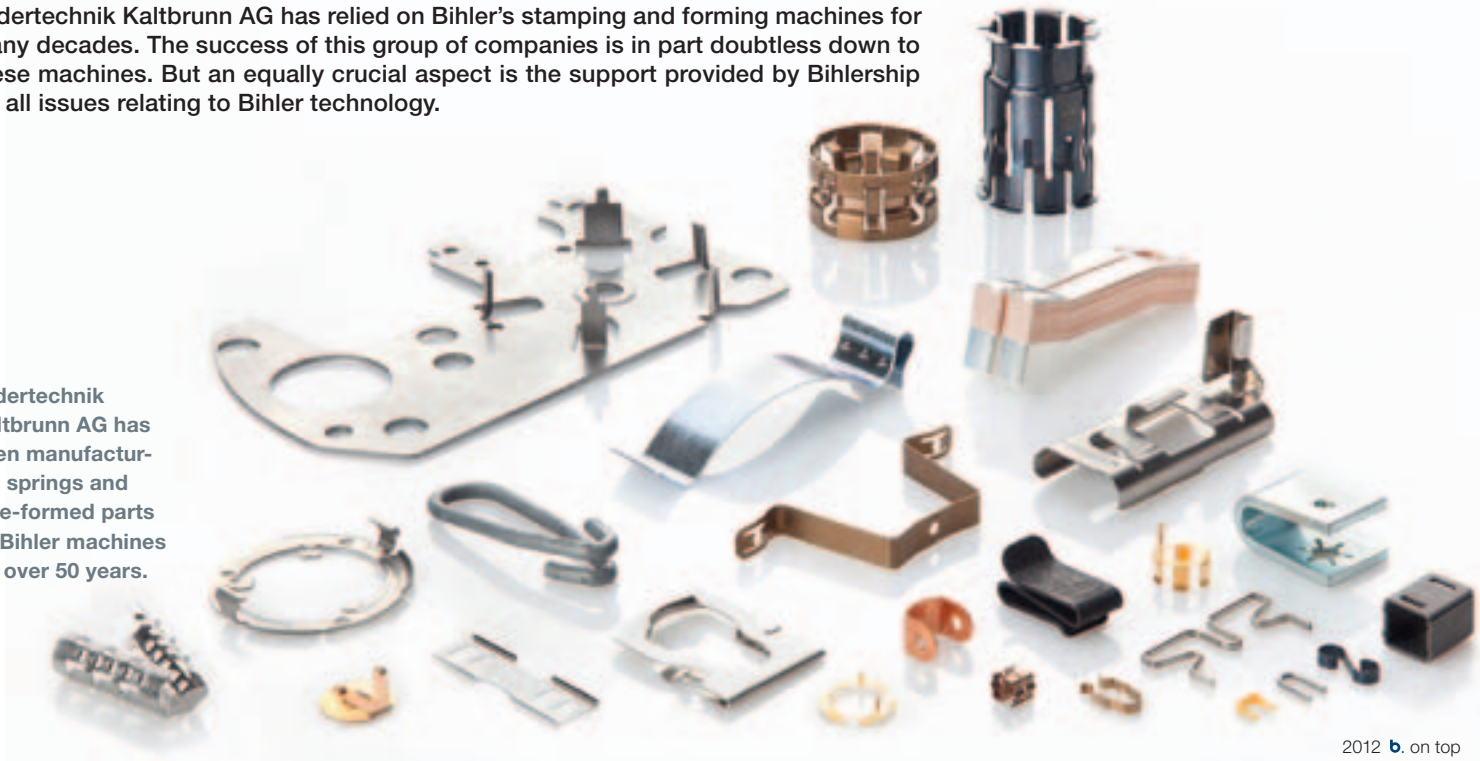
www.metalis.fr

METALIS GROUP

FEDERTECHNIK KALTBRUNN AG

A WINNING COMBINATION: BIHLER AND BIHLERSHIP

Federtechnik Kaltbrunn AG has relied on Bihler's stamping and forming machines for many decades. The success of this group of companies is in part doubtless down to these machines. But an equally crucial aspect is the support provided by Bihlership – in all issues relating to Bihler technology.



Federtechnik Kaltbrunn AG has been manufacturing springs and wire-formed parts on Bihler machines for over 50 years.

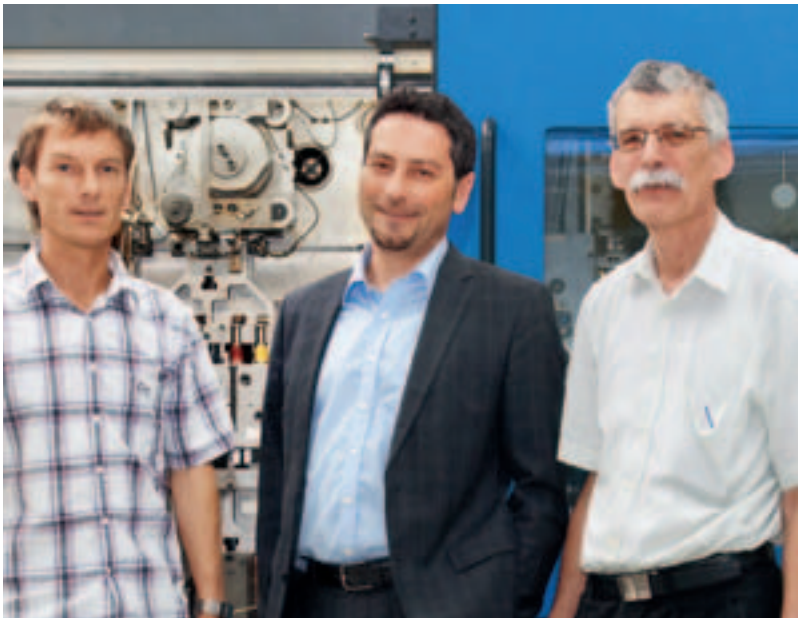
Compression, tension, torsion and leaf springs, wire-formed parts, punched and punched/bended parts as well as laser-processed parts, fine-blanked parts and assemblies – all these are included in the product portfolio of Federtechnik Kaltbrunn AG. The group of companies that employs 280 staff at four production locations in Switzerland and boasts over 80 years' manufacturing experience now supplies some 2,000 customers in 35 countries. Its products are used in automotive, ropeway and aircraft construction, as well as in the fields of medical technology and electrical engineering and in the machine, construction and plastics industries. "We don't just offer a product, but an entire package – from initial design all the way to fully controlled series production," explains Claudio de Filippis, Sales Manager at Federtechnik Kaltbrunn AG. "Customers are increasingly demanding solutions for ever more complex parts that can be implemented more and more rapidly – and such demands can only be satisfied from a single source by a company that boasts well trained staff and state-of-the-art, high-performance machines."

Individual manufacturing benefits

For many years now, Federtechnik Kaltbrunn AG has relied on the machines of Otto Bihler Maschinenfabrik. Its first Bihler machine started operation at the beginning of the 1960s. Today some 15 Bihler machines, including two CC1s, seven GRM 80 Es, two CC 1s, seven GRM 80Es, two RM 25s, one RM 35 and two RM 40Ks, make for optimum manufacturing quality in the production of both small and large runs. "The Bihler machines stand for stability, precision and reliability, even when complex parts have to be manufactured to the highest quality," explains Toni Müller, Design Manager at Federtechnik Kaltbrunn AG. "For us, the particular benefits of our Bihler machines lie in their optimum control, excellent punching capacities, variable rolling direction and component production in the required material width from the outset." To this can be added the close collaboration with the Bihler experts in Halblech. Their wealth of know-how ensures that they can provide practical and rapid assistance on issues relating to projects and machine technology.

Efficiency with bNX

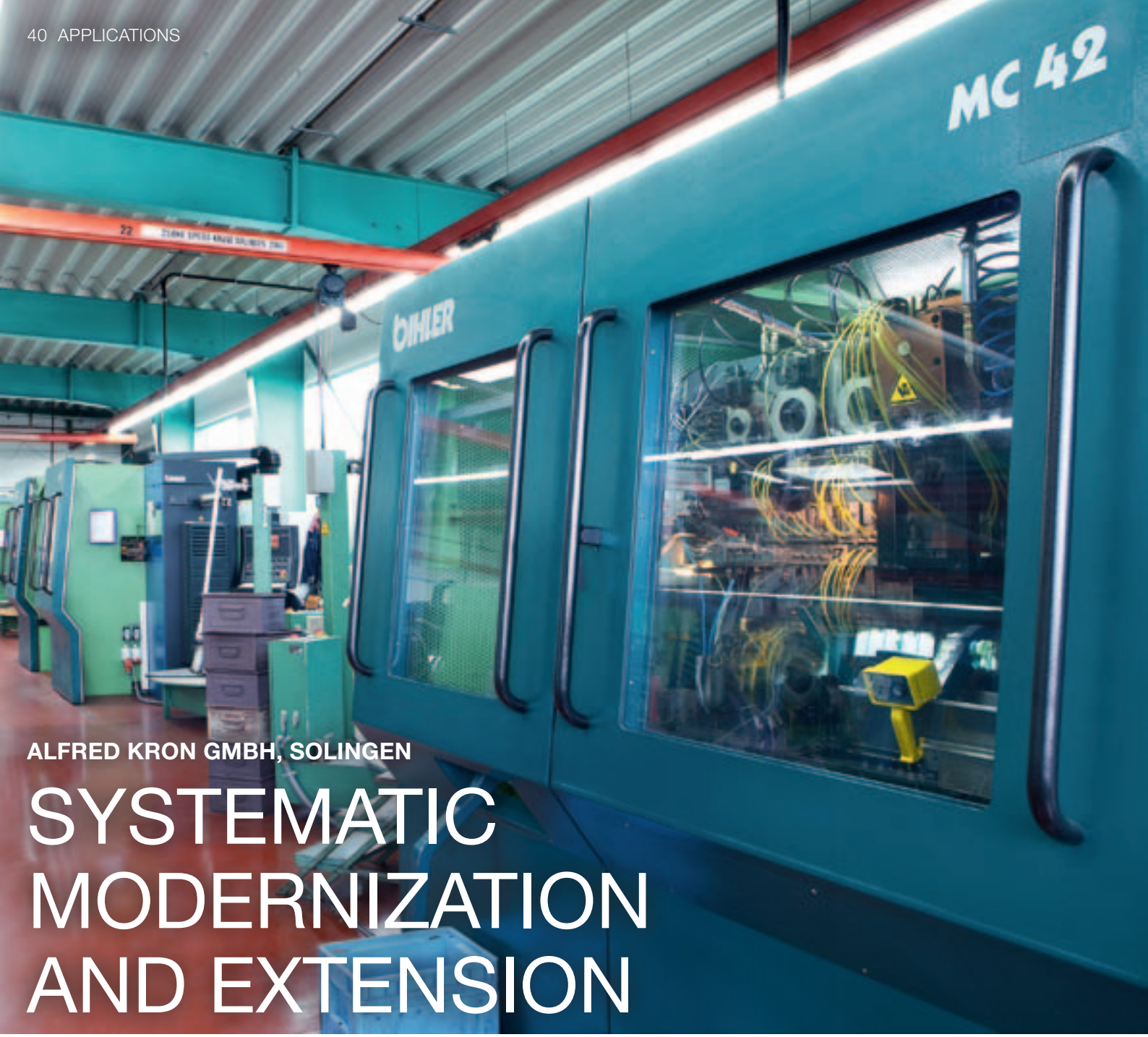
The success of the support provided by Bihler in practice was demonstrated in 2008 when the bNX software was introduced on Federtechnik Kaltbrunn AG's Bihler machines. "The challenge lay in the fact that we had to change our entire design from one day to the next," says Toni Müller. "It made for a lot of work, but we were able to complete the project successfully thanks to the wide range of services and support provided by Bihler." The staff of Federtechnik Kaltbrunn AG now regularly attend Bihler's training courses in Halblech to ensure that they are kept up to speed with the latest developments. Bihler's telephone hotline is also available round the clock to deal with any problems or questions that crop up between training sessions. This assistance, together with the training courses and close personal collaboration, is an element of Bihlership which ensures that customers are provided with comprehensive support in all matters relating to Bihler technology. "Bihler starts where other companies leave off," concludes Claudio de Filippis. "We regard the support provided by Bihler, in conjunction with the company's machines, as the key factor in our success." Federtechnik Kaltbrunn AG will be relying on Bihler in the future too: "In future we will be using the NC-based BIMERIC technology to enable us to manufacture flexibly to the highest quality and at the same time address specific customer requirements in even more targeted fashion than before." ■



Sales Manager Claudio de Filippis (center), Design Manager Toni Müller (left) and Toni Rüegg from Technical Sales.

www.federtechnik.ch

federTECHNIK GROUP



ALFRED KRON GMBH, SOLINGEN

SYSTEMATIC MODERNIZATION AND EXTENSION

50 years ago Bihler's stamping and forming machines opened up completely new fields of business for Solingen-based Alfred Kron GmbH. Many of the company's customers now demand Bihler as the manufacturing standard. Alfred Kron GmbH satisfies this requirement by systematically modernizing and extending its Bihler machine pool.

The punched/bended parts manufactured by Alfred Kron GmbH are mainly used in the automotive industry.

Founded in 1903, Solingen-based Alfred Kron GmbH can look back on over a century of business. It is now managed by the fourth generation of the family in the person of Philipp Kron, and employs around 60 staff. The current product portfolio includes punched/bended parts, as well as metal-plastic and pure molded parts – products destined for use in the automotive, furniture, window, electrical and construction industries. Alfred Kron GmbH started out as a manufacturer of simple wire-formed parts, subsequently going on to include spring production. The company launched its strip processing operations at the end of the 1960s – and this was where Bihler made a significant impact: "Thanks to our close and fruitful collaboration with Otto Bihler Maschinenfabrik at an early stage, we were able to open up new and innovative fields of business and make the successful transition from small-scale workshop to industrial enterprise," says Managing Director Philipp Kron. "Purchasing a number of Bihler machines enabled us to embark on punching and bending technology and enjoy manufacturing success over a number of decades."

Bihler stands for precision, quality and top performance

At the same time Alfred Kron GmbH enhanced its own toolmaking operations, became an early CAD system user and acquired any amount of know-how over the years. As a successful provider of parts, particularly those manufactured in large runs, the company is now the world's sole supplier of many components – for instance to large corporations such as Bosch, which manufactures its spark plugs with parts made by Alfred Kron GmbH. "Whatever the request, we can now almost always offer the right manufacturing solution," says Head of Sales Harald Dannert. "Bihler machines provide unlimited manufacturing options and the required degree of flexibility for complex parts and special solutions in particular – while remaining efficient in terms of raw material and material consumption. Many of the company's customers now demand Bihler – as a byword for precision, quality and top performance – as the manufacturing standard.

Increase in production thanks to individual tool optimization

Today Alfred Kron GmbH has a total of 27 Bihler machines in operation, ranging from the GRM 50, 80 and 100 all the way to the MC 42 and 82. The most recent machine, an RM 40K, was delivered to Solingen in October 2011, having been purchased in conjunction with optimization of a tool – a project that involved close collaboration with Otto Bihler Maschinenfabrik. As a result of this measure, combined with the launch of a new bending tool, carbon brush production cycle speeds were able to be more than doubled.

Alfred Kron GmbH sees future trends in the automotive sector in particular as heading towards increasing product diversity and component complexity. For the company this means enhancing the value added chain, increasing production depth and becoming a supplier of assemblies. "In all this we will continue to place our trust in Bihler technology," says Philipp Kron. "We are constantly modernizing our machine pool, while supplementing it with new systems from project to project – and of course Bihler is the first company we turn to, particularly when complex parts have to be manufactured." Joint projects such as development of the tool exhibited at the latest BihlerTEC fair also form part of the future plans of Alfred Kron GmbH, which will doubtless continue to expand on its century of success. ■

Managing Director Philipp Kron (left) and Head of Sales Harald Dannert are building on their corporate success by constantly modernizing and extending the machine pool.

www.kron-solingen.de

KRON SOLINGEN

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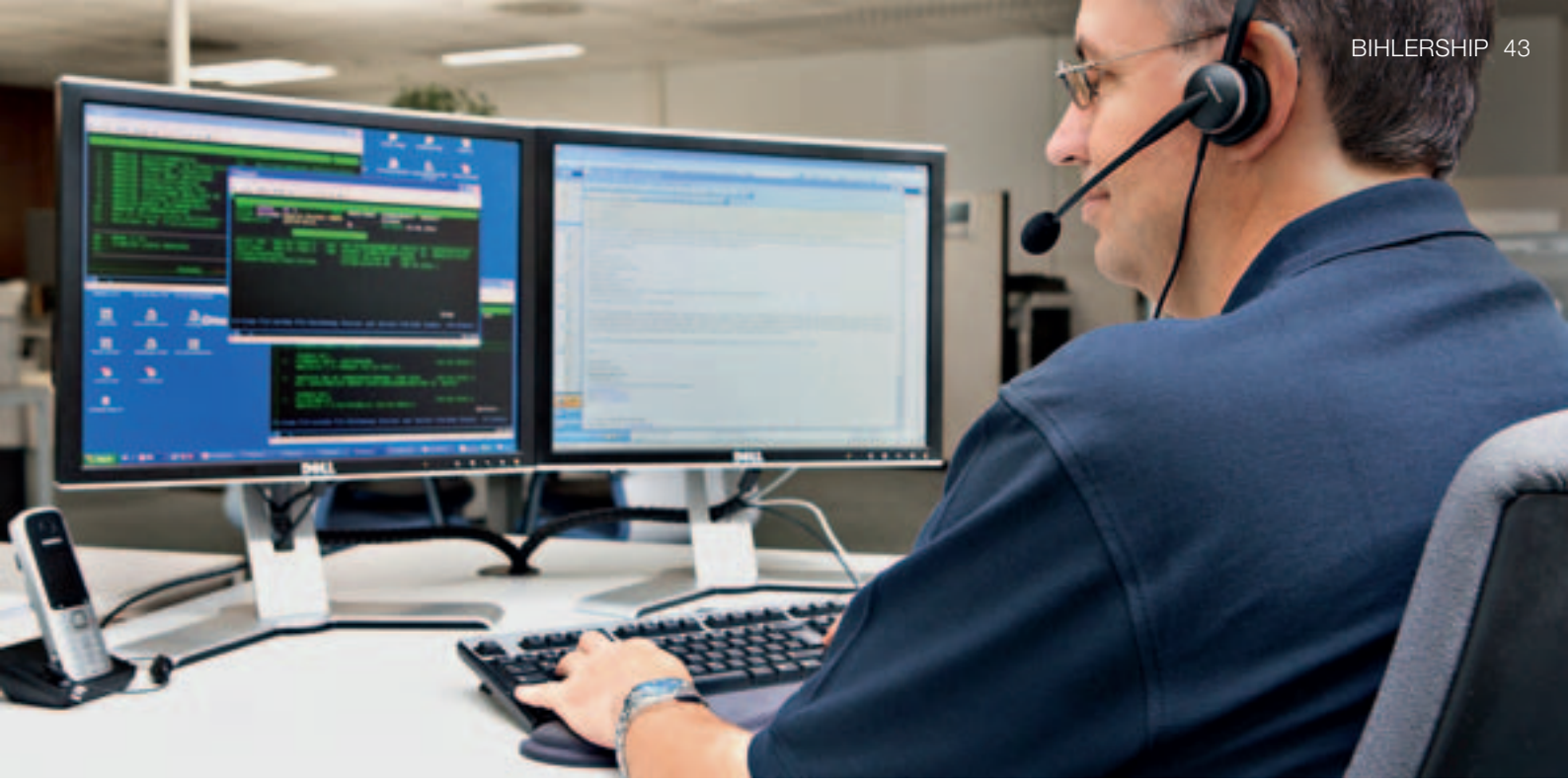
BIHLER HOTLINE WITH EVEN BETTER SERVICE

Bihler has once again extended its service offering and boosted its hotline both in organizational and staffing terms as the first port of call for customers with problems. The aim is to resolve all reported problems even more quickly and comprehensively than before. As of October, new and more extensive software will also help to ensure that all reports are entered, forwarded internally and processed as quickly as possible.

The Bihler experts offer customers advice and practical support under the Bihler hotline number.



The Bihler hotline team (from left to right): Wolfgang Heisl, Stefan Martin, Georg Keiss, Martin Schenk, Roland Franke. Not pictured: Roland Schütz.

The new software and organizational structure will enable Bihler to further extend its outstanding service offering and comprehensive support. As of now, all the processes involved in a reported case will be saved in a single software program and linked with one another. Whether the report concerns loaned equipment, spare parts delivery, telephone support, the deployment of field staff or remote maintenance – all the related activities and documents can be viewed at a glance by any Bihler employee. This ensures that work and activities that have already been completed always remain transparent and are easily traceable. At the same time, integrated escalation management with its automatic reminder function means that no deadlines are missed and all the outstanding help and support services are performed smoothly, quickly and efficiently.

Three-level solution process

The organization comprises three service levels, the first of which involves recording the tasks and entering the required details in the software program. Every case is automatically allocated a ticket number, via which the latest project status is displayed throughout its handling period. The second level involves drawing up an initial analysis of the reported problems or discrepancies on an individual basis. The cause of the reported errors frequently becomes clear at this stage, with second level staff generally able to provide speedy and straightforward assistance in the form of a suitable solution. If the case cannot be resolved at the second level, the third level specialist departments are called in. They provide the specific expertise required to resolve all reported faults in the long term.

Six-strong team of experts

Parallel to these measures, Bihler has also enhanced its service offering in staffing terms. As of September 2012, another experienced Bihler employee is joining the first level Bihler hotline team, ready to call the customer back with all the relevant information to hand. This brings the number of hotline team members to six – twice as many as in 2008.

These processes and changes have seen Bihler embark on a policy to safeguard the future viability of both hotline and downstream processes in organizational terms. The company's objective is to provide the fastest possible assistance to customers coping with an ongoing rise in the number of machines on the market, while retaining the familiar high standard of machine availability.

Just give us a call (+49 (0)8368 / 18-200) – the Bihler hotline is at your disposal! ■

Prof. Dr. Volk (right), Mathias Bihler and Dr. Roland Golle have been cooperating closely over many years with a view to developing new technologies and manufacturing methods in the metalworking industry.

PROF. DR. VOLK AND DR. ROLAND GOLLE, TU MUNICH

LEVERAGING POTENTIAL

Otto Bihler Maschinenfabrik recently placed its BIFLEX NC laser cutting and forming system at the disposal of the Technical University of Munich. Prof. Dr. Wolfram Volk and Dr. Roland Golle from the Institute of Metal Forming and Casting (utg) at the TU Munich talked to Mathias Bihler, Managing Director of Otto Bihler Maschinenfabrik about their joint collaboration, current research projects and the importance of the results obtained for industry and academia alike.

b. on top: Prof. Dr. Volk, research into manufacturing processes in sheet metal processing is a major topic at the Institute for Metal Forming and Casting. What role do the links with industry play?

Prof. Dr. Wolfram Volk: Contact with industry is crucially important to our application-oriented Institute. We need associates from industry as sparring partners and driving forces who work with us to analyze the respective process chains and point to development needs, which we can then address in the course of research projects. If we did not have this contact with industry, we would run a high risk of producing results which have no real foundation in practice. Our aspiration is to develop solutions that can be used in industrial process chains. At the same time, the utg is naturally also engaged in basic research – but always with a view to subsequent applicability in practice. The industrial projects also bring a fresh impetus to our basic research.

Otto Bihler Maschinenfabrik recently placed the BIFLEX NC laser cutting and forming system at the Institute's disposal. One of the aspects to be examined is how forming speed influences the behavior of bending components.

b. on top: The TU Munich has long enjoyed close collaboration with Otto Bihler Maschinenfabrik. How did this come about?

Mathias Bihler: Relations that result from the meeting of people who share the same interests, objectives and visions always prove particularly fruitful. And this was certainly the case with Prof. Dr. Hartmut Hoffmann, the former Head of the Institute. Our basic approach was that our competitive status, both nationally and globally, could only be maintained and enhanced by appropriate education and research. This marked the start of the cooperation between the TU Munich and our company – a collaboration that will continue to play an important role in the future, especially as regards the development of new technologies and manufacturing methods. We are combining our potential, and it is industry that profits from the know-how generated in the process. This know-how is also brought to bear in teaching, after some delay, enabling students to benefit from the quality of training that is crucial to our present and future alike.

Dr. Roland Golle: We are not only focusing on research methods, but also on the actual planning and engineering process. Projects can go into an incredible amount of detail as regards materials and system technology. And Bihler, as one of the world's leading manufacturers of systems in the field of punching/bending technology, is simply the perfect partner for us. It gives our efforts a practical relevance, and at the same time enables us to ask questions related to basic research where required. We have certainly come to appreciate Otto Bihler Maschinenfabrik as a constructive partner with whom it is a pleasure to work.

b. on top: This collaboration is reflected most particularly in the BIFLEX NC laser cutting and forming system, which Bihler and Trumpf have now placed at the Institute's disposal. What are the research objectives behind this move?

Prof. Dr. Wolfram Volk: The system is an important element of our Optibend research project, which investigates the impact of forming speed on the spring-back and effective length of bending components. The results of the research project enable existing analytical calculation approaches to be developed further. The intention is to integrate these into an operator-friendly calculation program for practical application, involving the saving of a materials database. This will allow us to forecast the expected component geometry quickly and precisely on the basis of the material and process parameters. Not only will the optimization cycles of bending tools be reduced as a result, but so will the resulting costs. This challenge calls for specific application know-how, and the BIFLEX system made available to us by Bihler provides ideal conditions in which to conduct our research.

b. on top: What are the implications of the research results for industry?

Mathias Bihler: When developing a production tool for a punched/bended part on one of our machines from a design perspective, it is essential that the blank design is generated precisely with a view to satisfying all shape and positional tolerances including Cpk requirements in the finished punched/bended part so that the part can ultimately be manufactured to a consistent level of quality and dimensional accuracy. Changes that have to be made to the blank or bending tool in order to achieve the required geometric shape in the bending process can be extremely complex and expensive. Such complexity and expense have been significantly reduced thanks to the results of the Optibend project. The result is a tool for us and our customers which enables tool corrections to be kept to a minimum or even eliminated altogether. The data acquired is incorporated directly into our bNX software, where our customers can naturally access it immediately. Thus the results constitute valuable potential which can be leveraged by our customers to provide precise and dimensionally accurate punched

and bended parts in a fast and simple process. They also serve to render tool setup more reproducible – an ever more important aspect in view of the ongoing increase in automation levels. Secure and stable manufacturing methods are the basic prerequisite for the satisfaction of these requirements – and also help to reduce manufacturing costs, increase speeds and enhance product quality.

b. on top: What does the BIFLEX system provided by Bihler offer in terms of manufacturing quality, reproducibility, process precision and economic efficiency?

Prof. Dr. Wolfram Volk: Unlike cam-controlled systems, the servo technology of Bihler's BIFLEX system gives us the potential to examine the relevant process parameters extremely accurately. We can thus analyze quite selectively the tool processes and dimensions that play a key role in factors such as reproducibility and precision. And of course there is also the ingenious modular concept of the Bihler system itself, which provides us with a wide variety of functionalities that could not be implemented using a follow-on composite tool for reasons of price alone. Individual stages which in themselves are relatively inexpensive can be integrated and combined in the system in flexible fashion, allowing the system to be configured and extended easily and almost at will in terms of the number and complexity of the tools. Bihler's BIFLEX system enables us to address a large number of different issues in a highly selective and detailed manner without having to get involved in series production.

Dr. Roland Golle: We can isolate individual factors influencing even complex manufacturing processes and analyze them individually. This was always an extremely difficult proposition in the case of conventional machines, as any change made to an individual parameter often automatically altered other process parameters too. But the servo technology of the BIFLEX system has done away with such problems. Not only does it allow us to resolve previously undifferentiated issues, but we can now also tackle new aspects relating to manufacturing quality, reproducibility, process precision and economic efficiency in specific fashion.

b. on top: What trends have you observed in mechanical engineering and in forming technology in particular? What direction is development taking?

Prof. Dr. Wolfram Volk: Issues related to process control and quality assurance have increasingly come to the fore in recent times. Flexible machines such as Bihler's BIFLEX are required if we are to provide adequate solutions in these fields. They allow us to obtain metrological results from the process itself and provide us with precise analysis options via measurement windows. Material development is also playing an increasingly important role in this area: here the aim is to find innovative processing options for newly developed materials. Our main objective is to develop process solutions that result in more rapid success in terms of development and manufacture alike.

Mathias Bihler: Although we live in very short-lived times, long-term trends can be detected in the forming industry in particular. The topic of raw materials, for instance, and the relevant issues relating to shortages and price movements will continue to play an important role in the future. The call is for solutions that offer maximum material and resource efficiency. Other challenges result from the use of new materials and manufacturing methods in the manufacture of tool components – which will entail entire processing sequences having to be reviewed.
Innovative staff and highly complex equipment are called for if these challenges are to be addressed successfully. And this is where servo technology has crucial advantages to offer, for instance with its "gentle forming" option – particularly in cases where semi-finished products are becoming thinner and harder all the time, as they are in the automotive industry. I believe that servo technology will bring about significant changes in the field of punching and bending technology. Our task, both now and in the future, is to further leverage the potential of this technology. ■

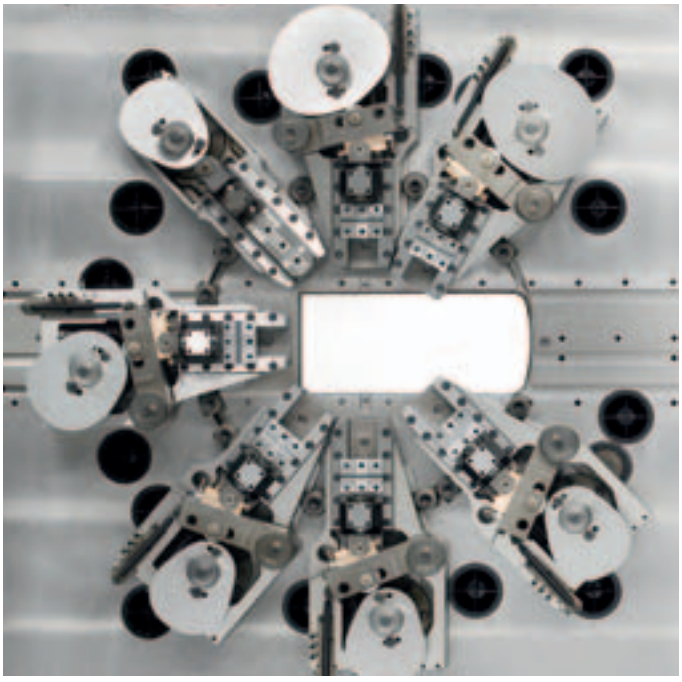
SPECIALIST TERMS EXPLAINED

THE BIHLER GLOSSARY

As a world-leading system supplier of forming, welding and assembly technology, OttoBihler Maschinenfabrik provides its customers with a full range of innovative, high-performance solutions. The Bihler Glossary explains the most important parts and procedures involved in Bihler's machine technology.

RADIAL AND LINEAR

Radial and linear are words frequently used at Bihler. The word "radial" was even incorporated in the names of entire machine series when they were first developed – examples being the "radial machines" of the RM series and the "great radial machines" of the GRM series, which have long also boasted "linear" capability. In the Bihler jargon, "radial" und "linear" generally refer to two different tool concepts that are used depending on the application in question.

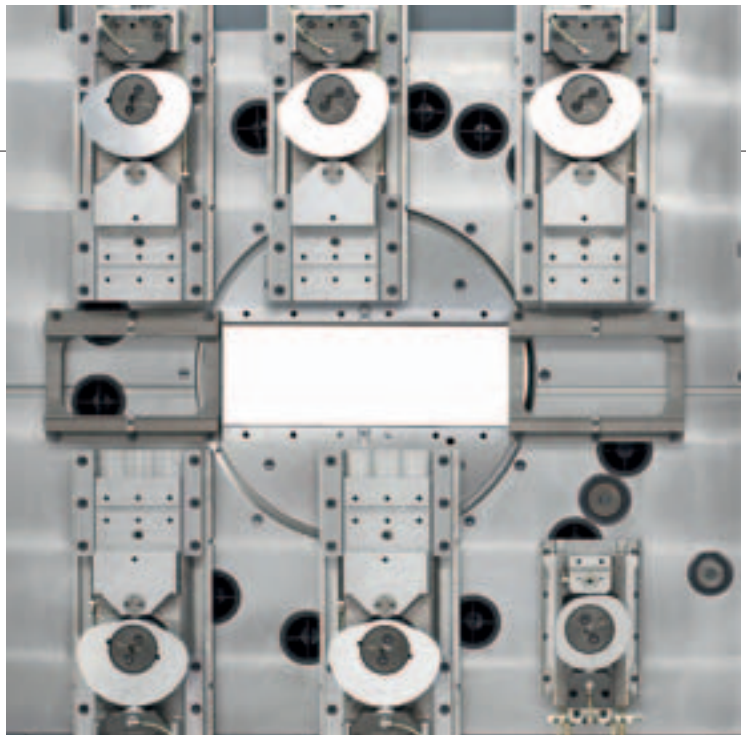


The radial tool solution is used for bushes and rings in particular.

RADIAL TOOL SOLUTION

In a radial tool solution the slide units and attached bending tools are mounted radially, i.e. in circular fashion around the processing center. Regardless of whether the part has been pre-punched in the press or not, it is separated from the punch strip and bent into its ultimate shape in a number of operations in the machine center.

This radial tool solution is used for simple parts, in applications involving few bending operations, and for parts with a suitable geometric shape, such as bushes and rings. The design of the bending tool determines the geometry of the workpiece, its dimensions, the material thickness and required manufacturing quality.



The advantages of the linear tool solution lie in being able to integrate a number of forming stations as well as additional operating steps with ease.

LINEAR TOOL SOLUTION

In a linear tool solution the slide units are positioned on the perforated workplate in linear fashion, i.e. vertically above and below the primary machining level (at punch strip throughput height). After pre-punching in the press, parts are formed on the punch strip at successive stations using the bending tools and processed in further operations.

The linear tool solution is used for complex components, in applications requiring numerous bending operations and for components and assemblies that call for additional operating steps such as thread forming, screw insertion, welding, feed mechanisms, assembly, etc. ■

NEW NC-SEMINAR

HANDS-ON TRAINING MAKES FOR MORE EFFICIENT WORK

Bihler's training offering includes three-day courses on the BIMERIC NC production and assembly system.

Bihler has been offering intensive training on its BIMERIC NC production and assembly system since mid-2012. The future-oriented machine is equipped to offer maximum hands-on experience with all NC process modules, as well as state-of-the-art control technology. Participants can familiarize themselves with all the main aspects of Bihler's NC technology in the three-day course.

Comprehensive course content

The wide-ranging course content covers everything from the detailed basics regarding set-up, functionality and maintenance of the individual NC assemblies, via extensive insights into the versatile application options of Bihler's VariControl controller, all the way to practical exercises featuring application scenarios such as the programming of synchronous and asynchronous movements, creation of individual tool programs, and integration of tool-specific data such as images, videos and documents in the bAssist online help system. ■

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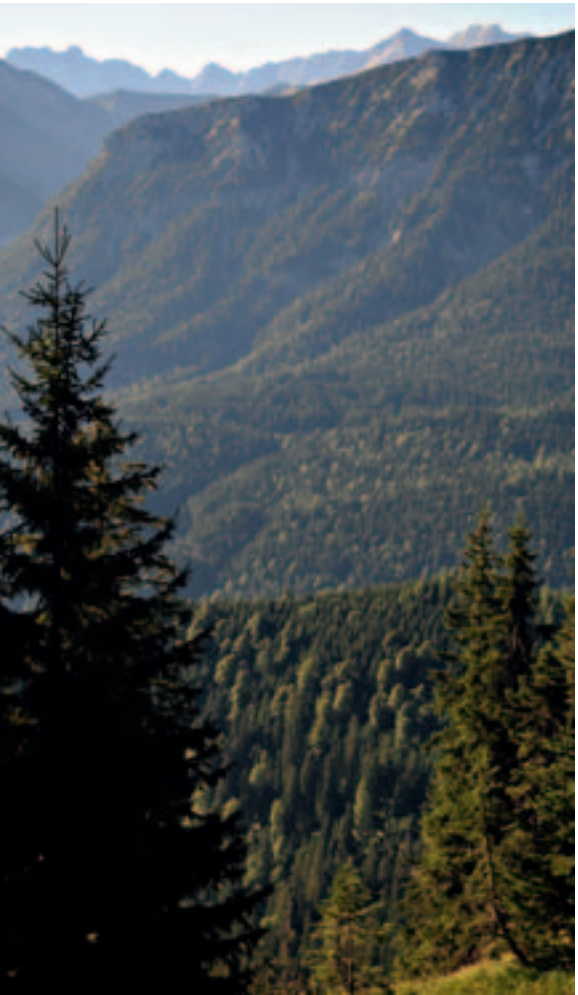
THE B. ON TOP HIKING TIP

HIKE UP THE KLAMMSPITZE

"Why not try the hike up the Klammspitze from Linderhof, it's a really rewarding tour!" This tip was passed on to me by none other than Bihler boss Mathias Bihler during a visit to the company headquarters in Halblech. Linderhof Palace – which is easy to reach via Ettal or the Plansee – may well be a highlight for fans of King Ludwig II of Bavaria, but it is also the ideal starting point for a number of impressive mountain hikes through an unspoiled romantic landscape.

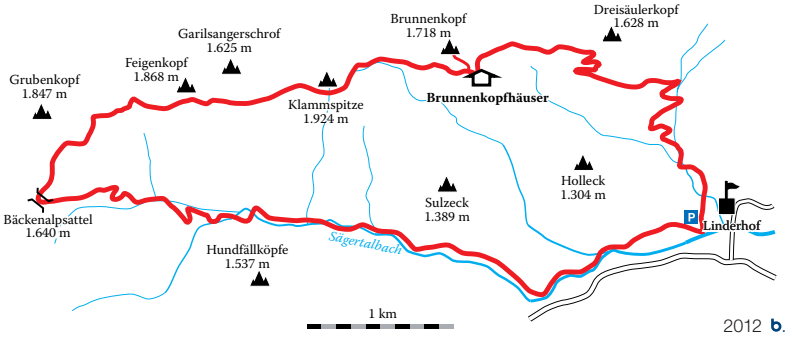
The sound of the Bavarian anthem floats quietly up to me as I stand on top of the Klammspitze (1924 meters above sea level). The Saulgrub Folk Costume Association and Musical Society have assembled on the Brunnenkopf some 200 meters below to celebrate a mountain mass, whose liturgical section is brought to a conclusion with the well-known hymn. The text is perfect for this Sunday in August, with the sun blazing from a deep blue sky over the green valley. The spectacular view stretches from the Ammergau Alps all the way to the highest Alpine peaks. To the north is the Zugspitze, while the Allgaeu Alps can be seen to the west behind the Geiselstein and Forggensee, and there's a good view of Ettal Monastery in the east. The Ammersee and Starnberger See are clearly visible in the north, and it is even possible to make out Munich in the distance. This peak certainly offers an unparalleled panorama. Admittedly, the climb up here is not that straightforward, and should only be attempted by the sure-footed. But the hike, which takes around six hours and features an ascent of over 1,000 meters, is by no means impossible either. Those who prefer an easier life can take one of the shorter routes, for instance to the top of the Brunnenkopf (1,718 meters above sea level).

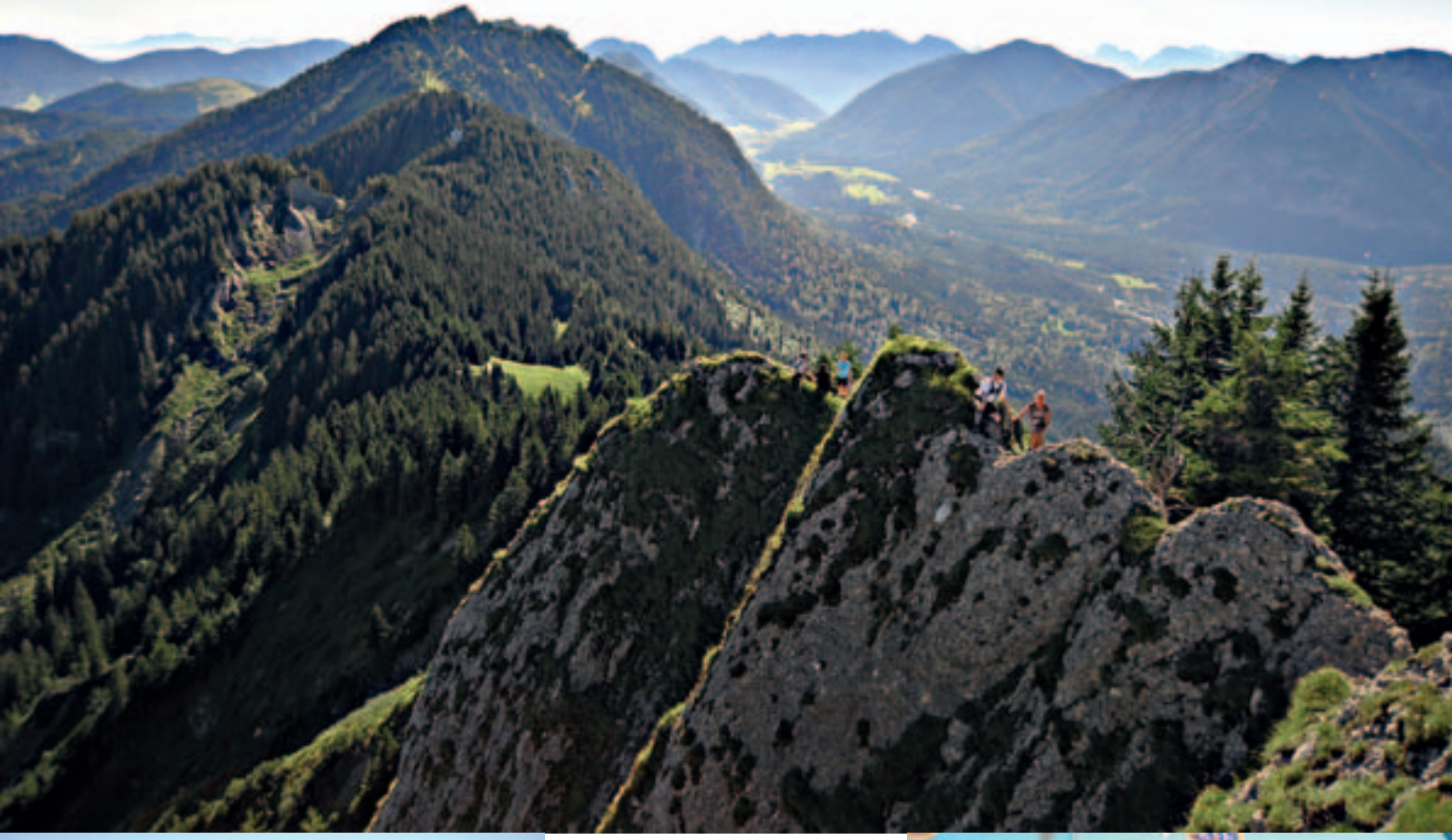


An early morning hike up the Brunnenkopf

It is 7.00 a.m. and the first walkers are gathering at the car park close to Linderhof Palace (which charges a €2 parking fee). Most are locals who are hiking up the Brunnenkopf to celebrate a mountain mass. Many of the men are clad in the traditional shorts known as Lederhose. I accompany them on the brisk one-and-a-half-hour ascent through the beautiful mixed forest. The air is still fresh and clear. Birds are singing, and the rushing of a nearby mountain stream is clearly audible. Soon we reach the Brunnenkopf houses and stop for refreshment at a mountain hut. There are plenty of options for hikers seeking to recharge their batteries: I choose a "sportsman's breakfast" of muesli with orange juice. From here it is not far to the top of the Brunnenkopf itself, and even from our present resting place we have a fantastic view of the Ammergau Alps and Alpine foothills. The last few meters of our ascent are secured with a steel cable, but nevertheless present no problems. Now I want to conquer the Klammspitze too! Although the path now offers hardly any shade, I am compensated for this with an unobstructed view of the surrounding Ammergau Alps. The climb becomes more challenging, and I have to use my hands in places over the final few meters. But the reward comes in the form of an incredible view from the summit. From the Klammspitze you can return to Linderhof via the Feigenkopf und Bäckenalmsattel – or go on towards the Kenzenhütte and Halblech. ■

Walking time: 6 hours
Ascent: 1,150 m
Difficulty: moderate





The route up to the Brunnenkopf and Klammspitze offers spectacular views of the Ammergau Alps (above) and Ostallgaeu region (below). The Brunnenkopfhütte provides a range of refreshments for hikers.

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