

# MAKA

## INFO 02

Composites – a trendy material

Vertical when it comes to high demands

MAKA customers like the personal touch

**Honeycomb - the lightweight wonder**

MAKA China – one step ahead

Fit for the “Nordschleife”

MAKA ComfortCare & Retrofit – that’s what safety is all about



CNC Spezialmaschinen





## Dear Readers,

Lighter but nevertheless sturdier, and with falling production costs at the same time. That is the current trend with composite materials. While in other areas progress is only being made in small steps, the composites industry is practically bursting with innovations. Considerable advances are being achieved in both materials engineering and machining. With so much in its favour, the once almost unaffordable high-tech material carbon has now embarked on a triumphant march through the industrial landscape. Once the question of recycling has been resolved, a technology transfer can be expected to take place at all levels.

With a turnover of more than 70 billion dollars worldwide, the composites market reached a new record in 2014. Top of the list of the growth rates is the aircraft industry, followed by key industries such as automotive and construction engineering. MAKA has an outstanding position on this market. This is something we also underline with our membership of CFK-Valley Stade e.V., the competence network for carbon fibre-reinforced plastics (CFRP). The world's best partners in the field of CFRP work together in the CFK-Valley Stade association.

For a leading aircraft industry supplier we are currently developing a machining process for honeycomb structures such as those used in outer shells, partition walls and engines. Anyone who has ever seen such honeycomb meshes will know how delicate the structure is. The design is inspired by nature. Bees create real wonders in their own way, as our title photo shows. The use of our machining tool, on the other hand, requires high-precision control engineering. Here MAKA puts all of its 60 years of experience into the CNC machining. When can we help solve your production problem?

Your  
Klaus Kern  
MAKA Managing Director



MAKA  
is at  
home  
where  
progress  
is.





# Vertical when it comes to high demands

Customised production also presents the suppliers to the automotive industry with new challenges time and again. In this balancing act between flexibility, quality and productivity, QUIN relies on high-tech MAKA engineering. MAKA Info spoke to Development Manager Adrian Antonescu from QUIN Romania.

**Question: "Mr Antonescu, QUIN's customer list reads like a "Who's who" of the automotive industry. What is your model for success?"**

Adrian Antonescu: "We guarantee our clients first-class workmanship and maximum flexibility. Very strict criteria are applied that we ensure through appropriate internal measures and the careful selection of our partners."

**Question: "What are the particular challenges faced in the production process?"**

Adrian Antonescu: "QUIN manufactures high-quality trim parts for vehicle interiors to the clients' individual wishes using exclusive materials and material combinations. Sometimes it's plastic, at other times it can be wood, carbon or metal. For our production process this means that materials which are difficult to handle have to be formed into complex trim geometries and combined with modern backing materials and coating technologies. The demanding 3D machining operations can only be performed by very precise and dynamic milling machines. The constant changing between series production and one-off items also requires enormous

flexibility from the manufacturing technology."

**Question: "Why did you decide in favour of MAKA technology?"**

Adrian Antonescu: "MAKA impressed us with its many years of experience and competence in the CNC production of a very wide range of materials. MAKA's customers include leading manufacturers from all high-tech industries. We wanted to benefit from this know-how. In the meantime we have a total of 21 MAKA machines."

**Question: "The DC 7 concept is employed in the Brasov works. What are its strengths?"**

Adrian Antonescu: "The central feature of the DC 7 concept is the vertical clamping. That makes the machines very compact. In this way we achieve a space saving of 40 percent compared with conventional machines with a horizontal double table. Furthermore, the DC 7 machines have a rotary table that reduces set-up and machining times. The workpieces are clamped on the jig hanging vertically downwards. While one part is being machined on the one side, a finished part is being replaced



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with a blank on the other. The rotation takes just a few seconds. Our five DC 7 also have two spindles that machine the workpieces simultaneously on one side of the table. The clever MAKA detail solutions also impressed us. The machines have a special anti-static system that prevents dust deposits and sticking of the chips to the part."

**Question: "You have just ordered two new machines. Can we conclude from this that you are satisfied with the DC 7?"**

Adrian Antonescu: "Absolutely. We have had very good experience with this technology. The MAKA production system fully meets our daily changing demands with respect to flexibility as well as efficiency, performance and quality of the finished product. I would also like to say a big thank you to the Service Team. We have a very high level of machine availability."



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**01** Space-saving: DC 7 concept for vertical clamping  
**02** Impressive: part machining in a very confined space

**03** High quality: centre console as partly manufactured by QUIN  
**04** Demanding: veneer-coated trim





# MAKA customers like the personal touch



## The boss and his team

**Michael Stier (53)**  
What little leisure time he has is spent preferably with the family. He also likes to play tennis and badminton.

**Michael Stier has been with MAKA since 1990. At that time he had already gained a few years of experience as an application engineer after studying mechanical engineering. He says it's his dream job. Today he is project manager. He and his team of application engineers know their customers' technology like the backs of their hands.**

Every Monday is meeting time when Michael Stier coordinates the individual assigned projects with his team – all highly qualified experts for CNC technology. Each of them is responsible for several projects. On the other hand, however, each customer has only one contact person from the placement of the order through to the installation of the machine or system. That is the principle of the application engineer at MAKA. In the tough competitive environment, continuous personal support has become a key factor, says Michael Stier. Just one example: a few years ago, Creative Composites from Northern Ireland bought several MAKA machines. At that time Werner Köpf from MAKA UK was the application engineer. Just recently a further order was placed. And what was the first question? Of course: "Will Wöörner be coming again?"

The application engineer is a permanent fixture in the MAKA structure. Every enquiry from the customer lands

directly on his desk. Every meeting takes place with him. The know-how that the application engineer is therefore able to build up about the operation, the production and the function of the MAKA machine in the overall process is immensely important for the customer. One man - one customer is the guarantee for stress-free cooperation and fast solutions. That is particularly important with customised production systems where even the smallest detail counts. The permanent link to the application engineer ensures that even the customer's most complex system can be put into operation in a minimum of time. Last but not least, the customer also benefits from the internal work processes at MAKA. As with all the other application engineers, too, Michael Stier is additionally involved in testing. As project manager he predominantly carries out time studies and other calculations to help improve the customer's productivity. "The customer comes to us with a task and asks us for an idea as to how it can be most efficiently implemented," says Stier, describing a typical situation. Ultimately it's a question of proving profitability. It goes without saying that he and his team with their vast know-how offer the customer an added value that a conventional application engineer cannot achieve. The application engineer ideally conveys the MAKA philosophy of the problem solver. And not only that: "It's fun being so close to what's going on," enthuses Michael Stier.



**Hans-Joachim Paduch**  
With MAKA since 2005.



*"I was recently able to accompany a project for a customer from the programming through the running-in up to the production of 100 parts. The customer was satisfied – for me it was the challenge that I am looking for."*

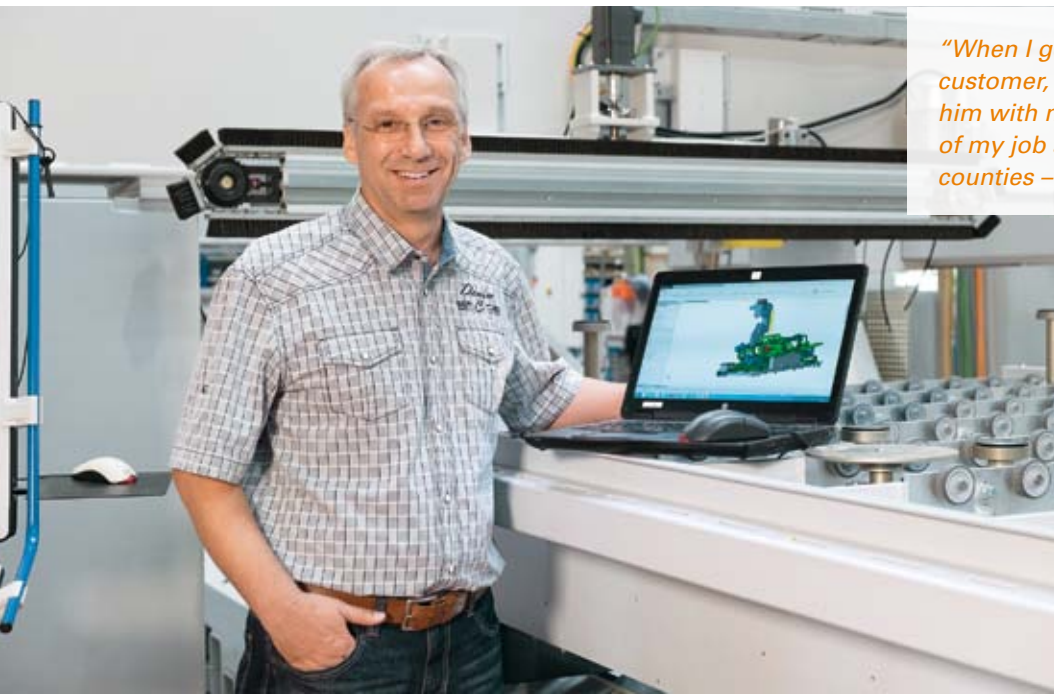
**Hans Kimmel (34)**  
With MAKA since 2013.

*"It gives you a good feeling when there are no loose ends during machine acceptance or commissioning and the customer is satisfied with how the project was handled by the responsible application engineer."*



**Sebastian Hermanns (26)**  
With MAKA since 2014.  
Hobbies: restoring vintage cars and basketball.





*"When I get a positive reaction from the customer, I know that I have been able to help him with my work and my efforts. Highlights of my job are naturally the trips to far-away counties – Brazil is my absolute favourite."*

**Thomas Richter (47)**  
With MAKA since 2005.  
Hobbies: endurance sports, cycling, marathon running.

When the complete specialist know-how for your MAKA is just a mobile number away: the application engineer



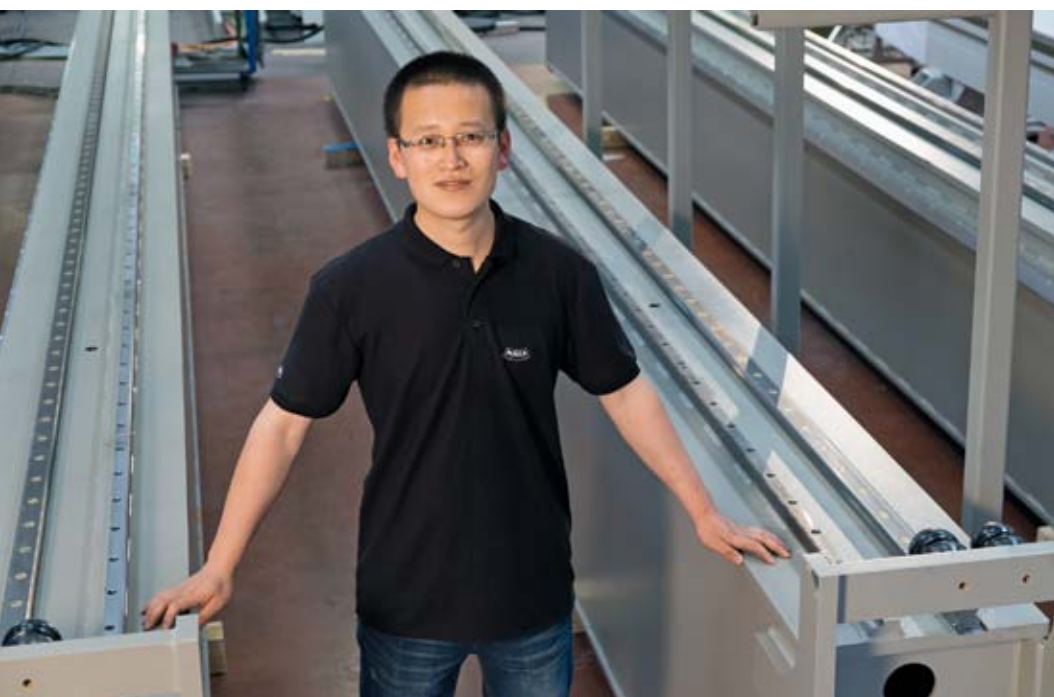
*"The job of application engineer covers a huge bandwidth of activities. For me that is a great challenge."*

**Manfred Eberle (55)**  
With MAKA since 1997.



**Sven Baumann (26)**  
With MAKA since 2012.  
Hobbies: motorcycling and tinkering, technology, hiking and camping.

*"I think it's fantastic to work for a company that is involved with the leading automobile manufacturers. When I see one of these vehicles on TV and know that there's a little bit of me in it, then I'm on cloud nine."*



**Jian Zhang (28)**  
With MAKA since 2014.

*"It is great to be in such close contact with the customer and to see how the project is brought to a successful conclusion."*



**Werner Köpf (53)**  
With MAKA UK since 1998.  
Hobbies: photography and Indian cooking.

YOU HAVE  
A GOAL?  
WE KNOW  
HOW TO  
GET THERE

Turn our creativity into your success. Contact us. Our spectrum ranges from standard to customised high-end with robot technology.

MAKA – your technology partner for 5-axis CNC machining systems for plastics and composites through to light alloy and wood.



# LIGHTWEIGHT WONDERS WITH PRECISION MILLING

Lightweight construction is the art of leaving out. It is an invention of nature. A tortoise has no problems with its huge shell. Delicately constructed honeycombs don't collapse under the weight of the honey. The two constructions are united by the same principle: minimum material input for maximum stability. This is ensured by the ingenious hexagonal construction of the individual chambers. Loads are transmitted via the walls to the whole surface and don't act on a single point. The honeycomb is a particularly fascinating example of this structure.

"Bionics" is the expression used when humans take nature as the model for their technical developments. The lightweight construction wonder of the honeycomb structure is well-proven in multifunctional wall elements for improving the acoustic properties, for vibration damping, and as reinforcing structures for two-dimensional parts or sandwich cores. Composites are generally used, particularly in the aviation industry. They already account for more than 50 percent of the structural weight.

Apart from the outer shell and partition wall inside the aircraft, honeycomb structures are also used in the engine. Extreme differences in temperature prevail here, leading to the formation of condensation. The water has to be systematically discharged so that it does not remain in the honeycomb and cause damage to the part. It is therefore necessary to give the honeycomb chambers a groove through which the water can drain off. Absolutely precise machining is crucial here in view of the great safety relevance of the components. The associated demands are enormous: the tool has to mill a large number of defined grooves at intervals of just a few centimetres in the ridges of the honeycombs that are only a few tenths of a millimetre thick, and that without damaging the bonding points between the individual chambers.

A leading supplier to the aviation industry came to MAKa with this problem. One challenge for

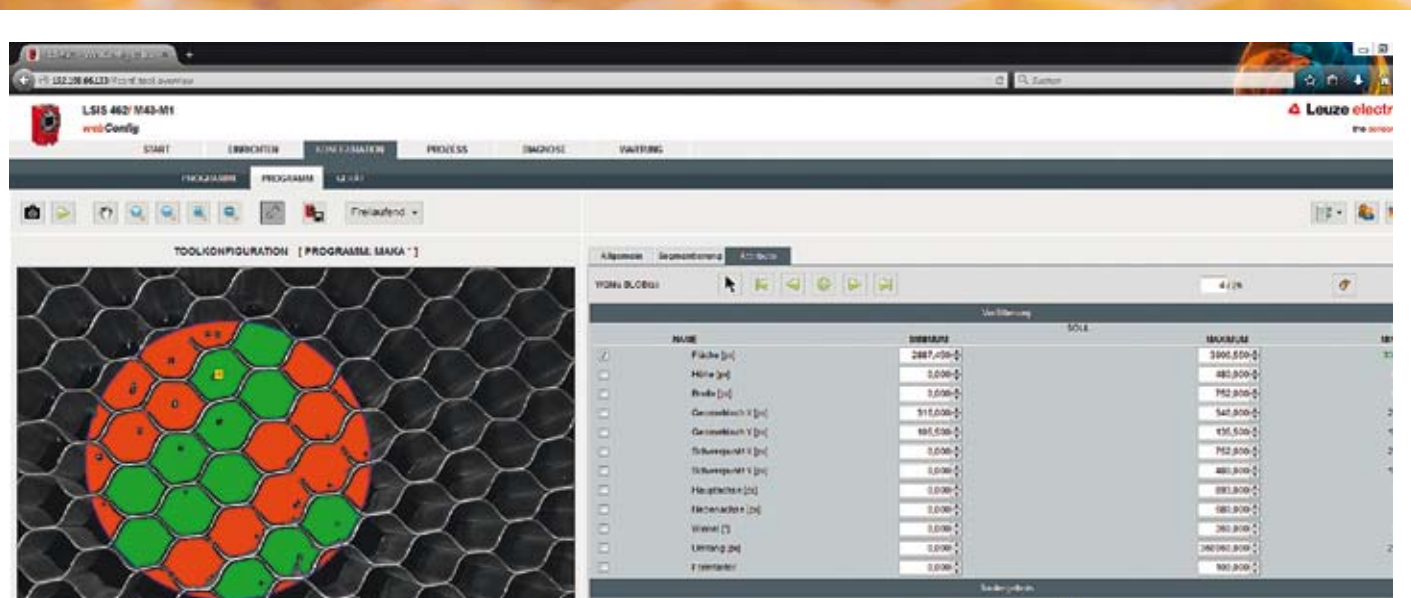
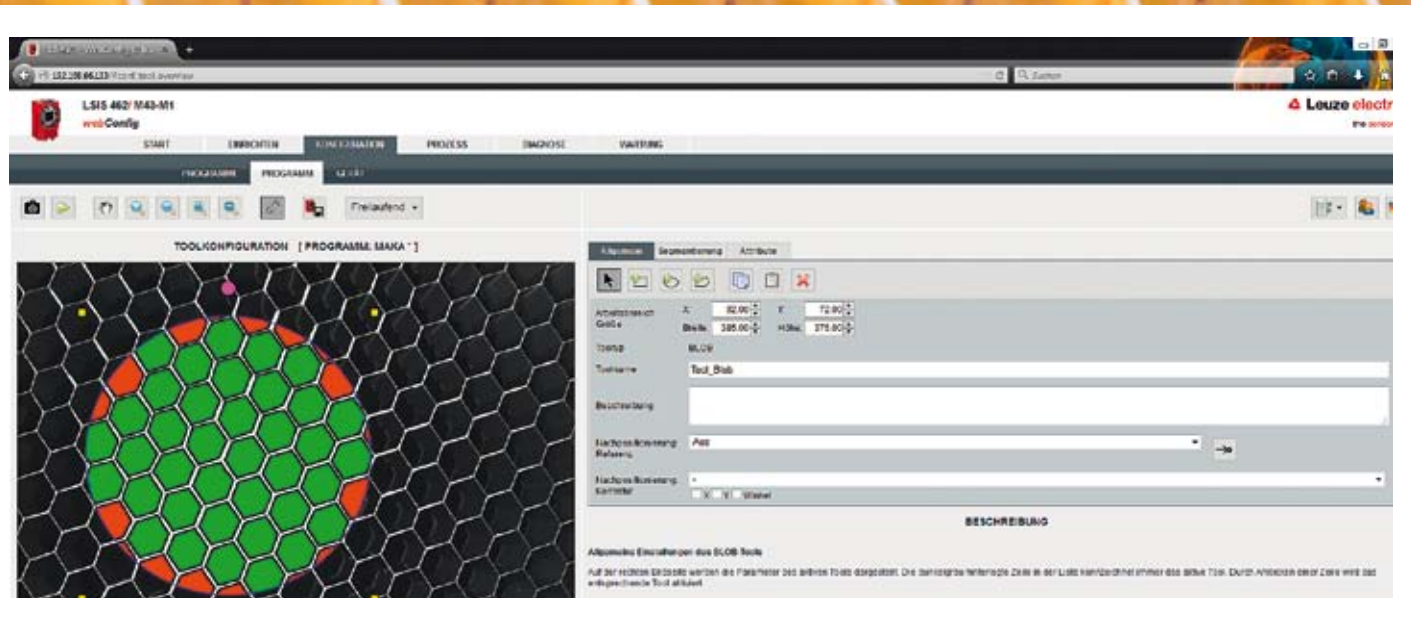
the developers here was the clamping of the honeycomb element made of epoxy resin-impregnated polyamide on the machine table.

The manual positioning employed by the client to date had resulted in inaccuracies. MAKa solved the problem using an adhesive film which allowed the honeycomb to be fixed by vacuum. During the machining it was a matter of finding a way of exactly approaching the individual honeycombs. A further problem for the technicians was that the honeycomb panels are not completely uniform.

MAKA therefore decided in favour of a camera-based recognition process. The system was developed together with Leuze electronic. The camera first scans the honeycombs and transmits the exact coordinates to the machine. A special configuration of the control system is necessary for the processing of the data. The exact machining positions are then transmitted to the milling cutter.

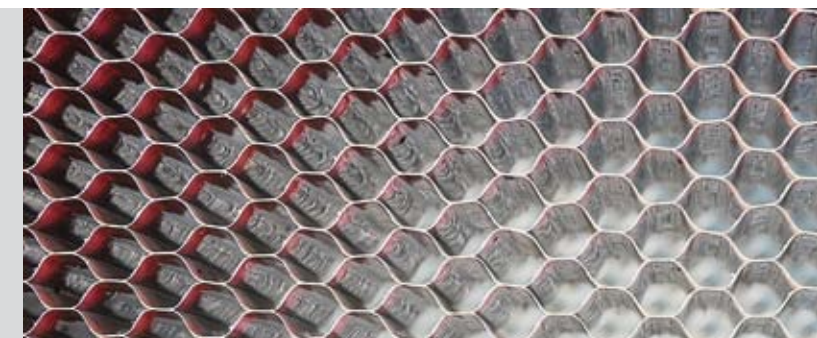
MAKA has already carried out extensive test runs with the process and is very satisfied. "We see an enormous potential here – also for other applications," says Managing Director Klaus Kern, summing up the progress to date.

Perfectly controlled  
MAKA  
precision



**Photo top left:**  
The ridges of the honeycombs are lit up and can be detected at their upper edge.

**Photo bottom left:**  
The centre points of the honeycombs (marked in green) are detected and transmitted within just 25 ms. The data are transmitted via Ethernet.





Economic powerhouse China: growth of around 7 percent is expected for 2015.

# MAKA CHINA one step ahead

MAKA competence for China: customised rather than standard solutions



**Qingdao is a large city in Eastern China. By contrast with Peking, it was more or less unaffected by flooding following the devastating storm in 2012. Many people in Qingdao attribute that to German engineering skills. They point to the German sewer system from the imperial period – but which no longer exists. A curious example showing that perfection is a trait that the Chinese still associate with Germany.**

There are indeed huge opportunities particularly for top German companies in the Middle Kingdom. Preconditions for success in the rapidly growing market of the future, however, are a clear strategy and solid know-how about the country.

MAKA has China firmly in its sights. Now that machines and systems are already in operation with customers in China, the opening of a subsidiary there is the next logical step. The preparations are already in full swing. Managing Director Klaus Kern has decades of experience in China and is very familiar with the mentality there. A team of Chinese-speaking MAKA specialists deliver perfect customer service: Haoyang Wu, who studied in Germany and apart from his mother-tongue Chinese also speaks German and English, looks after the custom-

ers on the sales side. Prominent reference customers have already been built up in China in a very short space of time.

MAKA is aware, however, that the high regard that the Chinese customers have for German machine engineering is not a matter of course. The demands on German engineering have risen in the meantime. Commitments to quality are expected to be fulfilled. That applies equally to products and service.

For this reason, the second important pillar alongside sales – service – is being greatly strengthened. MAKA is therefore sending out a service technician and an application engineer. The application engineer, Jian Zhang, is native Chinese, speaks German and during his studies in Germany spent a great deal of time at MAKA in Nersingen being prepared for the task. As usual at MAKA, he will look after the customers from the receipt of the order through to the installation.

Responsible for service is Alper Celik. He is of Turkish origin and married to a Chinese woman and therefore also speaks Chinese.

Klaus Kern knows how important the individual preconditions of the team are: “We are practising excellent customer service in China, too.” This includes communication with the customer in his language in order to understand exactly what is needed, and then to perfectly implement this in the design and production of the machine.”

Strategically MAKA relies strictly on market-oriented technology: machining of light-weight construction materials for innovative branches of industry such as aviation, automotive and railways have great perspectives in China. Sophisticated solutions that also include robot solutions for the automation, are designed to customers’ individual needs. Klaus Kern: “There is a market for our system solutions in China. The key of success is understanding the customer’s requirements in detail and then creating a customised solution for improving the productivity.”

The branch in China is to be opened before the end of the year. A step with which MAKA aims to further strengthen its international presence and continue the success story of recent years.



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- 01 Fascination also in China: Klaus Kern explaining the MAKA technology to fair visitors
- 02 Haoyang Wu
- 03 Alper Celik
- 04 Jian Zhang



# Fit

## for the

## “Nordschleife”



Wolfgang Lorse (centre) and his CNC team



The Nürburgring is renowned as a legendary race track worldwide. capricorn Composite GmbH has had its headquarters there since the end of 2005. It produces components for motor sports in the immediate vicinity of today's test track. And, as almost everywhere when high-performance is called for, MAKA technology is employed.

Whenever cars tear around the race tracks anywhere in Europe there is a good chance that capricorn know-how is on board. For almost a decade the company has been successfully serving the international avant-garde in motor sports with its products. The composite components are developed and manufactured in the Nürburgring works. Wolfgang Lorse has been team leader for CNC machining there since 2009. Initially involved in the Toyota Formula 1 project, he looked around for a new challenge after the Japanese withdrew from the elite class and found it in the Eifel. "I was already involved in composites at Toyota. The planned set-up of a CNC production facility at the new Nürburgring site naturally interested me," says Lorse looking back.

Since 2012 his place of work has been directly on the test track, the former venue of numerous Grand Prix races where until 2013 racing stars such as Michael Schumacher were celebrated. Wolfgang Lorse has never driven on the Nordschleife himself. He and

his team are more at home in the role of companion for successful lightweight constructions. In recent years more and more structural components have been found in the leading cars of the Le Mans 24 hour race. capricorn Composite GmbH is currently working on complex components for a WRC car. capricorn is also building the complete outer shell for a car that will be competing in the Paris Dakar rally. High-performance components of aramid, carbon and glass fibre composites for this project, as well as for exclusive sportscar models of leading manufacturers and prototypes, are produced in the Nürburgring works – around 2500 units per project for series production alone every year. The process starts with the CAD concept and continues through mould making, make-up of the parts right up to hardening and joining, and ends with the final machining in the form of component trimming. Coating and quality assurance in the dust-free measuring room are the last two steps in the process.





# Uniform control for flexibility

capricorn uses the 5-axis CNC technology from

MAKA in particular in the component trimming. The total of 5 machines were purchased in 2012 at the time the new production facility was set up. The plan provided for their use as model making machines. In addition to the machining quality, the focus was also on flexibility. In the meantime they have gained many years of experience with the MAKA technology. The uniform control concept for all the machines has proved to be very advantageous. "I don't need to worry about which machine I use to produce which part," says Wolfgang Lorse. He can choose freely between the two MK 7 S, the MM 7 T and the two BC 570 machines.

The necessary preconditions are created by the "gigantic working range" of the machines. "On the BC machines I have 6m x 3m x 2.5m and can produce huge moulds," enthuses Wolfgang Lorse. That is an important criterion, because parts such as bonnets, roof shells and tailgates of cars have to be machined. On the MM 7 T, on the other hand, carbon components such as spoilers and rear diffusers are produced in series. The solution must be able to combine large dimensions with short lead times. "In this respect 2 x 2 m x 2 m is also fantastic," says Wolfgang Lorse. With this working area it is possible to hold 2 to 3 jigs on the table and hence achieve a high productivity.

The team leader for CNC machining also appreciates the integrated vacuum pump on all the machines that allows even self-manufactured jigs to be used without the need for major modifications. The high precision of the machines rounds off his very positive opinion of the MAKA technology.

At the moment a project team of MAKA technicians and capricorn staff are working together to further optimise the production process. "A meeting on a technically equal footing," says Wolfgang Lorse describing the exchange between the highly qualified specialists. He is also very satisfied with the service. Overnight deliveries of spare parts have already helped him out of difficult situations on a number of occasions. "When it comes to trimming machines, MAKA is without question first choice for us," summarises Wolfgang Lorse. "We enjoy working with MAKA."



Whether exclusive series production vehicle or racing chassis - high-end quality is called for.

- 01 Trimming of a front spoiler
- 02 A MAKA milling cutter in operation
- 03 Quality control in the dust-free measuring room
- 04 Testing of a door mirror cap
- 05 Testing of a front spoiler



06 Tailgate of the multi-Paris-Dakar winner  
07 Front of the rally car

08 Rear diffuser  
09 Bugatti intake manifold



# ComfortCare & Retrofit

## That's what safety is all about

Complex, high-performance production systems involve a great deal of responsibility. If the system comes to a standstill, part of the plant stops and delivery times cannot be met, activities have to be reorganised. In the longer term this is a vision of horror for the company. MAKA ComfortCare ensures that the production manager is on the safe side. Regular maintenance by the manufacturer according to strict quality criteria ensures the highest availability, maximum performance and value preservation of the equipment. "By constantly monitoring the machine, we are warned in good

time of impending problems that could lead to expensive damage in the event of a lack of maintenance," says Patrick Fischer, head of the Technical Hotline. In addition, MAKA ComfortCare customers benefit from attractive tariffs for certain service operation and the spare parts installed during a service call.

The MAKA ComfortCare package includes two maintenance visits including travelling and accommodation costs at a fixed price. A reminder from the Hotline draws the customer's attention to the due service one month in advance. As long as the technical preconditions are established, contract partners also receive support via remote maintenance beyond the warranty period. Novem Car Interior is one of the many MAKA customers who rely on MAKA ComfortCare. Norbert Seemann, head of milling operations at Novem, says: "MAKA ComfortCare means a bit more planning security for us. The MAKA service technicians are excellent specialists who have everything under control and always have answers to our questions."

But MAKA ComfortCare is not the only attractive offering from MAKA Service. "Retrofit" is the second clever concept to come out of Nersingen. The idea behind this is to bring MAKA machines and systems that have been in operation for many years up to the performance level of the latest production technology. Patrick Fischer explains: "Control system components and drive technologies in particular are subject to varying product cycles. That's where Retrofit comes in." For example, with a modernisation of the control system from BWO 785, 788, 900C to 921 Vektor and older Siemens system to 840Dsl.

No expense has been spared to achieve this: MAKA has developed dedicated software for converting the old programs to the new control system. The retrofit significantly increases the performance of the control system, and the interface possibilities to the in-house network are greater. With a BWO retrofit, a touch-screen simplifies the handling while the familiar user interface is retained. "Machines modernised with Retrofit have longer service lives with considerably reduced costs and a longer spare part availability," promises Tobias Doser, Service Center/Retrofit.



Tobias Doser Service Center/Retrofit

Patrick Fischer Head of Technical Support

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