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2015/01/EN

>>> Measuring at High Speed



>>> Manufacturing Skills Gap Dilemma Confronted



>>> Low CO₂ Emission due to Cutting-edge Test Bench Technology



>>> LaserControl at Playmobil



Blum-Novotest News

If nothing else, electronic media and means of communication accelerate our everyday working life more and more. In one phase, we might be dealing with the pains of growth and/or success, while, in the next instant, we see many activities reduced or even discontinued in order to overcome the already raging crisis and to prepare for the next upturn.

However, what is the best approach to coping with this accelerated working life and its short-term requirement fluctuations as well as its varied challenges? The answer is simple: It is to lean back in relaxation, at least mentally, on a regular basis and to perform a detailed assessment as to whether one consistently pursues the guidelines of one's own (working) life. However, it also takes a critical reflection as to which new aspects one might want to add or which obsolete ideas one should dispense with. And when sorting your thoughts, do not simply go along with what everyone else thinks, but first critically examine their importance. Find out what makes you unique for others and which added value your new ideas or activities might present, e.g., for your customers as a decisive argument when they place their orders. Be a pioneer whenever it fits your profile and take your business to the next level in time before others leave you behind.

At Blum-Novotest, for instance, our NOVOTEST testing business division entered the double clutch transmission testing technologies in the automotive segment in good time. We are pioneers in transmission testing for the latest generation of electric/hybrid vehicles. We provide you, our customers, with comprehensive application support, maintenance and service offers around the globe. Be it in measuring components for machine tools, measuring devices for production or in the field of test rigs including R&D, as well as endurance test rigs for drive shafts.

In our division of measuring components for machine tools, we brought a significant improvement to the market with our laser equipment for tool setting and breakage detection. For many years, we have been performing successful groundwork with touch probes for applications in large-scale serial production. Years ago, when



Alexander Blum, President



>>> Be a pioneer whenever it fits your profile and take your business to the next level in time before others leave you behind. <<<

Alexander Blum
President



Marcin Rzeminski (2nd f. r.), head of the Poland sales office, at the TOOLEX awards ceremony



Roland Gasser (7th f. l. at the top), Sales Manager Switzerland, at the PRODEX awards ceremony

workpiece probes were no longer only used as edge finders, but were employed increasingly as touch probes, we embarked on the multidirectional touch probe market and thus on universal application for the entire clientele. And due to our unique measuring mechanisms and the usual comprehensive application support for our customers expected of BLUM, this step has been widely recognized.

Starting with our intelligently combined "LaserControl NT-H 3D" measuring solution for multi-process measuring instruments, with a laser beam for optical and a touch probe for contact measurement, we have broken new ground in production metrology for machine tools paving the way for trends towards automated, closed processes. Our technology realises this by identifying the variables between your manufacturing target and the influence of physical parameters on the process, such as thermal growth, and compensating the same.

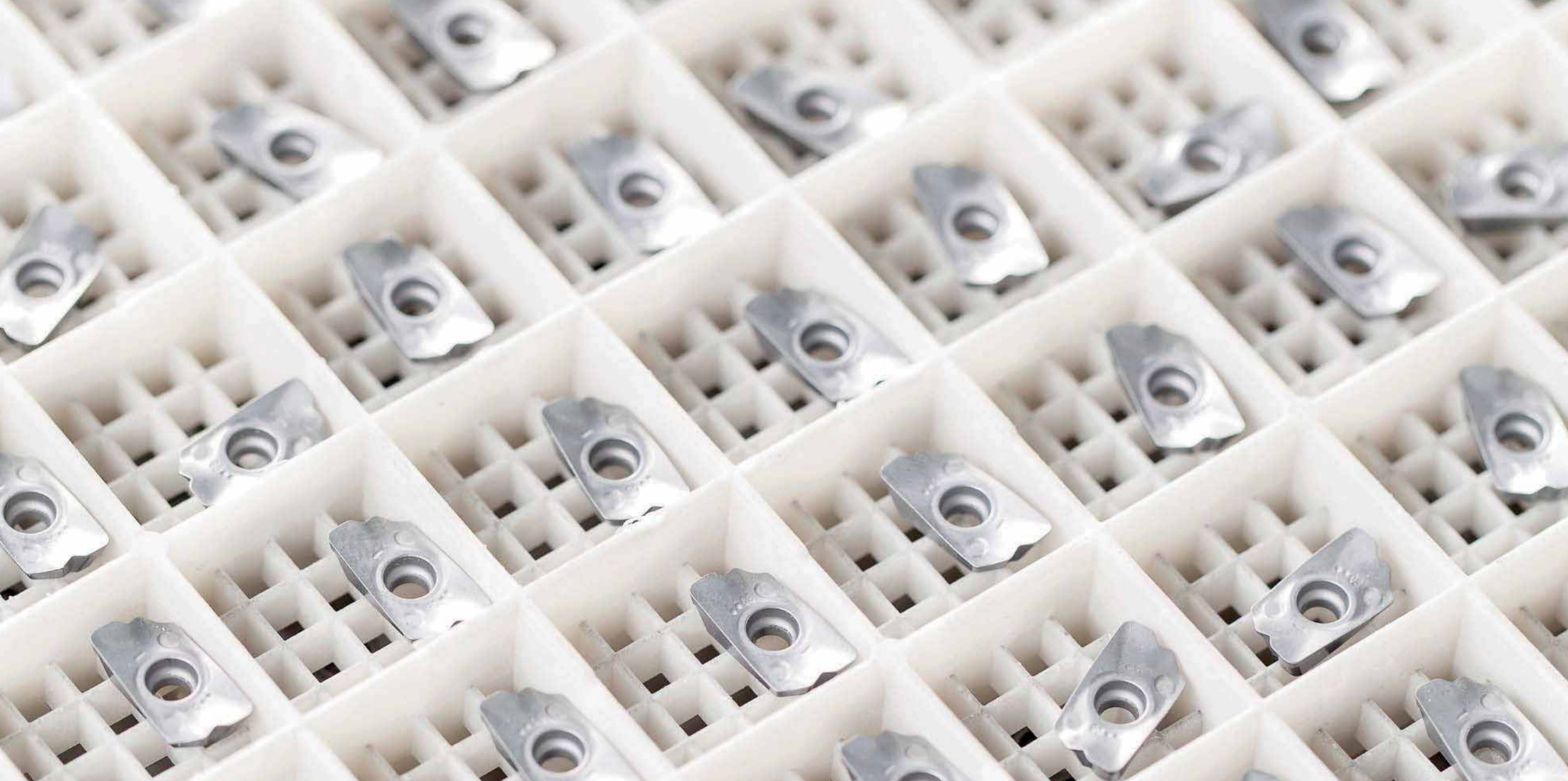
The latest developments in this direction comprise our DIGILOG analog measuring instruments opening up new dimensions or, on the cutting

edge, our multiple innovation award-winning RG technology for wireless roughness testing within the processing machine. These technologies allow you, for instance, to perform the necessary corrections on the workpiece when clamped.

Browse through these Blum-Novotest News and get to know customers who consistently follow their guidelines and who take the right decisions for their company and personal success due to regular reflection.

Finally, on the reverse, you will find a report about Blum-Novotest supporting young people in taking the right personal decisions in future.

Alexander Blum
President



Measuring at High Speed

High-precision, high-speed measurement of tool inserts

Practically everyone has used a product from carbide specialists CERATIZIT at least once in their lives – 90 per cent of all the balls in ballpoint pens come from this company. For the measurement of carbide cutting inserts, CERATIZIT Austria recently began using an automated measuring cell from Blum-Novotest. This system is special in that the measurements are precise down to the last few micrometres – and this even though each measurement takes less than four seconds.

CERATIZIT Austria's facility is located in the picturesque mountains of Reutte in Tyrol, near the town of Füssen and the border to Germany. But there's little of that Alpine cosiness felt in the facility's production halls – here it's all about maximum precision. The company supplies semi-finished carbide blanks and finished products, with the portfolio being broken down into 'preforms', carbide rods and tool inserts. Preforms are made-to-order carbide parts that are preformed and partly ground, and are then processed by the customer. Carbide rods, for example, are semi-finished products that become drilling or milling tools. Lastly, tool inserts are finished products that are used in milling, lathing, punching or drilling tools.

The portfolio of tool inserts covers around 2,700 standard inserts, which can be ordered via a catalogue. In addition to this there are many more special geometric forms that are made-to-order on the basis of customer specifications. In addition to the inserts, the associated tools are also offered. The portfolio includes numerous types of carbide that provide the ideal combination of properties for any purpose.

Until recently, an old automated measurement system was used to measure the many plates, but it was already being put to the limits of its capacity back in 2011. A new measuring cell was sought out that not only could achieve very short throughput times but was also as compact as possible. At Control, the international trade fair

for quality assurance, Daniel Scheiber, CERATIZIT's Quality Officer for the Presses Production Line, discovered the flexible Blum-Novotest's BMK measuring and automation concept for the first time. Scheiber had until then never seen such a compact measuring cell that combined automation and measurement from any other manufacturer.

With the BMK 3, Blum-Novotest GmbH has developed a flexible measuring and automation concept in the form of a variable, modular, expandable measuring cell that can also perform additional functions such as sorting, labelling and packaging of parts when fitted with appropriate modules. The BMK 3 can be deployed in fields ranging from small-series production, for example as a flexible standalone measuring and testing cell, to fully-integrated process systems for high-capacity serial production. The compact measuring cell can support multiple measuring devices tailored to the purpose at hand and can be combined with a wide range of options. For example, palletisers or even labellers can be integrated. The robot is fitted to the roof of the interior chamber, which enables it to not only reach the entire surface of the cell but also provides it with access to the entire floor surface of the cell interior for the measuring instruments.

"While we already had the BMK 3 successfully in use with a number of customers, CERATIZIT presented two new challenges: the required throughput rate and the high measurement precision, as well as the geometry to

be measured," said Peter Mösle, Head of Sales of the business division Measuring and Testing Technology at Blum-Novotest, remembering the first talks. "There aren't any flat surfaces on these tool inserts, the cutting edges are curved. This makes them very difficult to measure using conventional methods – especially not to the precision required in the specifications," added Scheiber. "We very quickly came to the conclusion that we would have to use a high-resolution optical measuring system," continued Mösle. "We had only used camera systems until then to detect positions or geometry, not to measure micrometre-level tolerance values. The required unit throughput time of 3.5 seconds also required us to use a very fast delta robot, which would normally have been used in pick & place machinery in packaging, instead of a conventional robot arm."

A concept using two robots was first pursued – a delta robot for handling the inserts and another portal conveyor system for handling the boxes, in which the tool inserts were to be placed. The robot would remove the plates from a transport pallet and place them in the machine on a high-speed rotary bench. This rotary bench would turn the insert under the camera where it would be measured. Finally, the robot would place the insert into a 10-insert box. To ensure a stable process, Blum-Novotest developed a monitoring system that ensured that the boxes would lock into place correctly during stacking.

"It became apparent as early as the design stage that robots would be too expensive and that getting two systems to work together would be too complicated," said Mösle as he remembered the development process. "A changing gripper system was the breakthrough. We now use two different rapid prototyping vacuum grippers to transport the tool inserts and the boxes using the delta robot."

The Blum-Novotest measuring cell offers quantifiable advantages – the BMK measures 40 per cent more tool inserts per hour on half the space compared to the old system, and all this at a speed that could not be achieved before. "We were fast before, but now we're measuring what we want – all of the insert's features," explained Daniel Scheiber. "And we can operate the system practically without personnel – the operator just locks in from time to time to fill up empty packaging boxes. Our operators have taken quite a liking to the BLUM system," added Schmid.

"We have a very open and honest relationship with Blum-Novotest, that was clear in the development and optimisation phase," concluded Lothar Schmid. "Our needs were understood right away and met superbly. We've achieved the necessary throughput rate, whilst still achieving maximum measurement precision and a very reliable process. This has provided us with large capacity reserves – and shown us that the vision of integrating measurement into the production process is certainly realistic."



Peter Mösle, Head of Sales of the business division Measuring and Testing Technology at Blum-Novotest and Lothar Schmid, Head of Presses Production Line at CERATIZIT



Manufacturing Skills Gap Dilemma Confronted

Blum-Novotest and Joe Gibbs Racing Internship Program

Long before the checkered flags, the geysers of champagne and the million-dollar endorsement deals, NASCAR race winners take shape in the shop. In a sport where victory is often measured in fractions of a second – .001 separated the winner and runner-up at 2011's Talladega – it's no surprise that manufacturing accuracy plays an increasingly make-or-break role.

But there's a problem looming. In a global manufacturing marketplace where low wages often trump experience, the U.S. must adapt to – and invest in – automation to remain competitive. But without trained personnel to understand the application of these new technologies, American manufacturers are still competing on an uneven playing field. The nation may continue to watch its manufacturing base erode as the gap grows between an aging workforce of machinists with hands-on experience and the dearth of new, young machinists who have been properly trained how to use the new technologies.

That gap is one of the reasons behind a new workshop internship in Charlotte, N.C. co-sponsored by Blum-Novotest, Inc. and Joe Gibbs Racing (JGR). The initial impetus behind this program for Bob Blunk, BLUM's southeast regional sales manager, is the qualified-machinist gap that he encounters in the field. On sales calls, Blunk sometimes finds that when he talks up the benefits of BLUM products, his intended targets – the machinists and their managers – aren't as up-to-speed on technological developments as they could be with more current training.

"That's where the internship idea really caught traction with me," Blunk says. "I felt we needed a program that would get in at the ground level of training these guys how to utilize this technology before they get out in the work-force. But to attract the right people, we would need an attractive program."

Since 2009, BLUM has maintained a sponsorship with Joe Gibbs Racing, and the team – led by the three-time Super Bowl-winning



Bob Blunk (2nd f.l.), with the Team of JGR

coach Joe Gibbs, 2014 Talladega winner Denny Hamlin, and 2009 Nationwide champion Kyle Busch – provided the ideal internship training ground. The 240,000 square-foot facility employs 400, including 15 machinists in its 12,000-square-foot CNC shop. With its sparkling enamel floors, tall ceilings and bright lighting, it resembles a germ-free science lab, the exact image needed to overcome the stereotypical machine shop image deterring new talent.

So Blunk sat down with JGR's Director of Manufacturing Kelly Collins and Manufacturing Engineer Dan Schnars to outline the program. Then with the internship program established, Blunk searched the surrounding area to find a source of potential candidates. For this, BLUM brought in a liaison, Ed Injaychock, Workplace Learning Coordinator for Central Piedmont Community College (CPCC).

Injaychock saw the benefits to the program immediately. "When you think 'machine shop,' you immediately imagine piles of scrap metal everywhere and parts lying around covered in dust or buried in oil," Injaychock says. "Students need to realize there's a different, new age type of manufacturing out there, and you can do very well with a long-term career on an affordable, two-year-degree that allows you to complete your studies quickly, and put that degree to work immediately."

Injaychock was glad to help and recommended students to the internship committee.

For interns, the benefit of being comfortable at the cutting edge of new technologies extends far beyond the classroom. At JGR, BLUM's state-of-the-art equipment supplements the theoretical education and the manual set-ups they learn in class. Interning machinists get hands-on experience with BLUM's laser tool setters, spindle probes and Z-probe tool setters to measure tools, detect tool breakage, perform in-process part validation, and set work-piece coordinates and fixture offsets.

"Simply put, the internship shows them how it's done in today's technologically advanced manufacturing facilities," Blunk says.

Upon completing the internship, interns take that shop-floor experience into the working world with a competitive head-start. (Spring 2014 intern Elliot Mitchell has been hired part-time at JGR while he finishes his degree.) Knowing how to operate time-saving devices like BLUM's is crucial in a fast-paced machine shop. "Our volumes have increased but our head-count has stayed relatively the same or even lower," Collins says. "The majority of it has to do with the fact that we can go from concept to a finished part much quicker than we could before."

This is largely due to continuous investment and implementation of time-saving technologies."

Learning those time-saving technologies form the core of the interns' experience at JGR. Dan Schnars reiterated this fact by saying, "Beyond the sex appeal of building cars that travel bumper-to-bumper at 200 mph, working on the floor at JGR introduces a mix of high-volume production work, small lot and one-offs that doesn't just build top-of-the-line race cars – it also builds well-rounded machinists."

Mitchell, a 32-year-old native of Austin, Texas, is the second intern through the program, and says he learned that first-hand. "The first few weeks on the floor were a blur. This program was a real crash course in 'this is the real world and how stuff gets made,'" Mitchell says. "The variety of tasks and technologies that were thrown at me have greatly increased my share of practical experience in a true manufacturing environment."

That large dose of exposure on state-of-the-art machinery is what the sponsored internship was designed to encourage. The idea, Blunk reiterates, is to "create well-rounded individuals who, when they're done here, can get a letter of recommendation or help with a job search from us because we stand behind them – 'these guys are ready to run a machine for you.'"

Mitchell is now confident he could walk into any machine shop and handle whatever they throw at him – something he couldn't have done before his five-month internship with the BLUM/JGR program. "The skill sets and confidence I gained through adding this program to my CPCC studies is invaluable," he says.

Since Mitchell's completion of the internship program, he has already accepted a position with a local CNC retrofitter, Newman M2M, based out of Rock Hill, SC. Such success is great news for the BLUM/JGR joint internship program, as well as for both Mitchell and CPCC. It might even be better news for the future of manufacturing in America.

USA





Without a monitoring system to detect worn or broken tools, automated production is hardly possible. The LaserControl system's breakage monitor ensures that broken tool detection runs immediately after every machining step. Depending on the programming, the machining centre can then either exchange the tool for a twin or notify the on-call service staff, who can log in to the machine over the Internet and monitor the workshop through a webcam. At Playmobil, as many as four of the key tools are held in the tool changer, which means that the automated overnight jobs run very reliably.

We mostly use steel with a high chromium content because it shows the least wear during the large volume production large. It does cause considerable tool wear during cutting, however. That is why it is very important to keep an eye on the running times of the individual tools. The BLUM laser measuring systems do this very well.

High-precision measurement in a dirty environment poses a major challenge, and cooling is essential to the production process. To protect the optical system from being soiled, the measuring system

is mechanically sealed off from the coolant by a pneumatically operated shutter piston during machining. The rotating tool is also cleaned with compressed air prior to measuring in order to ensure that the measurement is not impaired by swarf, dirt or cooling lubricants. During measurement, a stream of barrier air provides protection against soiling.

The LaserControl systems have truly been their money's worth at Playmobil. The systems are practically maintenance free; and, after more than 10 years in continuous operation, the seals look like new. Above all, however, the experts have never been let down by the laser systems and have experienced nothing but good things in terms of service, too. "We have had only good experience with BLUM lasers – and we save working time because there is no need for pre-setting", Marco Mendl, team leader CAD/CAM/NC, summarises. "The accuracy of the LaserControl systems is astounding, as well. Based on our experience, its repeatability is within less than two thousandths of a millimetre. And for us, one thing is for certain: Without the BLUM laser systems, this degree of automation would not be possible."

LaserControl at Playmobil – Reliability for Automated Mould Making

As the company approaches its 40th anniversary, some 2.6 billion Playmobil figures currently populate the earth. Many new figures are released every year, placing high demands on the in-house mould shop. To achieve maximum efficiency in unmanned, automated operation, Playmobil's numerous machining centres have been using LaserControl measuring systems of Blum-Novotest already for 15 years.

"For Playmobil figures, hundredths of a millimetre count," says Attila Britting, head of Playmobil's in-house mould shop in Zirndorf near Nuremberg. "The aim in building the injection moulds is to produce finished plastic items that require virtually no rework – which is vital in view of a daily production of approximately 10 million individual parts and over 100 million figures a year. Consequently, the mould separation must also be a high-precision operation, so that there are not any burrs on the individual parts or the finished figure."

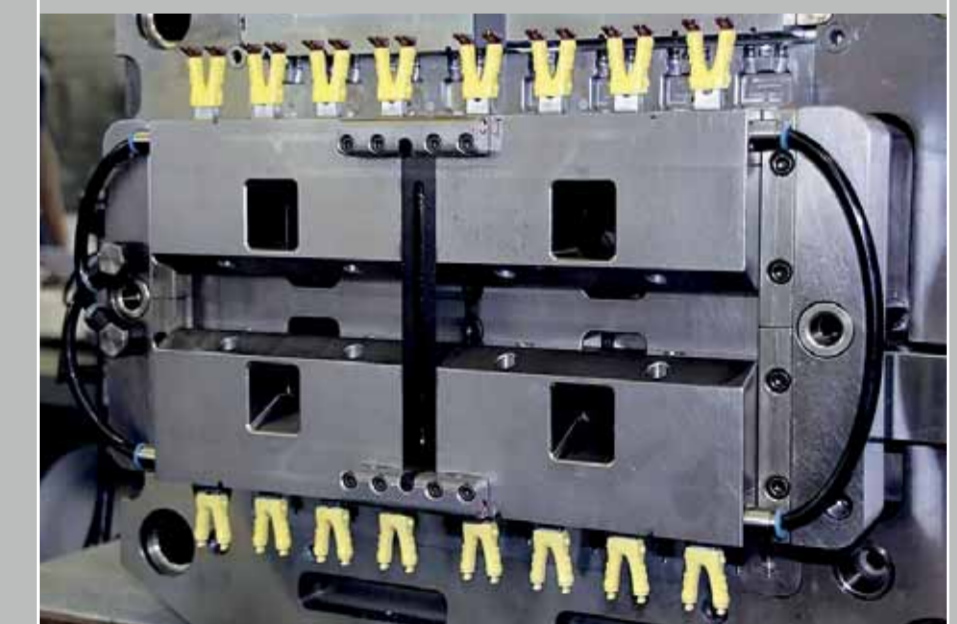
And not least, the moulds are specified for extremely high volumes, production runs of 200,000 to 300,000 pieces from one mould are no rarity. The required productivity can only be achieved by partially automated production alongside the normal two-shift operation. So an array of machines works overnight on prepared jobs. To execute these jobs, several of the machining centres are equipped with pallet changers and tool magazines

with the capacity to hold as many as 120 tools. The machines even keep running unmanned over the weekend. The Blum-Novotest systems are installed in the machining area of the automated DMG five-axis machining centres

After every tool change, the laser automatically measures the length and radius of the tool prior to machining, and after machining checks for breakage and wear. Thus, our skilled workers no longer have to pre-set the tool in the pre-setting device. A new tool is simply shrink-fitted into the holder and measured at machining speed after fitting. This ensures that the tool data in the machine is correct, numerical errors or data reading mistakes can no longer occur. Further features include high-speed automatic compensation for the thermal expansion of the entire machine and for spindle displacement. Incorrect tool data can have costly consequences such as defective tools, rejects, or machine stoppage. A spindle damaged by a crash will cost at least 18,000 Euros to replace.



Attila Britting, head of the in-house moulds shop at Playmobil and Marco Mendl, team leader CAD/CAM/NC



Unique Products due to many In-house Developments

Also in this issue, we introduce a machine tool manufacturer who successfully uses the products of Blum-Novotest GmbH. We were fortunate enough to have the opportunity to interview Mr Yuji Kaneko, Chairman of the Board of the Japanese Enterprise, Sodick Co., Ltd.

The globally active company of Sodick Co., Ltd. is a manufacturer of eroding machines as well as HSC machine tools. As one would expect from a Japanese company, they are committed to the highest quality standards and have top technical expertise at their disposal. Therefore, Sodick does not only develop its machine concept itself, but also many components other enterprises would purchase.

The company name says it all

The name "Sodick" comprises the corporate philosophy of "creativity (sozo), performance (jikko) and endeavour/effort (kuro, kokufuku)". Ever since the company's foundation, it has been the basis of all corporate activities and has been dedicated to customers. Over time, this attitude has been very fruitful contributing to the creation of several innovative products such as EDM machines, HSC machine tools as well as injection moulding machines.



Yuji Kaneko, President and Representative Director of Sodick Co., Ltd.



When developing new tools, Sodick has always considered the customer's wishes and has mastered every challenge it has faced so far. The strength of the company is the fact that it develops and produces components such as NC-control, linear motors and PLCs itself. This high degree of vertical integration results in unique products that are not easy to imitate.

Use of cutting-edge technologies

As well as EDM machines, HSC machines represent another core competency of the company. In this area, several innovative technologies were introduced which we would like to present briefly below:

Linear motor technology: Linear motors and motion controllers they developed and produced themselves facilitated very fast, highly accelerated and precise movements. The linear motors work contact-free and have excellent technical properties.

CFRP at the head piece: In order to realise a weight reduction at the drive, and thus immensely improve the motion performance, CFRP (Carbon Fibre Reinforced Plastic) was used at the head piece. This brought a weight reduction of 41 % over the previous cast design while the precision remained unchanged.

Interview: Successful cooperation

Blum-Novotest: You primarily associate EDM machines with the name Sodick. However, you also have great expertise in the field of HSC machining centres. What are the benefits of your machines?

Mr Kaneko: Our machines run on a linear motor technology which we have been maintaining and developing for many years. This technology is not only characterised by high speed, precision and good response behaviour, but also by good maintenance properties, since it works without contact.

Blum-Novotest: You have been using our products since your first generation of machining centres, haven't you?

Mr. Kaneko: Not only do we use them, we also consider them from the onset in development. It is always our objective to develop high-precision machining centres. However, these kinds of machines require a measuring system allowing extremely small diameter tools of the machine to be monitored and measured without any contact.

Blum-Novotest: More and more of your machines are unmanned. What part do the contact-free measuring systems of BLUM play in this?

Mr. Kaneko: We attach great importance to the realisation of continuous processing through automatic workpiece and tool changers. And particularly during unmanned operation, tools have to be automated and monitored under rotational speed. Currently, there is no better solution for this than your laser measuring systems for contact-free tool measurement and breakage detection.

Blum-Novotest: What do you do better than others?

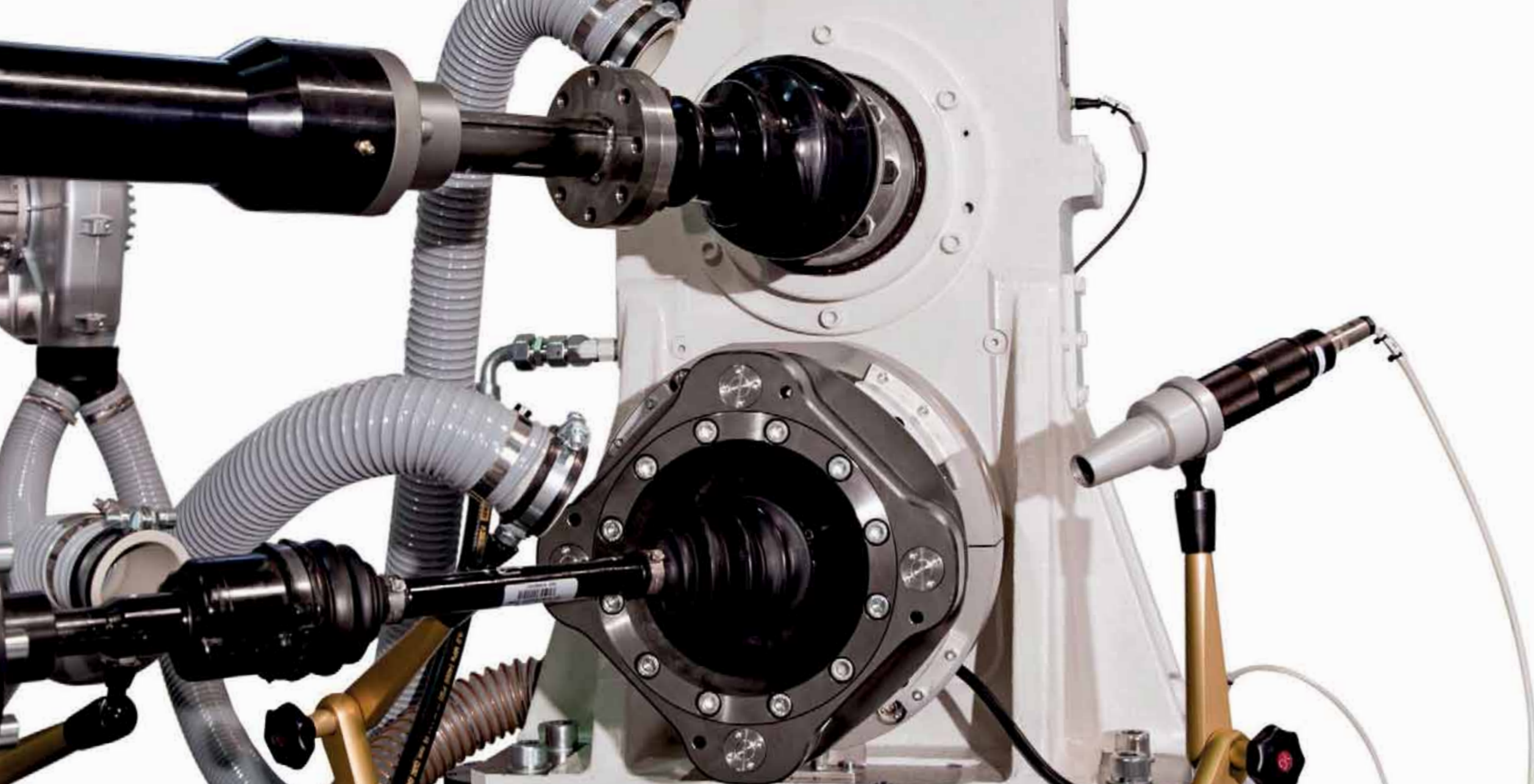
Mr. Kaneko: We have always gone different ways from our competitors. It is not only the machine head concept but we also develop and manufacture many components ourselves, for instance. BLUM has supported us since the very first machine generation and, therefore, understands our philosophy. We are very pleased with this. They developed special laser systems to meet our requirements for smaller and smaller tool diameters.

Blum-Novotest: What is the current highlight of your product range?

Mr. Kaneko: We have introduced a combined processing centre with an entirely new machine concept. It unites the technologies of 3D-printing and chipping in one machine. This is an entirely new machine generation developed with the objective of producing faster, more precisely and more simply. We presented it to the public at the last JIMTOF.

JAPAN





out this vibration at the end. Blum-Novotest does outstanding design work and perfectly masters this problem.

You have just commissioned an NVH test rig of Blum-Novotest. What does NVH stand for and how is the test bench used?

NVH stands for Noise, Vibration and Harshness, and the measurement thereof. NVH test rigs are used in drive shaft development and production. During tests, they measure the forces generated or transmitted by the drive shaft. An NVH test rig also simulates the load ratios in a car.

What is the typical process of a drive shaft test on an NVH test rig and how long does it take?

This depends on the type of test and can take anywhere from ten minutes up to four hours. We usually run combined tests that take three to four hours. Under rotation, torque is built up, a steering angle is generated or a spring travel simulation is performed. No noise is measured on principle, but rather the frequencies generated by the transmitted vibrations are recorded. We measure plunging forces or the forces generated in the joint. These forces are ultimately responsible for noises being generated and transmitted.

There is a basic test during which the excitation and the vibration of the motor is simulated: Using a hydraulic cylinder, a slight oscillating is caused at the drive shaft. Since the measurement is performed under torque, the drive shaft is under very high stress. In the load cells on the other side, the spectrum caused by the drive shaft is recorded via frequency analysis. In another test variant, the transmission side stands still and the drive shaft is turned under load and is angled, which generates forces in the joint. These forces, in turn, generate noise depending on the rotation speed. In this process, it has to be determined which noises are generated by the motor and which by the shaft itself. This is done by means of force measurement, since the frequencies generated there are the same ones that also excite the car body.

So using the test rigs, the drive shafts are optimised in such a way that vibration and the resulting noise generation are reduced to a minimum. Apart from these, are there any other advantages?

Yes, there are definitely some. When testing a drive shaft, you can also determine and optimise its efficiency. Such optimisation lets you save up to two grams of CO₂. Especially with respect to the CO₂ limits specified by the federal government, carmakers immediately prick their ears up when they hear they might be able to save two grams of CO₂ per kilometre with a drive shaft.

You mentioned carmakers. Which ones do you count among your customers?

GKN Driveline has a market share of 43 % in the area of drive shafts and I would not know which of the renowned automotive manufacturers is not supplied by us. However, our customers may be divided into two groups: the manufacturers who purchase all their drive shafts from us and the others who have their own in-house manufacturing and only purchase certain parts.

Do you use any other Blum-Novotest test rigs apart from those for drive shafts?

Apart from drive shafts, GKN also produces other driveline products such as differentials, power trains and eDrive transmissions. There are not any standard test rigs for these products yet. We are trying to change this in cooperation with Blum-Novotest. The hydraulic test rig we are currently developing jointly is one example.

What are your expectations and wishes for the future cooperation with Blum-Novotest?

Since I am in charge of technology, the technical improvement of test rigs is primarily important to me. Of course, the price always matters since we continue to expect good quality at fair prices also in future. However, the main thing we wish for is a reliable, long and successful partnership.

Low CO₂ Emission due to Cutting-edge Test Bench Technology

Every year, millions of cars are produced worldwide. And there is always the same challenge for every vehicle in every country of the earth: The power of the motor is to be transmitted to the wheels with as little loss and fuel consumption and yet as reliably as possible. GKN Driveline has tackled this challenge.

When it comes to test benches, Blum-Novotest GmbH is the partner of GKN Driveline. To date, the company has already supplied more than 20 systems ranging from NVH and quasi-static ones through to 4-square test rigs. Thus, GKN Driveline relies on the entire range of drive shaft test rigs of Blum-Novotest. We spoke to Michael Hagen, responsible for test rigs in the research and development centre at GKN Driveline in Lohmar.

Mr Hagen, your cooperation with Blum-Novotest has apparently been working for quite some time now. How did it actually come about?

The test rig industry is rather small, and people know one another. In our case, it has been already since 1992. In recent years this cooperation was intensified because we had to part with one of our long-standing partners. Apart from Blum-Novotest, 20 other companies were considered as possible successors theoretically able to build test rigs for GKN Driveline. After thorough investigation, we decided in favour of Blum-Novotest and another manufacturer.

Why did you decide to go for Blum-Novotest GmbH?

When selecting a partner for the production of test rigs, there are essentially only three criteria for GKN Driveline: Function, reliable delivery and price. We were looking for a partner with whom we could jointly develop test rigs

and adapt them to the needs of our end customers. Moreover, it was important for the prospective company to have some after sales experience, i.e. in the field of repair, maintenance and calibration of facilities. Building a test rig is not a serial project, but something individual. It takes time to reach an understanding since the wording of the requirements specifications can be interpreted in different ways. It became apparent quickly that the chemistry is right between Blum-Novotest and us, and that we speak the same language. In addition, the company has many highly competent associates who are real experts in their respective fields. Thus they are able to meet GKN Driveline's criteria with flying colours. Blum-Novotest's decades of experience quickly pay off, because, due to their profound experience, they do not make any mistakes in the first place.

You mentioned decades of experience and good chemistry. Where else is Blum-Novotest a step ahead according to your opinion?

Their experience is reflected in the quality of their test rigs, of course, as illustrated by the following example: Wherever vibration analyses and vibration measurements are conducted, a test rig might develop its own natural vibration. The objective is to prevent this vibration from generating, since they would appear in the measuring results and it is very difficult or even impossible to filter



Michael Hagen, in charge of test rigs at GKN Driveline



Bernd Donners, Test Rig Planning Electric, Stefan Reuters, Test Rig Planning Mechanics and Thomas Pannhausen, Sales Manager NOVOTEST Test Engineering

Roughness Measurement Attracts Many Visitors

Blum-Novotest is currently presenting its new TC64-RG roughness-measuring device at nearly all tradeshows worldwide. This product causes quite a sensation among expert visitors because it facilitates the automatic testing of workpiece surfaces in machine tools.

"If we look at a technical drawing in detail, we can see that almost all quantifiable measures can be automatically measured in machine tools," explained Winfried Weiland, Head of Marketing at Blum-Novotest. "An exception to this is the measure of a surface's roughness. Until now, such a test could only be performed on a manually clamped workpiece, or it had to be tested in the course of external inspection outside of the machine. Neither approach is really suitable for automated production, as they interrupt the serial production process and are prone to errors. With the TC64-RG, we close this gap in the process chain. Poor-quality surfaces are now detected when the workpiece is first clamped in place."

Given the harsh conditions prevailing within machine tools, the automated, machine-internal measurement of surface quality was considered to be technically impossible for the longest time. Moreover, customers in the high-production serial manufacturing sector expect extremely short measurement times but also maximum reliability and precision. BLUM decided to tackle this challenge. Based on the DIGILOG technology first presented in 2010, the company's engineers developed the new TC64-RG. Like all of the other TC touch probes, the TC64-RG is fully suitable for use in machine tools, is resistant to coolants, and has IP68 protection. It performs measurements at a remarkable speed too. Standard milled, turned or ground surfaces can be tested with μm precision in just a few seconds and analysed in terms of the roughness parameters Ra, Rz and Rmax. The detected roughness values can either be documented for later use, output as a status value, or displayed via the GUI.

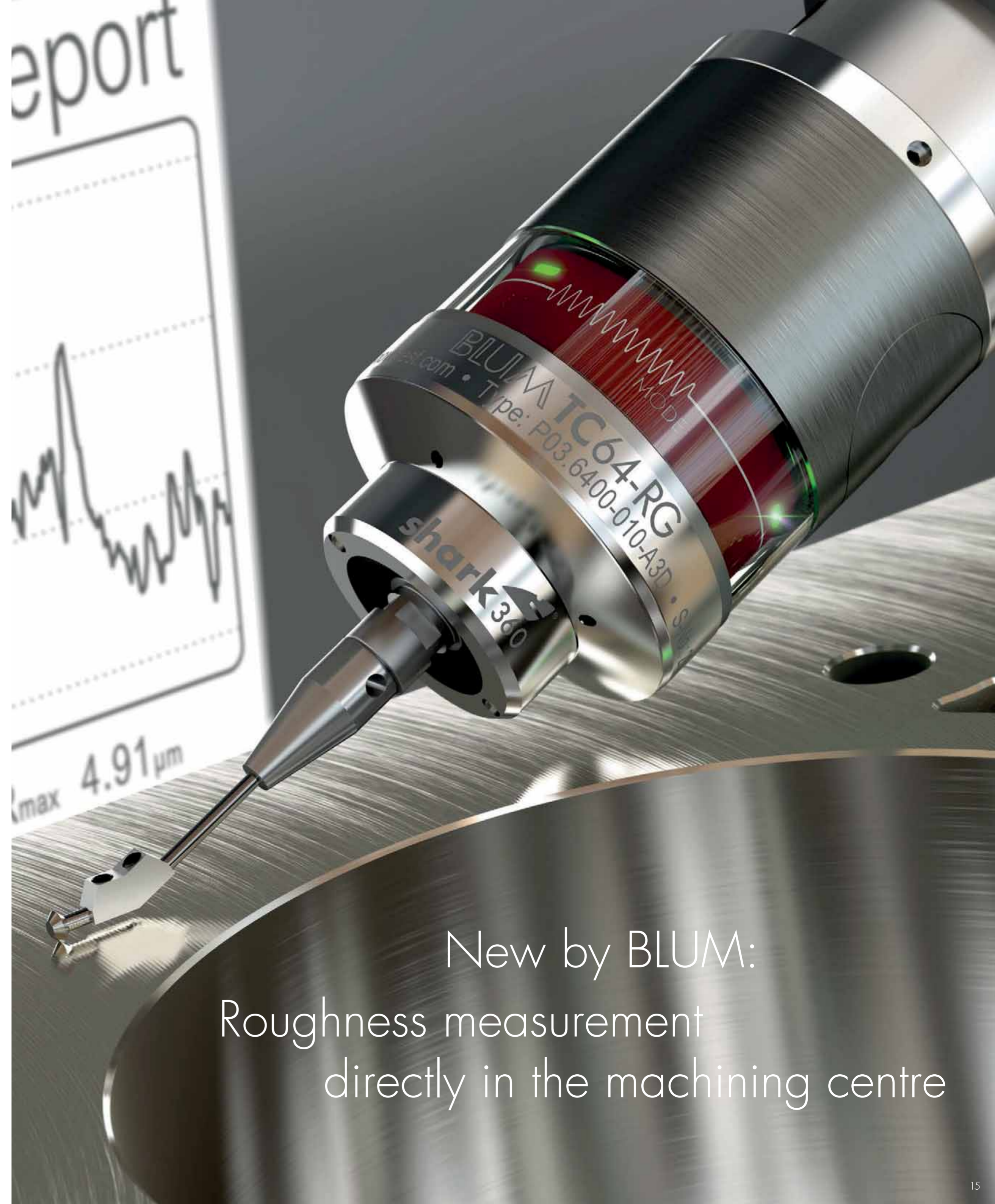
It has already seen some early adoption in the production of motor components such as impellers, connecting rods and cylinder bores. But the focus is not always on having a perfect surface quality. The latter examples named above, for example, are 'functional surfaces' – they have to comply with a precisely defined roughness value. If this value is too low, the surface no longer performs its function of 'storing' lubricant. The TC64-RG is also used in the production of transmission housings and in the machining of aviation components such as turbine blades. As movements are controlled by the NC system's axes, it is also possible to test free-form surfaces, unlike external apparatus.

As with all of the company's measuring instruments, the measurements are generated using a wear-free, optoelectronic measurement sensor inside the device. The TC64-RG also operates using the patented shark360 measuring mechanism. The integrated face gear enables the use of a defined deflection direction while maintaining a constant deflection force. Any torsion that may arise is absorbed by the face gear and therefore does not affect the measurement. For data transmission, the roughness testing device uses the tried-and-tested BRC Radio Technology that is already utilised in many of the company's other measuring systems. The advantage of this is that, if the user is already using a system from the extensive range of BLUM radio products, this generates cost savings and aids integration, as the required receiver unit is already present.

"The use of the TC64-RG in machine tools is not aimed at replacing traditional roughness measuring instruments. It's more about helping customers to achieve the goal of producing 100 % approved parts in as short a time as possible. Especially in chained production lines, it can sometimes take a very long time for the first reject parts to be discovered. In such cases, the use of the machine-integrated surface roughness gauge pays off quickly," Weiland summarised.



AMB 2014 in Stuttgart



New by BLUM:
Roughness measurement
directly in the machining centre

Doubling Productivity

The history of Jaguarmold, a leading company in the production of thermoplast injection moulding tools in Brazil, may be divided into two eras: Before and after the introduction of the LaserControl measuring system of Blum-Novotest.

Running at speeds above 80 km/h, the jaguar is one of the fastest cats of prey on earth and illustrates impressively the rapid rise of Jaguarmold in the Brazilian market for thermoplast injection moulding precision tools. After its foundation in 1998, the company promptly gained the trust of many customers and developed a good image. However, low productivity would have endangered the company in the long run. "Apart from quality, the price must also be competitive and lacking technologies prevented the conclusion of some transactions," relates Haroldo Stabile who has been the Director for tool construction at Jaguarmold for 8 years.

Since these technologies were not available, the determination and correction of mould parameters depended on the trained visual judgement of toolmakers. That was a difficult and involved

task. "The rework ratio was very high and caused corresponding costs," Stabile says. "Raw materials, energy, water, oil, machine wear and tear, labour – all of this was more affected by the lack of technologies than we would have liked to see." But Jaguarmold was born with a genuine "innovation gene" and visiting international trade fairs had shown the long and winding road to the goal: "On every trip to Europe, the United States or Canada, we tried to visit leading companies. We wanted to find out how and with which equipment these companies worked and a mirror was held up to us," the manager remembers. "From one visit to the next, our conviction grew that investments into state-of-the-art technologies were the correct path," Stabile emphasizes.

Six years ago, when the procurement of a new machining centre was required, Jaguarmold contacted DMG. Finally, a machine



Haroldo Stabile, Director for tool construction at Jaguarmold and Lilian Barraud, Head of the Blum-Novotest Sistemas de Medição Ltda subsidiary in Brazil



equipped with a laser system from BLUM was ordered from the German company. LaserControl is used for the automatic and precise measurement and monitoring of machining tools under process conditions. That was exactly the solution Jaguarmold needed to take off again like a cat of prey: "It was a revolution," the Director for tool construction affirms.

Doubling productivity in less than five months has surpassed the expectations of the results achieved by LaserControl of BLUM by far so that the management decided to purchase another machine with the same configuration. Stabile is not sparing with praise concerning the performance of the equipment: "We have doubled production and saved costs tremendously," he sums it up.

Previously, Jaguarmold produced only approx. 23 moulds per year. Twelve toolmakers worked on these moulds. Thanks to the BLUM system, the company can now manufacture 50 to 55 moulds per year – due to the considerable reduction of manual manipulation and the thus possible transfer of associates to other areas. "The laser system performs all of the tool correction automatically and compensates e.g. wear," the Director emphasises. This advantage is the more valuable the more complex the overall moulds are. Stabile mentions the cap of a cleaning agent bottle as an example which comprises dozens of surfaces and 128 indentations. Tool setting with the BLUM system safeguards process stability during processing of these indentations.

The production of complex moulds, as those of Jaguarmold, requires such a high degree of precision that a minute error can make a workpiece unusable. The thickness of the products requires a tolerance of e.g. maximum two hundredths (0.02 mm). To safeguard the reliability of the injection moulded parts, everything has to be perfectly controlled, and this for 24 hours a day and seven days a week. In addition, the BLUM technology has "drastically" reduced the time required for the alignment of the mould. "Previously, we had to open the machine,

measure and check the reference values and all of this supported by the experience of the operators of the machining centres. Consequently, the tool was taken in such conditions to the injection moulding machine and the expected result was not achieved. We lost a lot of time through rework and manual alignment. That was pure manual work. Now, the process has been automated to such an extent with the equipment of BLUM that the operator does not have to intervene any more. This has considerably increased the productivity of the process."

There were further positive effects: For example, in the production of a mould for packaging fasteners, the overall working hours up to final acceptance was decreased by 35 % on average. According to Stabile, even the useful life of the tools has increased by 10 %. "Tool exchange was also based on the experience of skilled workers. Today, LaserControl facilitates the measurement and compensation of wear so that the useful life of tools is optimised and they are only exchanged if this is really required," the manager explains.

The good experience with LaserControl has paved the way for further innovations developed by BLUM. The next item on the purchasing list is the FormControl software together with the TC50 measuring sensor. This technology facilitates that dimensions and surfaces of the processed workpiece can be measured right in the machine and compared to the data stored in the CAD 3D model using just a few mouse clicks. In this way, deviations of the workpiece are recognised already in its mounted position so that corrective action securing the final quality of the mould can be immediately taken. "Based on its competence, Jaguarmold is supposed to become a standard in mould construction matters in Brazil. Everything contributing to the improvement of checks and increasing the reliability of our products takes us a step closer to this goal. For this reason, the FormControl software and the TC50 measuring sensor form integral parts of our investment plan for 2015," Stabile states.

BRAZIL





core components, training of skilled workers and the integration of IT technology.

"The companies in the economically swiftly rising threshold countries like Russia, China and the South-East Asian countries prefer Korean machine tools which are competitive in terms of quality. This can signify a good chance for us," Mr Son says. Nevertheless, he points out that the domestic development of superprecision machine tools on the level of the industrialised countries will constitute their future task.

Mr Son supplements in this connection: "It is high time to concentrate actively on the domestic development of core components like precision instruments and CNC controls and to promote them." He has insistently appealed to the government for political support so that the technological competitiveness of machine tools, which are considered to be the "roots" of the Korean key industries like the automotive, shipbuilding and electronic industry, can be improved. Furthermore, he states that it is a reality that Korea suffers from a lack of skilled workers who have the workmanship at their disposal to manufacture highly precise machine tools.

Mr Son explains that the machine tool technology is presently undergoing rapid changes from individual part processing to multifunctional or complex processing.

He points out: "It would be an extremely ideal solution concept to merge the strengths of the country, i.e. the competitiveness of the electrical and electronic as well as the IT industry, with machine tools. If this became a reality, Korea would be on the right path of soon developing the best machine tools in the world."

Innovative value of BLUM's solutions

Namsun is very interested in the products of Blum-Novotest, since these perfectly suit their machining centres due to their high technological competence. The systems are an innovative tool to secure the precision of every workpiece produced. The instrumentation of BLUM causes a massive reduction of setup times of tools and workpieces, minimises the error rate almost to zero, contributes to the reduction of manufacturing costs and increases productivity. The BLUM concept perfectly harmonises with the Namsun strategy of producing highly precise machine tools in future.

Mr Son evaluates this as follows: "The technology of innovative products and the reliability are a stepping stone to becoming a global machine tool manufacturer for our company which focuses on technology. I would like to make known the technical competence and the brand value of Korea in the world market through the domestic production of highly precise machine tools," he states his desire and hopes for a win-win strategy with BLUM.

Concerning the Competitiveness of Machine Tools

The machine tool is the so-called "mother of all machines" and an important integral part of the Korean capital goods industry. Blum-Novotest spoke to Mr Jong-Hyun Son, Chairman of the Association of Korean Machine Tool Manufacturers and Chairman of NAMSUN MACHINERY CORPORATION concerning his endeavours for an improvement of the competitiveness of the local machine tool industry.

NAMSUN MACHINERY CORPORATION was founded in 1955 and is one of the leading machine tool companies in Korea. The manufacturer claims to have coined the history of the Korean machine tool industry and proudly refers to its technological know-how.

The company is divided into several business fields. The product groups include: 5-axes machining centres, universal milling machines, vertical machining centres, large horizontal lathes (to process component for wind power as well as nuclear power stations) and others. The products are sold both domestically and worldwide.

Completely in line with the vision of the deceased founder, Mr Jung-Man Son, "the company is continued despite the demise of an individual person". In this way, growth is passed on from one generation to the next.

A man of the second generation, Mr Jong-Hyun Son, manages the family enterprise and is the Chairman of NAMSUN MACHINERY CORPORATION. The Deputy Chairman, Mr Yu-Gu Son, and eldest son of the Chairman, Mr Son, is presently preparing himself for his succession in the company.

The technical and economical experience gathered by the company founder as well as the leadership qualities

are now assumed by the subsequent chairmen of the second and third generation in an exemplary fashion. This creates an economic basis for growth and the long continuation of the company.

"I have endeavoured to increase the business performance as well as to maintain the company culture and this despite of innumerable difficulties, failed attempts and misapprehensions which have occurred since the foundation of the company. I hope that the vision of our company, which has been developed and cultivated for a long time, can be continued by subsequent chairmen without any interruption," Mr Son, the Chairman, states in view of a successful continuation of the company enterprise.

More growth in the industry

The machine tool constitutes the basis for the manufacturing trade. Last year, Korea achieved fifth place in global ranking in the area of machine tools with production earnings of 5.3 bn US dollars. Despite sluggish investments of the Korean industry and the decline in global demand, the same place as the previous year could be held.

Mr Son states three strategic points for the development of the machine tool industry, i.e. domestic production of



Jong-Hyun Son, Chairman of Namsun Machinery Corporation and Chairman of the Association of Korean Machine Tool Manufacturers.



Focus on Service

Apart from excellent product quality, good service constitutes one of the most important factors for customer satisfaction – Blum-Novotest is, if nothing else, so successful also because of this fact. We asked Ralf Eckenstein, Service Manager at Blum-Novotest GmbH, to give us some information on his area of responsibility.

Mr Eckenstein, you have been responsible for the area of Service at Blum-Novotest GmbH since 01 Jan. 2009. Please tell us something about your personal and occupational background.

I started my career with an apprenticeship to become a precision mechanic specialising in milling engineering. Subsequently, I gained practical experience on 3+2-axes milling machines for two years. After my graduation as a machine construction technician specialising in production and automation engineering, I joined BLUM as a service technician in August 2004. After one year in Germany, I went for almost four years to the United States and worked there also as a service technician for the company. This experience helped me particularly in relation to Fanuc controls which are frequently used on Asian machines in the USA. Due to my experience, which I had gained both in the US and Germany, I was appointed Service Manager in 2009.

Could you let us have an overview on the development of the area during recent years and its tasks?

When I started my work as a service technician here at the headquarters of Blum-Novotest, today's departments of "Service" and "NC Software Development" were still one department in Germany of a limited size. Today, we have considerably increased our number of service technicians both in Germany and throughout the world. With 14 subsidiaries and more than 25 sales and service sites as well as system integrators worldwide, we have now created a very close-knit, global service network.

The numerous service tasks comprise, first of all, the classic commissioning of our products at final customers. The second large area of tasks concerns the support of OEMs, which are distributed worldwide, in the integration of our products into their



Ralf Eckenstein, Head of Service at Blum-Novotest in Grünkraut, Germany



Gerd Fuchs, service technician at Blum-Novotest, explains the BLUM FormControl measuring software at a workshop.

machines. Furthermore, we conduct trainings and workshops in which we show participants our products and their varied applications. And last but not least, our service technicians are available on the telephone worldwide to provide fast assistance to our customers in case of any problems.

Blum-Novotest thus offers a varied spectrum of services. Please explain the areas of commissioning and training mentioned by you in more detail. What is the respectively typical procedure?

- In regular commissioning, the device is installed and tested by our service technicians and the software is transferred to the control. In so-called initial installation, training is mostly recommended and normally takes place after commissioning. The customer is informed about the numerous possibilities of our products and correct handling of the same is trained. In case of a process adaptation, the entire process is analysed and optimised at the machine in addition to installation and training in order to develop the optimum solution in respect of accuracy, safety and economic efficiency. This ensures that the customer has a safe and fast process with a high degree of component quality at its disposal right from the first part.
- The focus of user training is on small groups of associates of the customer in which the correct handling of our products is explained.

The operation of our systems is mainly trained in the customer's process, ideally on site at the machine. The reason for this is simple: Every machine has its peculiarities and it is often most productive to learn using the systems on the machine one operates daily.

- A workshop typically consists of several theoretical and hands-on sections with 15-20 participants from the most varied areas. The theoretically assumed knowledge is intensified and applied directly at the machine. These free-of-charge workshops are conducted, on the one hand, at the demonstration centres of large machine manufacturers. On the other hand and starting this year, they also take place at our new, ultra-modern customer centre at the headquarters in Grünkraut. At present, four machines with Siemens, Heidenhain and Fanuc control are available at the centre.

You say that you support your customers with process optimisation. Could you give us some examples as to how customers have already benefited from your know-how?

Different factors are of importance to customers depending on their process. In series production, it is mostly essential to keep the cycle times per part as low as possible. When a customer specified a maximum process time of 60 sec. and I was able to reduce the process to 28 sec. with our fast instrumentation, one was, of course, greatly surprised.

Understandably so, because after all, a reduction of the cycle time by more than 50 % spells hard cash in series production.

The aerospace area is not primarily concerned with a reduction of cycle times but rather the production of exclusively good parts, since often highly complicated components involving expensive materials are at stake. A good example in this respect is a customer who produces main rotor supports for helicopters. The costs per support amount to about € 90,000. Therefore, the key requirement was 100 % good parts.

Do you offer your service for every machine and control worldwide?

Our numerous specialists operate worldwide and work hand in hand with our service technicians at the company centre. At regular international technology days, training and the exchange of experience takes place and also the integration and application of our products in different machines and controls is trained among other activities. This enables us to offer both customer vicinity and, at the same time, competent service around the globe.

There are hardly any restrictions for machines and controls. Machines merely have to provide a measuring input. We offer solutions for any common control, be it Siemens, Heidenhain, Fanuc, Mitsubishi or Okuma. There are also solutions for less common controls like Num. Our repertoire comprises about 30 controls which we can serve with our cycles in relation to

our laser systems. Of course, the controls partly differ only in detail, however, each one of them has its peculiarities which are to be taken into consideration.

Which future plans do you have for the Service area?

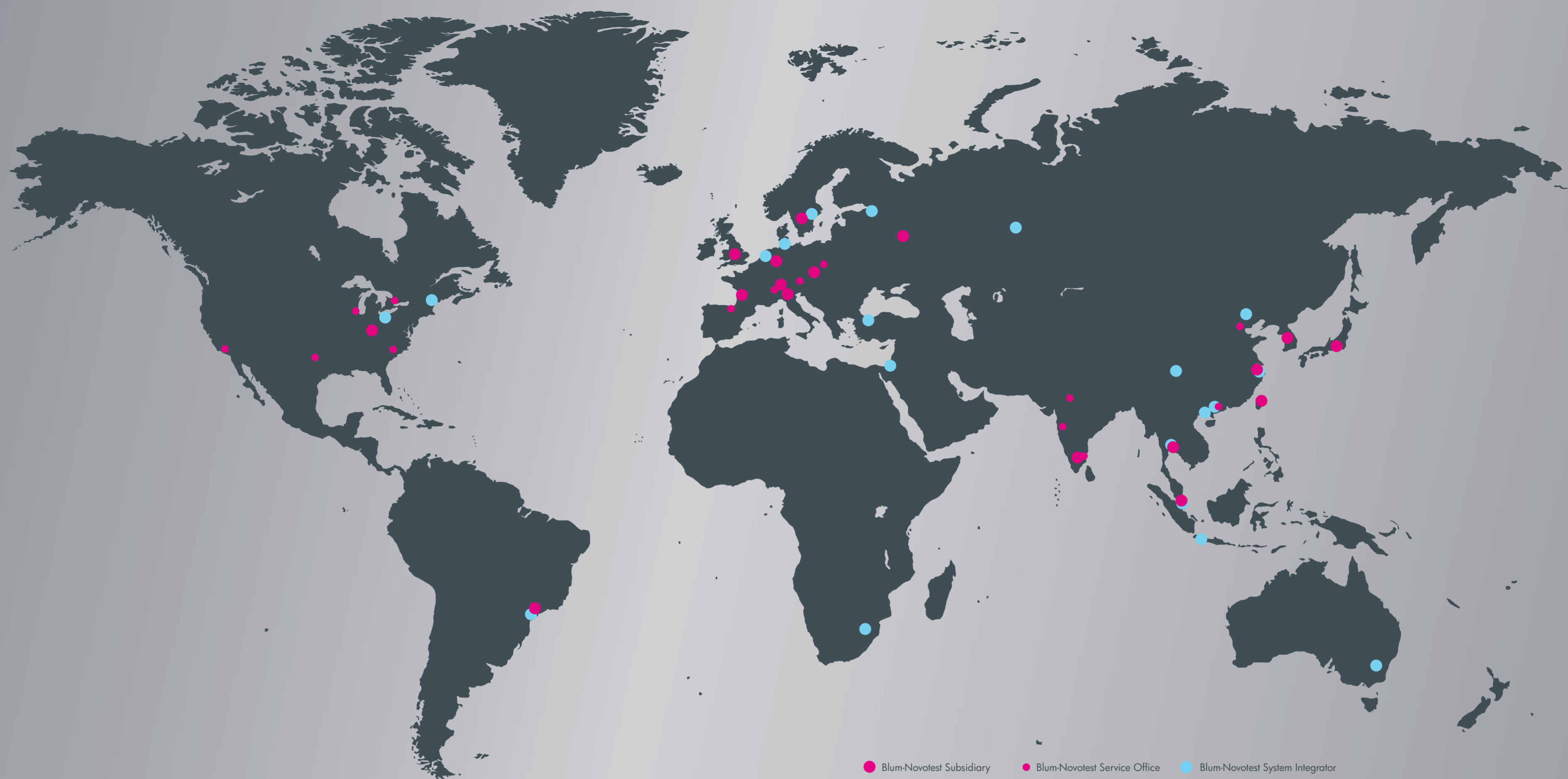
The service will grow simultaneously with Blum-Novotest. Today, it is not sufficient in our industry to offer "only" high-quality products. You have to be close to customers and support them in their applications in order to achieve the best results for them. Since the requirements of component accuracy and process speed will rise also in future, the need for application specialists will also increase. We offer both highly motivated, competent application specialists and customer vicinity already today and will continue doing this in future.

As a service technician, you certainly were the guest of the most varied customers. Is there one customer or one application which you remember particularly?

A customer comes spontaneously to mind who had three cells with respectively eight machines linked to a robot. The production was thus almost completely automated. The only thing not automated was the workpiece measurement. A machine operator had to measure the drill hole in intervals of five minutes using a Subito, correct the tool manually and subsequently start the machine again. Using our BG40 and BG60 bore gauging heads, it was possible to automate the measurement, recording and tool adjustment completely, which then permitted a much more productive manufacturing process without any staff.

WORLDWIDE





New Subsidiary in Sweden

Since the end of last year, Blum-Novotest has operated in Sweden from its own representation. The Director of the new company called 'Blum-Novotest AB' is Mr Klas Wallberg, an experienced sales engineer who has already assumed leadership responsibility in other engineering companies. The new subsidiary is domiciled in Skövde. It assists local customers in Sweden and supports the sales force and system integrators (dealers capable of providing service) in the Nordic and Baltic States as a local sales and service centre. "The presence on site will further strengthen the strategy of maximum customer vicinity and optimum service and will increase our performance in relation to solutions of customer-specific tasks once more," states Alexander Blum, President of Blum-Novotest GmbH.



Klas Wallberg, Head of the Blum-Novotest AB subsidiary in Sweden

The Business Divisions



Measuring Components

The division of Measuring Components develops and produces high-quality measuring technology for machine tools. We offer laser measuring systems and probes for tool setting and monitoring, touch probes for workpiece and tool measurement, as well as sophisticated probing software for comprehensive production control during initial setup.



Measuring and Testing Technology

The division of Measuring and Testing Technology offers state-of-the-art, well-proven solutions for dimensional or geometric measurement and crack testing mainly for rotation symmetrical parts in the automotive industry and its component suppliers. Furthermore, we are a capable partner for your individual measuring and testing demands.



NOVOTEST Test Engineering

NOVOTEST is the Test Engineering division of Blum-Novotest GmbH. The business division specialises in test stands for automotive and hydraulics industries. The scope of supply and services incorporates planning, design and manufacturing of test stands for function, endurance and lifetime testing as well as the integration into the automated systems of our customers.

High-tech Meets Humanistic Education

Since 2011, Blum-Novotest GmbH has had an educational partnership with Spohn-Gymnasium Ravensburg. The goal of this co-operation is to familiarise students of all levels with typical company processes and to inspire the theoretical school background by practical applications at the company.



Students of Class 6 learn programming an industrial robot through a teach-in procedure.

© Derek Design

Many a person might ask at this point: Why does a high school where classic languages are taught select no other than a high-tech company as a partner? Alexander Blum, Managing Director of the company, explains: "We want to convey a real picture of how people presently work in an industrial company to young persons. This includes clean and light production halls just as much as state-of-the-art technologies and multimedia. In the course of globalisation, the requirements of current and future associates have considerably changed. If you want to be internationally successful, technical know-how alone is not sufficient. After all, a good command of foreign languages and a high degree of social competence are indispensable in contacts to customers of other cultural areas."

Practical experience through joint projects

Being an innovative and globally operating company, Blum-Novotest offers many opportunities for joint projects to the Ravensburg secondary school. The educational covenant contains an appropriate company support for every age group. The students are introduced to business life in technical lectures or they learn programming of robots. Students of Class 6 produce workpieces on lathes, A-level students program a traffic light control. In addition, BLUM associates offer professional and college information. In lectures delivered in the English language by international associates of Blum-Novotest GmbH, the students are supposed to get to know the respective countries and discuss exciting subjects. For example, Lilian Barraud, the Head of the

Brazilian subsidiary, delivered a speech on the effects of globalisation in Brazil in the Economics course of Age Level 1 in September 2013. The Head of the Japanese subsidiary visited an English course and discussed – of course in English – the Japanese school system and other subjects concerning Japan, e.g. nuclear energy, with the students. Candy Ong, the Head of the subsidiary in Singapore, spoke about the role of the woman in Asia. Planning of further speeches and discussions is already in full swing.

Architectural project of Classes 10

In the course of the educational partnership, Spohn-Gymnasium's Classes 10 had the opportunity of accompanying the construction of the new customer centre at the Grünkraut site during the 2013/2014 school year. Since the students had already been introduced to the subject of architecture in Arts classes, this offered the chance of seeing the individual steps from planning through to the completion of the building in reality. Being divided into groups, the students prepared a construction journal for months. Furthermore, they produced models of the outside areas true to scale.

For every school year, further exciting projects are developed and the educational partnership between the Managing Director, Alexander Blum, and Rector Susanne Lutz is confirmed. Students can look forward to joint projects with Blum-Novotest during the new 2014/2015 school year.

