

## *We make it possible*

KAUFMANN OBERHOLZER AG

***The team of the electro-mechanical design department***  
*Experts in machine programming*

***TUBE – a new machine concept***  
*A built-in future*

***Distortion-free vision when flying***  
*MECAPLEX AG*





Foreword by Christian Meier.

## Ready for the future!

We can welcome 2018 with great optimism: last year was generally a very successful one for the machine building industry and prognoses are for continued strong growth. This positive trend of recent years is also evident for Reichenbacher Hamuel and has become even stronger over the last few months.

Our success is due to our capability of always offering innovative products and optimum solutions for the respective industries at the right time. We have doubled our total sales volume since 2013 and keep on doing our best to perfectly match our line concepts to customer requirements.

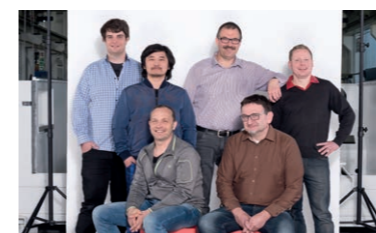
Our new TUBE series is an excellent example for the fact that the engineers in our development department are always doing their job with the specific concerns of our customers in mind. TUBE is an innovative machine concept tailor-made for the automotive industry that offers everything global players might need for efficient milling (see special section pages 8 - 9).

However, we do not only focus on optimum processes for our customers, but for us, too. As part of our campaign for process optimisation we are going to open a logistics centre with state-of-the-art equipment on 1,200 square meters at our company headquarters in Northern Bavaria in 2018. This, too, is an investment in the future.

**Christian Meier**  
Commercial Manager  
Reichenbacher Hamuel GmbH



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The focus is on plastics technology.



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We get your machines up and running.



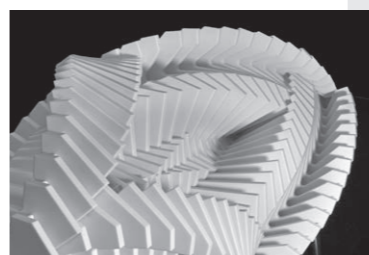
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# Distortion-free vision when flying

The focus is on plastics technology.



The name Mecaplex comes up whenever it is about transparencies. Almost all gliders manufactured in Europe, but also business and military jets, are provided with their panes. The Swiss company is specialised in the three-dimensional forming of acrylic glass without optical distortion and their know-how is met with world-wide appreciation.

Thanks to their expert knowledge, the Grenchen-based company, which was founded in 1948 and joined the Glas Trösch Group in 2011, has become indispensable in the field of transparencies. "90 percent of the parts and assemblies leaving the factory are intended for the aircraft industry and, apart from those for one single Swiss aircraft manufacturer, all these products are sent abroad," states Daniel Reutimann, supervisor CNC. Transparencies from Mecaplex have gained a world-wide reputation in aviation, and leading aircraft and helicopter manufacturers are among their regular clients. Half of the projects are military ones that only provide a company like Mecaplex with the opportunity of exploiting its potential for development, as otherwise the costs would not be financed. Civil aviation, too, eventually benefits from the results.

The company is specialised in processing composites, acrylic glass, glass, polycarbonate, GFRP and CFRP. The components are predominantly made from cast or stretched acrylic glass or polycarbonate at a material thickness of 2 – 30 mm and in pane sizes of up to 3,000 mm for the use in gliders, business jets, helicopters, and military and commercial aircraft. This includes e.g. also transparencies with integrated static discharge, laminated edge reinforcements, and the integration



Final assembly of cockpit transparencies for training aircraft.

of detonation cord systems – just to mention some of the components. Grenchen is the development and production site, where all processes to obtain a certified assembly group take place. If you take into account that the development of intricate components can require up to 5 years, as sometimes certain fits will have to be modified, or corrections will have to be made subsequent to safety testing (such as bird strike tests), you will understand why Mecaplex is appreciated as a supplier of entire systems.

Plastic transparencies and their structural frames form a system subject to highest loads when the aircraft is airborne. Safety, functionality and a distortion-free vision are mandatory. An advantage of the company is to be seen in the fact that everything is from one source owing to the company tool-room and 5-axes CNC machining, and in the ensuing possibility of keeping the time from order placement to delivery short. For 11 years the company had gathered experience in the field of 5-axes CNC machining, "but we had problems with respect to accuracy and capacity issues," says Daniel Reutimann, who is also in charge of project management. Thus, they were looking for a machine supplier from Germany for their intended investment. "Reichenbacher was the most flexible of all suppliers, and this was decisive in the end," he adds.

The demands had been clearly outlined. A requirement was crane-loading of the parts into the machining centre to ensure easier handling. Moreover, it had to be possible to effect a very accurate placement of the components on the displaceable machining table. In addition, there was the demand for greater spindle power and a higher Z-axis. The CNC machining centre ECO-2616-A Sprint consists of a stationary, low-vibration 2-column portal with a machine table in frame design with a 30 mm aluminium plate. There is a probe available from the tool magazine for the vertical measuring of the part positions, as well as a "Laser Control" system based on the principle of a light barrier for measuring the tool diameter, wear, zero point, etc. And then there was one special request on the part of the customer which was largely due to the great temperature variations in the factory: glass scales. Those were to guarantee a measuring of the machine in its current status, as, because of the structural heat, deviations can ensue on the long machine bed. The glass scales render the machine more exact, as there are two control systems for mutual monitoring that signal any deviation. They guarantee even greater accuracy. And the expert was right: the quality of all components is excellent since they are working with the Reichenbacher line.

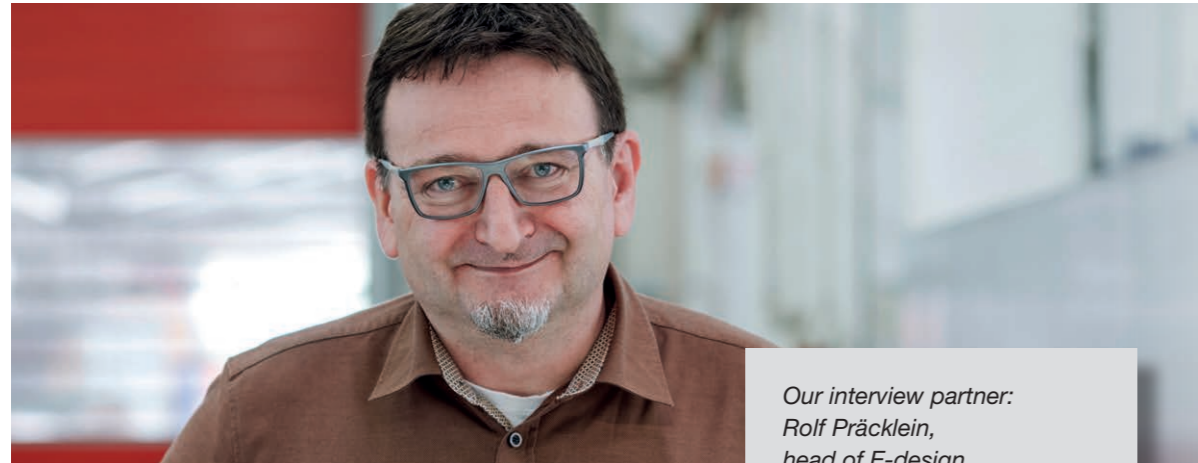


Daniel Reutimann, supervisor at Mecaplex, at the ECO-2616-A Sprint.

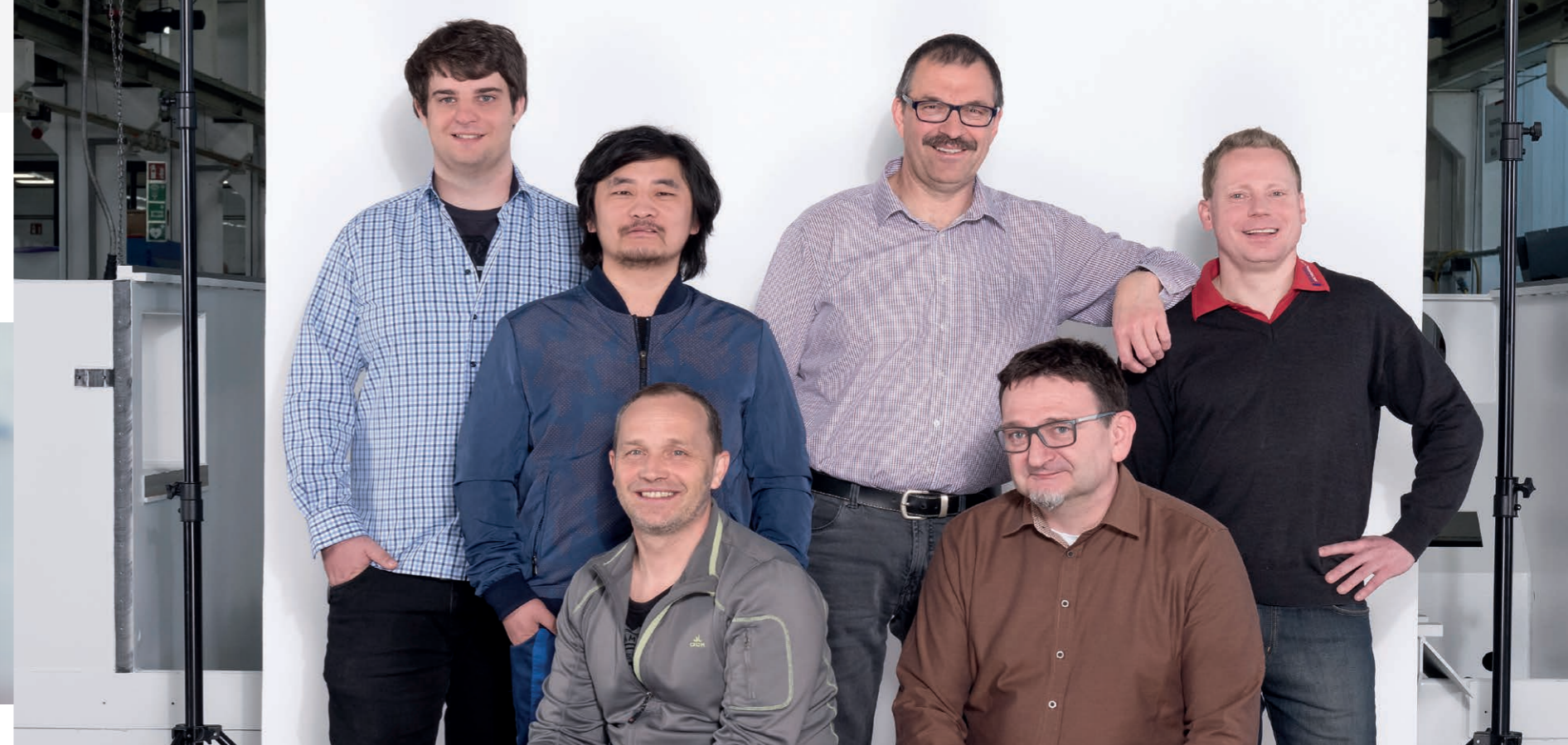


## Experts in machine programming

We get your machines up and running.



Our interview partner:  
Rolf Präcklein,  
head of E-design



**Interviewer:** How long have you already been working for Reichenbacher?

**Präcklein:** After my vocational training as a certified engineer, I joined Reichenbacher in 1994 and was first working in the assembly department and later on in the department for PLCs. Seven years ago, I became head of the department. My task consists in searching for trends that offer standardisation potential. Apart from this, mainly the communication with Siemens should be mentioned.

**Interviewer:** What is your daily work routine like?

**Präcklein:** The department can be subdivided into two sectors: on one hand hardware engineering, where 2 people are employed. They deal with everything, where electronics, switches, valves and the activation of the machine are concerned. We establish circuit diagrams and parts lists, based on which the material will be procured, and assist the purchasing department in selecting suppliers and products, as our knowledge is simply more specific. The second sector is the PLC-programming department with 5 people employed. Here, the PLC-programmes are developed on the basis of the hardware specifications, the actuators and sensors, and thus quasi the control logic is stored. Moreover, they set the

parameters for the drives and for the entire CNC-control system. We create an image of the mechanical groups by storing data, such as transmission ratios, pitches, motor sizes, etc. so that mechanics and electronics will form a unity and „we get the machines up and running“.

Moreover, in close cooperation with the department for application technology, we write NC-programmes for control functions, such as tool change, or the safety-programming for Siemens control systems. And finally, we provide assistance to our service department: this includes help for our final customers, but also the classical support as a back office. We do so during the commissioning stage, in a maintenance setting or during trouble-shooting. 90 percent of this support is through tele-maintenance tools, as they warrant for speed and flexibility – and this world-wide.

**Interviewer:** There are certainly companies with reservations as to data safety and a critical attitude towards tele-maintenance?

**Präcklein:** There are such reservations, but they are offset by speed and flexibility. Of course, it is crucial that the respective IT-department on site warrants for the necessary safety mechanisms,

meaning that customer responsibility is an important aspect, too. Basically, a machine should be treated like a PC. Additional possibilities to ensure safety do exist, but at considerable cost.

**Interviewer:** Is there a division of tasks in your department?

**Präcklein:** We do have specialists for various control systems, such as Beckhoff, Bosch and Heidenhain, up to providing support for Siemens control systems 30 years old. Moreover, there are people programming Windows-applications, for example with respect to barcodes, feedback into the SAP-system, and many others.

**Interviewer:** The Siemens control system is the one most often used?

**Präcklein:** This is correct. Efficiency requires that we concentrate on only a few suppliers. However, this likewise applies to the mechanical side, as by using identical parts we can keep the number of special constructions small. We have built up our know-how in intensive training courses. Staff members possessing this know-how are much sought after in the market and there are often attempts to lure them away. My responsibility is to create a pleasant working atmosphere – then such attempts will prove ineffective also in the future.

**Interviewer:** What challenges do you see for the years to come?

**Präcklein:** The developments in multi-channel technology and automatic loading. Here, the trick is the synchronisation of several NC-channels. In doing so, we use the CNC-control system for parallel manufacturing, e.g. for the simultaneous machining of two parts. However, at the same time it controls also supplementary processes. Thus, we create added value by utilising the CNC-control system in full. A typical example are handling systems: we merely purchase the mechanical components and develop the respective hardware and control logic on our own.

This permits us to carry out control adaptations ourselves without the need for support from external experts.

**Interviewer:** What do you enjoy most about your work?

**Präcklein:** The people employed in my department are very independent in their working routines. I like this, as I am left with room to deal with other topics. The incessant development in the control and software sector calls for continuous learning and this keeps me busy. The future remains exciting, as we are living in a time of radical changes. Trendsetting is today's „generation smartphone“, i.e. there will certainly be modifications in the operating concepts, whatever they are going to be like...

**Interviewer:** What else will be of importance to you in the next few years?

**Präcklein:** Industry 4.0 is currently the omnipresent slogan, although there exists no standard definition for it. In my opinion there will be two sectors: on one hand Big-DATA, where data of a line are to be downloaded and e.g. to be analysed externally. In this case, we will have to provide the interface to generate such data. On the other hand, it is a matter of defining a broader range of process values for machining. Here, recording of the physical values by sensor technology will be the prerequisite.

**Interviewer:** What do you see as your personal task in the years to come?

**Präcklein:** The observation of trends: this was the case for the changeover from Profibus to Profinet, and I see my task for the next few years in finding new suppliers of control systems, also among niche providers. Siemens is our main vendor and often indispensable to reach a perfect match of control system and mechanical parameters. But there are definitely customers who very clearly criticise the older Windows operating systems they use and demand that Reichenbacher takes a clear stance in favour of more modern operating systems.



# TUBE – a new machine concept

Tailor-made for the automotive industry.

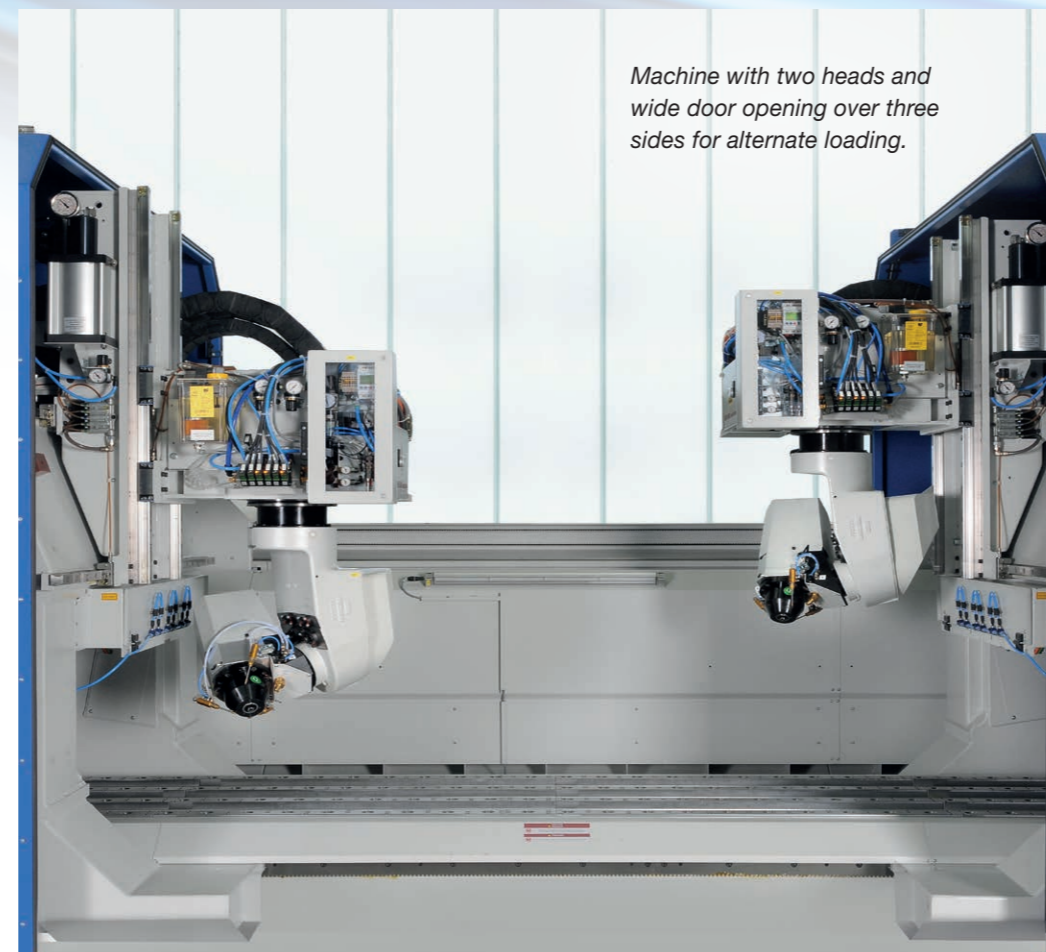


Our business philosophy consists in developing lines that appeal to our target groups. Normally, to achieve this goal we base the concept for each line on our modular system. In other words, we select the optimum series and modify its technical equipment to customise the machine in such a way that it perfectly meets the requirements of the respective client. For the first time our approach has been different in the case of the TUBE. The automotive industry has several peculiarities which we want to accommodate.

Global players in this industry must be extremely flexible, not only in terms of their range of products, but also where the production sites are concerned. A relocation can imply transporting many machines and lines. In doing so, international standards will have to be observed, meaning that, apart from safety, the focus will also have to be on the ease of transportation.

The major challenge for our engineering department was to build the TUBE in such a way that it could be loaded into a container and shipped to places all over the world without the need to remove many of its components. This has successfully been accomplished with this fully enclosed machine, where the control cabinet and the cabin are firmly connected with the machine base. Using a 20 ton crane, the line can be loaded in one piece into a 40' open top high cube container. A considerable cost reduction is achieved by this design, both, for transportation and for commissioning.

This series has been dubbed TUBE, as it very much resembles an underground. The "automotive industry" is our explicit target group, which is an absolute novelty, as all preceding series had never been designed for a specific industry. However, it is to be expected that its future utilisation won't be restricted to this industry. Taking into account the fact that the TUBE is ideally suited for the machining of plastics, aluminium and composites (CFRP, GFRP), it will attract the attention of other industries, too.



Machine with two heads and wide door opening over three sides for alternate loading.

## The TUBE system:

- CNC-centre for the machining of plastics, aluminium and composites (CFRP, GFRP).
- Very spacious machining area (2x 3,200 mm in X-direction) at a very small machine footprint (12,000 x 2,500 x 2,500 mm).
- Automatic loading doors offer excellent accessibility for the operator and at the same time a good view of the machining processes.
- Setting/loading in parallel to machining time: while machining is in progress in station 1, loading can take place in station 2.
- Machine fully enclosed with two cardanic 5-axes units and separate tool changers.
- Control cabinet and cabin firmly connected with the machine base.
- Cost reductions for commissioning, as well as for transportation (container).
- Container loading of the crane hook machine: transportation in 40' open top high cube container.



## Lightweight construction – also for the racetrack

Core competence in lightweight and sandwich constructions.



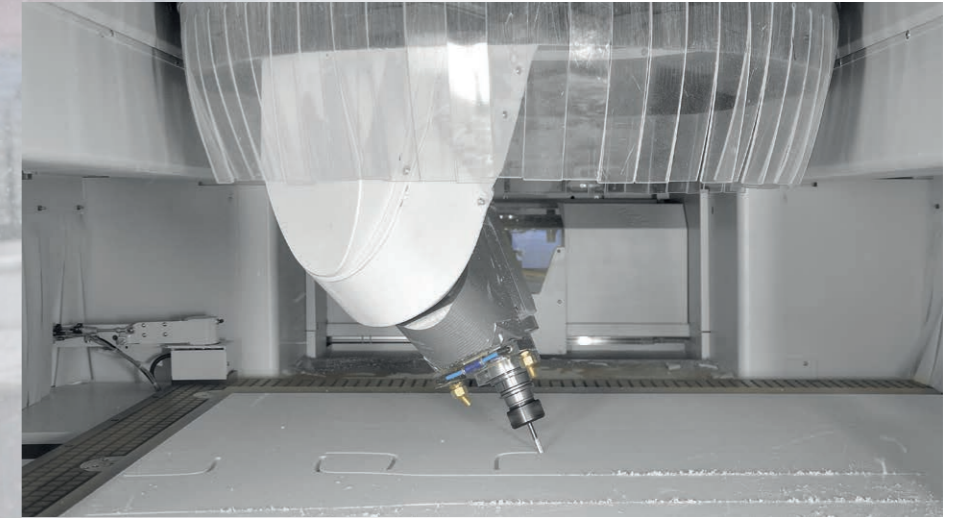
With their cross-linked rigid foams Gaugler & Lutz have landed yet another coup, as Kremer Racing and ZIMspeed have succeeded in building the Kremer Porsche K3, a modified remake of the 1979 winning car of Le Mans, and their high-quality materials in connection with specific customisation have significantly contributed to this success.

Its outstanding degree of specialisation when dealing with different technologies for the processing of organic materials makes the Southern German family business unique in the market. The business sector, where Gaugler & Lutz have achieved an excellent reputation as a manufacturer of semi-finished products over more than three decades, is the predominant one at a share in the sales volume of up to 80 percent. The company is top in the industry in its capacity as the supplier of core materials that enhance the rigidity and stiffness of a multi-layer structure while increasing its mass per area only slightly, as well as of special materials for lightweight and sandwich constructions.

If you ask Dominic Lutz, authorised signatory and member of the management board, their tremendous competence in processing organic materials by a multitude of technologies should be pointed out. They want to be innovation drivers and achieve this goal, as they are really living Industry 4.0. „High transparency, interlinked processes, plus real-time planning and control mechanisms“, Dominic Lutz emphasises, „guarantee a fast response along with system-spanning flexibility“. They aim at a fully dynamic capacity utilisation for the machines, which can only be obtained by an exceptionally adaptive management style based on digitalisation and networking, which in turn also affects their 250 employees.



*Dominic Lutz:  
„The Reichenbacher machine is easy to operate and equipped with a grooved HPL table plate that permits alternate loading“.*



The five-axes milling head of the VISION-I Sprint is a cardanic one with a power of 15 kW.

Their customers are from a handcraft background. This is why they have launched their portfolio of products and services featuring the so-called „dynamic capacity adaptation“, as this was the best way to respond to the extremely short lead times required. Thus, their competitive advantage is clearly to be seen in their short response times along with their wide range of products. „We realise everything and do so with utmost reliability based on comprehensive machinery and redundant manufacturing processes, as well as production technologies“, Lutz says. „And precisely these machines are of immense significance for our strategy“, Lutz makes clear. Thus, their machine suppliers will have to provide for the very best with respect to stability and flexibility.

Material processing is implemented by machinery ranging from simple sawing machines to state-of-the-art CNC-machining centres. This permits the perfect machining and finishing of the core materials chosen – in fact from batch size 1 to serial production. Their co-operation with Reichenbacher has existed since 1998, the main reason for this being according to their management, „that they are up-to-date and always open to new topics and ideas. Digitalisation is becoming more and more common in our company and results in ever higher demands made on our suppliers. Before production can start, there is a requirement for digital machine models to permit the verification of a NC-programme based on the machine-specific parameters. Reichenbacher provides such a 3D-machine model for a virtual collision test, as well as the data on the kinematic properties of the machine needed for a realistic simulation. This convinces our customers and simultaneously eliminates setting errors from the very beginning – this is system and process reliability at its best“, Lutz adds.

Their latest unit VISION-I Sprint is equipped with a grooved HPL table plate. In the case of single loading with a maximum of 3,740 x 1,570 mm there exists an assignable area of 2,600 x 1,570 mm, in the case of alternate loading with 2 x 1,400 x 1,570 mm an assignable area of 800 x 1,570 mm. „This provides for a great deal of flexibility in view of the permanent change in component sizes to be machined“, states Stefan Düsterhöft, project manager engineering/design. 18 pneumatically retractable stops with automatic control, a cardanic 5-axes head and a plate tool magazine with 24 places round off the equipment. In addition, there is a pick-up place for a saw blade with a maximum diameter of 400 mm, as well as a tool measuring system and a broken tool detection unit. „The advantage is“, explains Michael Müller from maintenance, „that a crash as a result of a faulty input is ruled out“. The 5-axes lines acquired in 2005 and 2003 have similar equipment and only the 4-axes line bought in 1998 possesses an additional drilling unit with 21 individually controllable drilling spindles for rows of holes and structural holes.



## We make it possible

*Kaufmann Oberholzer AG can look back at more than 40 years of experience in wood and timber construction.*

**When it comes to wood, most people can describe their feelings with only a few words. These feelings and the personal style, however, vary with the individual. And this is exactly why the desire for individuality can perfectly be met by means of the type of wood, choice of colour, finishing and design, and the associated multitude of possibilities.**

Here, the philosophy of Kaufmann Oberholzer AG, a joinery business founded in Switzerland in 1971, comes in. About 140 employees at two sites in Canton Thurgau manufacture almost everything from wood one can dream of. This starts with house building and ends with complete interior design. For each customer they create his own domestic ambience, unequalled where stylish exclusivity and contrasting accents are concerned.

When asked for their product and service portfolio, managing director Rico Kaufmann can mention a lot: machining tasks for industrial and joinery shop applications, cupboards and wardrobes, shelves and racks, floor elements, entire kitchens, doors, staircases, furniture for living quarters and bathrooms, acoustic elements, such as partition walls, and a great deal more. The passion for this material and all its facets is tangible everywhere. The Swiss company has gained a reputation as a modern service provider for all aspects of wood as a material, 80 percent of which are from regional sources. They are in great demand for the construction of new buildings, for reconstruction work and the addition of extensions, as well as for renovation work. „The latter, in particular, asks for a gentle hand to preserve the charm of the existing while bearing in mind modernity“, Rico Kaufmann explains.



*Interior design by Kaufmann Oberholzer for a good way of living.*

About one half of all orders comes from the commercial or public sector. They are, for example, for the complete interior design of school buildings, retirement homes, shopping centres, as well as of restaurants and hotels. Private customers are the second-largest group, but also industrial customers from railway vehicle manufacturing or aircraft construction, who get components made from aluminium, GFRP or CFRP, are among their clientele.

Thanks to their expertise gained from decades of experience, the engineers, technicians, timber construction specialists, carpenters, joiners and CNC-experts ensure top quality results. The utilisation of innovative CNC-technology, however, has become an indispensable necessity to deal with often large order volumes and to meet the high demands made on machining quality in the long run. Given his professional experience, Daniel Lomscher, member of the management board, was entrusted with the task of implementing 5-axes CNC-lines within the company. As a specialist, he was well acquainted with potential machine suppliers and checked them out thoroughly. He established a catalogue of requirements with the central concept of using modern technology to meet the challenges presented by intricate component geometries and different materials. „In addition, there was the desire to keep tool changing times as short as possible, as especially in door production there is the need for a large repertoire of tools – and extended downtimes are quite simply inefficient“, he adds.



*Managing director Rico Kaufmann and machine operator Peter Köpfli while discussing order details.*



© Kaufmann Oberholzer AG





Machine operator Peter Köpfl at the Reichenbacher CNC-machining centre VISION-II Sprint while adapting the CNC-programme.



Automatic chain tool changer for 40 tools with pick-up place for a saw up to max. Ø 450 mm.



CNC-machining centre VISION-II Sprint in stop position after machining with component still in place.

Soon, Reichenbacher proved to be one step ahead of the others. Not only the fact that the components required for the machining dimensions, materials and software were easily to be found in the existing machine conceptions, but, above all, the competent support provided by area sales manager Kurt Kutschmann, was a decisive factor for the purchase. Lomscher emphasises, „that, in view of such capital expenditure, the support before and during projecting and installation is a really crucial aspect“.

They received machining centres perfectly customised for their requirements, but leaving sufficient leeway as to their technical equipment for reasons of the machines' modular system. At the beginning of 2016, the first 5-axes line type VISION-II with a manual beam table was put into operation to be followed by an even bigger machine with an automatic beam table and a chain tool changer with 40 places in June of the same year. Now, intricate three-dimensional components up to a length of 7,390 mm, a width of 1,600 mm and heights of 48 cm are machined on these extremely robust gantry-type machines. Apart from wood, also flammable materials, foams, plastic materials, massive plates and aluminium components can be machined on the very same machine. Nesting, too, is possible on both lines.

Both units are equipped with a retraction force measuring unit that checks the retraction force of the clamping system in the milling spindle, thus being in accordance with the latest standards. The retraction force can decline owing to fatigue of the spring assemblies, dry running or wear. This renders the plane clamping force of the HSK-tools too small and thus adversely affects the bending stiffness, the run-out and the exchange accuracy at the interfaces. Moreover, a laser projector optimises the positioning of the vacuum clamping devices and of the components on the machine table. The elevated position of the cable chain in the X-direction ensures free access to the rear side of the machine.

The extraction unit at the bigger machine has proven to be a particularly ingenious concept. The company takes its ecological responsibility very seriously and has developed a visionary system. Primarily, wood and wood-based materials are machined on the CNC-centre, but plaster and other building materials can



© Kaufmann Oberholzer AG

also be processed. The extraction unit is equipped with a special shunt that is operated directly via the control system and separates wood from plaster waste. The company feeds this wood waste into a combustion plant which is part of a local heating network. Thus, they do not only cover their own requirements, but also supply the heat for 20 percent of the surrounding households.

Production manager Ruedi Züger is responsible for planning machine utilisation and needs to keep an eye on many aspects. Apart from delivery dates and rework, above all the time required for individual working processes must very precisely be taken into account in machine utilisation to avoid unnecessary downtimes. These processes can take only a few seconds in the case of alternate loading and the machining of smaller components, but also up to three hours when hundreds of individual holes have to be drilled into acoustic panels. Precise planning presents an enormous challenge, as they aim at keeping also set-up times as short as possible.

Rico Kaufmann points out that they are one of the most important wood-processing companies in Switzerland. This means the handling of considerable volumes of components within the shortest time possible. Proof of this extraordinary potential is a new hotel building where doors, furniture and wardrobes in the equivalent of two million Swiss francs were installed in only two months. It goes without saying that the machines were running 24/7. Daniel Lomscher mentions in particular, „that all components leaving the machine were immediately delivered and installed – and they all fitted perfectly“.

Apart from clearly shorter processing times, there are other considerable advantages in comparison with the preceding 4-axes line. Now, intricate 3D-structures, which were purchased in the past, are processed in-house, which permits an expansion into additional markets also in the future. Today, companies mostly attribute their success to specialisation. This doesn't apply to Kaufmann Oberholzer AG. Their product portfolio is an extremely diverse one if you disregard the fact that 80 percent of their focus is on wood as the predominant material. However, according to managing director Rico Kaufmann this is their very formula for success, as their multitude of competences in very different trades and the fact that „everything comes from a single source“ is greatly appreciated by their customers.



# Innovativeness as the driving force

*Recommended by experts.*

If someone in Switzerland wants to have an extraordinary staircase, he will inevitably come across the creative minds of Treppenbau.ch AG. The people working in Ganterschwil are innovative staircase manufacturers from the bottom of their hearts. There is a good reason for the company's advertising based on the slogan: **Do you plan something crooked? That is to say that their staircase constructions start at a point, where others leave off because it gets too complicated. The result are staircases designed, processed and installed with the aid of state-of-the-art technology.**

For the management team around production manager Daniel Kern, CNC-programmer Adi Scherrer and Wendelin Brägger, team manager work preparation department, the spatial connection of two floor levels presents more than an architectural challenge. The traditional company, which started out as a carpentry shop in 1977 and was among the first Swiss companies employing a 5-axes CNC-milling machine in 1992, has built up a considerable reputation with its innovative projects over the last 40 years.

Where, however, are the strong points of the company to be found? A question Daniel Kern answers as follows: „The innovative gene of our employees when dealing with CNC-technology distinguishes us from our competitors“. „Most projects start when architects or joiners contact us with a certain idea in mind. At this moment our work begins with advice and information as to how wishes can be realised and where there are limits with respect to the static structure“, Adi Scherrer adds. Modern equipment, such as a laser tachymeter, is used to measure demanding project sites at an accuracy of one millimeter, and based on these measurements unorthodox solutions are established and implemented.



*Spiral staircase at the centre of an administrative building of SSB. A filigree wooden staircase has been built around a load-carrying concrete structure.*

© Treppenbau.ch AG



*5-axes unit with cardanic 24 kW spindle while drilling horizontal holes.*



*5-axes machining of a round newel post.*



*Production manager (managing director) Daniel Kern and machine operator Simon Wohlgensinger during quality inspection.*

Programming skills are one aspect, the other being the new CNC-machining centre. Backed up by 25 years of experience, they easily agreed on the profile of the machine: sturdy, long-lasting, great motor power and an automatic table. Kurt Kutschmann, area sales manager Switzerland for Reichenbacher, was well aware of the specific challenges to be met. He knew that flexibility would be the decisive criterion in every respect, as very different shapes and materials were to be processed by this line: apart from the traditional elements of a staircase also individually shaped components with any radius and lengths of up to 5,000 mm.

The VISION-III Sprint is perfectly equipped for this task. The machine table has 10 automatic beams, displacement is 8,700 x 2,145 mm and more than impressive at 670 mm for the Z-axis. „Nevertheless, we sometimes work with a minimum clearance between milling head and component because saw blades with a larger diameter are used time and again“, Adi Scherrer says. This is due to often very intricate shapes. Of course, the line is equipped with everything that defines a modern machining centre: apart from the 5-axes machining unit this is a multi-spindle drilling unit including 4 horizontal drilling spindles, an automatic plate magazine for 24 tools, a pick-up place for a big saw blade, a tracing spindle unit with tracing bell – and much more.

One project is particularly suitable for explaining the need for sophisticated CNC-technology. At the heart of the spiral staircase in the administrative building of SSB is a load-carrying concrete structure, which had been measured 3-dimensionally to the millimetre by means of a tachymeter, and around which a filigree wooden staircase was to be built. Characteristic are, among other details, 21 different lateral balustrade stringer elements, which were bonded using the sandwich technology to form the blanks to be processed by milling on the CNC-line. The bottom view presented the greatest challenge. „Double-curve, massive negative and positive forms were used to veneer small propeller-shaped bonded oak plates, which were subsequently cut to the required dimensions on the CNC-line and attached to the bottom of the staircase according to the tongue-and-groove principle – wow effect guaranteed“, says managing director Daniel Kern with obvious pride.

80 percent of the line's production time are dedicated to staircase manufacturing. The other 20 percent are used for service tasks, such as the creation of intricate wooden structures and of free forms, like table elements, furniture, boarding for concrete work, round columns and arches, walls or funnel formwork. The components are milled, packaged and then installed on site – everything must be a perfect fit. Apart from wood, also Corian, acryl and HPL-plastics are machined on the CNC. The variety of materials provides for creative scope, as the material is decisive with respect to the role, but predominantly also the visual effect of a component.



## Visions take shape

Settings for museums, themed attractions, science centres and much more.

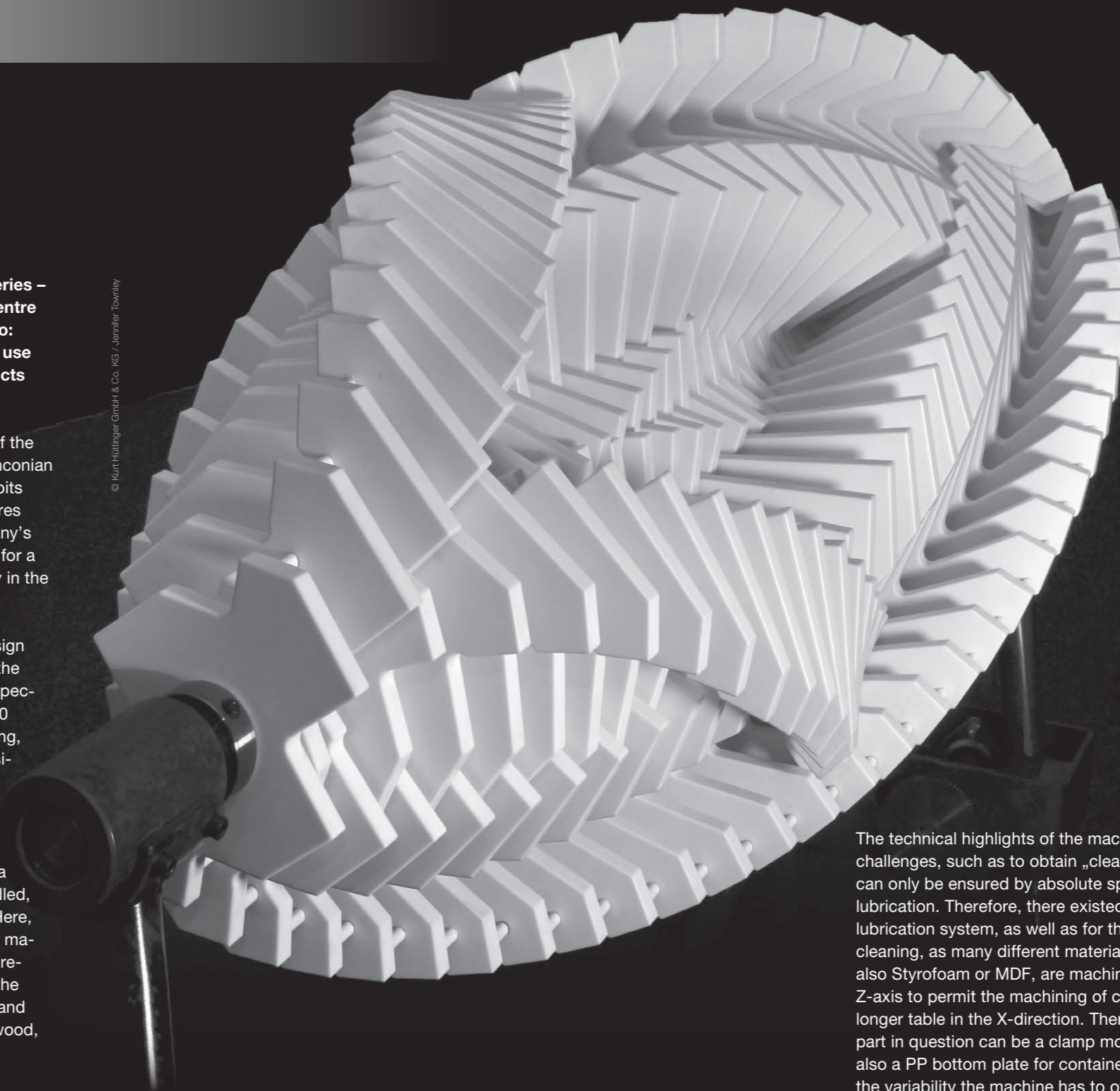
If it comes to being whisked off into a lively world full of fascinating discoveries – no matter in a visitor centre, a museum, a themed attraction or a science centre – most probably Hüttinger will have been involved. In keeping with the motto: the visitors should enjoy the settings and have the possibility of making full use of the latest didactic developments to absorb the technical and scientific facts presented at various interactive stations.

„Our family business was already founded in 1921“, states Jörg Hüttinger, one of the managing proprietors. Since the 70ies the company, which is located at the Franconian village of Schwaig, has developed into a world-wide provider of top-quality exhibits and interacting elements from various thermoplastics, above all for science centres and themed attractions, which today account for about 80 percent of the company's sales. Their sophisticated product portfolio reaches from the stand-alone model for a fair up to the entire equipment for exhibitions and information centres, especially in the sectors energy technology, communication technology and automobile.

At the beginning there are the ideas and concept outlines established by the design department. Using CAD-systems, they show the exhibits and interior design on the computer almost true-to-life to enable the customers to get a picture of the prospective outcome. Given projects with space requirements of sometimes up to 12,000 square metres and costs in the six-digit range, this, in connection with prototyping, is an integral part of the overall process and gives the customer security in decision-making. Afterwards, the design department's task will consist in integrating stability, safety aspects and the suitable production methods into the concepts, and only then production can start to implement them.

An annual order volume of 500 exhibits with delivery periods of sometimes only a few months, as well as the enormous speed at which the orders have to be handled, necessitated a decision in favour of an expansion of their in-house production. Here, the machinery available is the key factor. Apart from other lines, since 2013 their machinery also comprises a 5-axes machining unit from Reichenbacher. Their requirements included a few very specific parameters: the limited installation height of the machine for reasons of the low ceiling of the hall, the component diversification and the possibility of machining components made from various materials, such as wood, aluminium, GFRP, composites and Plexiglas.

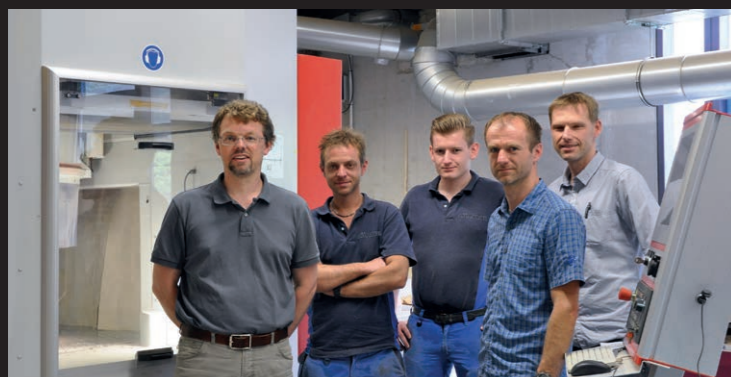
© Kurt Hüttinger GmbH & Co. KG / Jennifer Townley



The kinetic sculpture *Asinas II* has been conceived by Dutch artist Jennifer Townley and manufactured by Hüttinger according to her design. Even if the individual parts consist of various angles and curves, they create a fascinating harmony and unity when joined together. The two „wings“ formed by 77 parts of Avonite seem to slide through each other and rotate in opposite directions at different speeds. This movement makes the mechanical sculpture appear more multi-faceted and combines artistic aesthetics with complexity, thus casting a spell on any viewer.

The technical highlights of the machine were essentially related to very specific challenges, such as to obtain „clear“ edges for components from acrylic glass. This can only be ensured by absolute spindle precision and optimum minimum quantity lubrication. Therefore, there existed specific stipulations for the minimum quantity lubrication system, as well as for the elevated position of the cable chain for better cleaning, as many different materials, such as thermoplastics (PP, PVC, PMMA), but also Styrofoam or MDF, are machined on the CNC. Additional features are a higher Z-axis to permit the machining of components up to 520 mm block dimension and a longer table in the X-direction. There is a great variety of component dimensions: the part in question can be a clamp mounting from PVC with a size of 60 x 100 mm, but also a PP bottom plate for containers with a length of up to 3,950 mm. This illustrates the variability the machine has to offer.

The equipment is complemented by a blasting nozzle which causes an ionised air flow to prevent a fusion of the milled-off material with the component and thus scratching of the sensitive surfaces, as well as by a plate magazine for 24 tools and by a moving pick-up place for a saw up to a diameter of max. 400 mm. This saw blade is ideally suited for bevel cuts at components from EPS and MDF. Jörg Hüttinger is highly satisfied with the line: „We have become much faster and are capable of reacting much better to the acceleration in the market thanks to a manufacturing depth of almost 80 percent. Quality is excellent and there has been a considerable increase in efficiency. Rather than mass-producing components, we serve a wide range of customers. Based on our strategic planning and manufacturing methods, we are turning visions into reality keeping in mind clearly defined targets. This warrants for cost effectiveness, investment security and thus economic efficiency, even if almost none of the components is like the other“.



Team in charge of CNC with managing director Jörg Hüttinger.



Impressive exhibit at Centrum Nowoczesności.



Exhibit for fairs - Schaeffler Group Concept Bike.





# Discover new perspectives



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