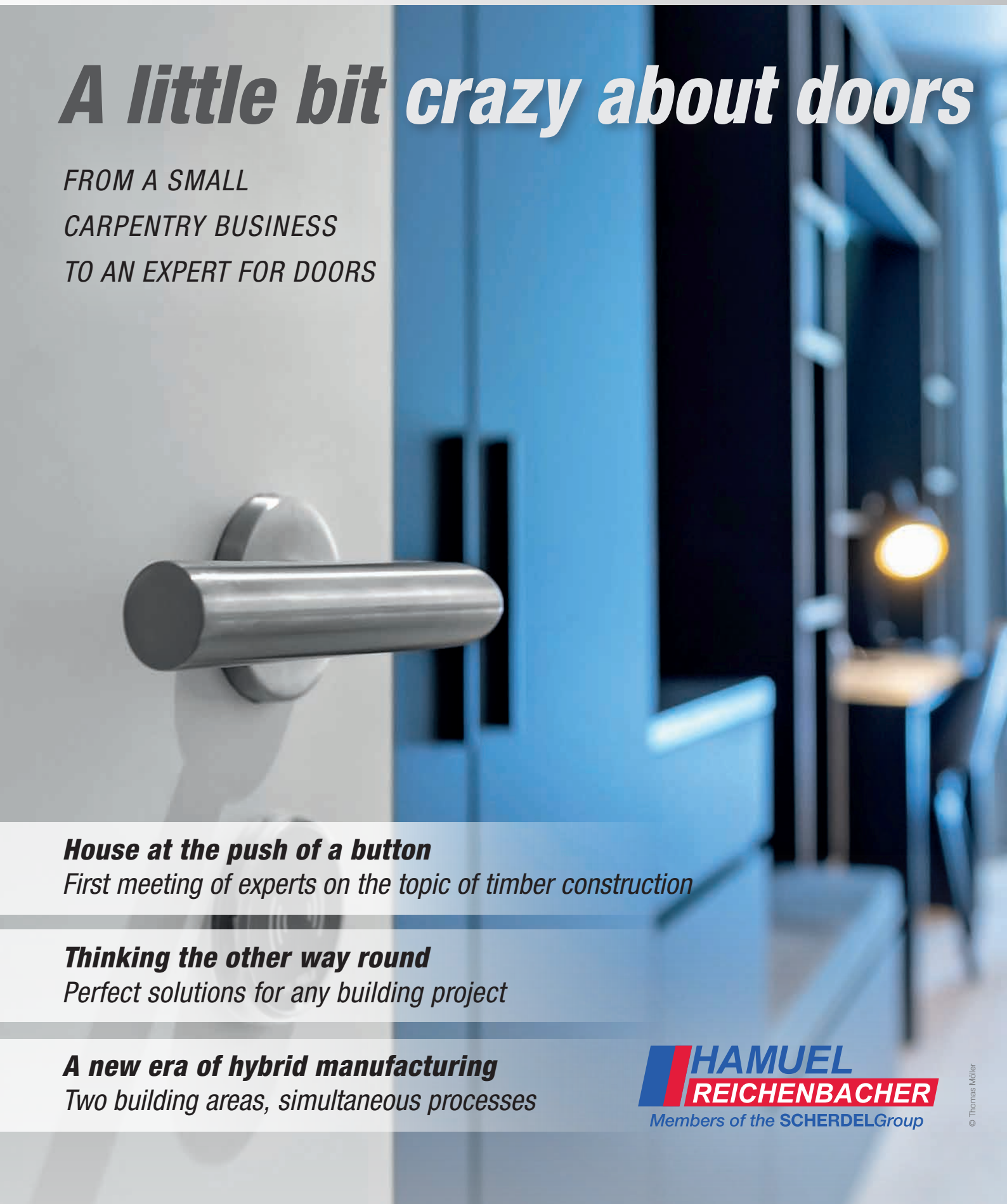
Insight

CUSTOMER MAGAZINE

11/2022



A little bit crazy about doors

FROM A SMALL
CARPENTRY BUSINESS
TO AN EXPERT FOR DOORS

House at the push of a button
First meeting of experts on the topic of timber construction

Thinking the other way round
Perfect solutions for any building project

A new era of hybrid manufacturing
Two building areas, simultaneous processes

HAMUEL REICHENBACHER
Members of the SCHERDELGroup

Foreword by Florian Mauch.

Turn of the times – for all of us…

Dear customers, business partners and colleagues,

these days we have to accept that nothing is or will be as we have taken it for granted for a long time. Climate change is no longer the only issue that will affect our actions in the years to come.

Increasing energy and raw material costs present us all with huge challenges and no one knows the ultimate solution yet. We are part of the SCHERDEL*Group*, a family-run group with about 6,000 employees and over 130 years of company history. The size of our group and the shared basic idea of long-term cooperation and close coordination with all our partners give you as a customer security - and the certainty that you can rely on us.

We are responding to these enormous challenges with some innovations and activities, which we present in the current Insight 11. On the one hand, there is the review of our first expert meeting on timber construction last year, which was very successful and prompts us to follow up with the second part at the end of 2022.

An exciting user report from formwork construction is to follow, as well as one from the manufacture of high-quality door solutions. We introduce our competent service partner for the Benelux countries and show how young people can plan their start into their professional life with us – by introducing a variety of interesting job profiles. Moreover, we have made another step forward in the field of Additive Manufacturing. Our colleague Dr Kawalla-Nam talks about the new era of hybrid manufacturing with the HybriDX-Pro machining centre.

Hence, many exciting topics are in store for you in our first issue published in 2022.

I hope you will enjoy reading this issue,

Florian Mauch
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Imprint

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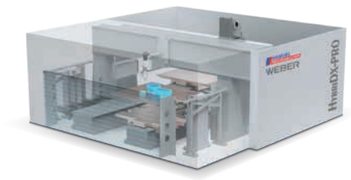


House at the push of a button

First meeting of experts on the topic of timber construction.

On November 9, 2021, we hosted the first expert meeting – the focus was on the future of timber construction. Housing is scarce and therefore everything to do with building will continue to increase in importance over the next few years. The objective of our expert meeting was to offer planners, contractors and all those involved in construction, a common platform to swap ideas about the role of wood as an ecological material and the advantages of automated processing.

Wood has excellent ecological properties, is renewable, easy to recycle and binds CO_2. Changes in building regulations have resulted in the permission to build houses higher than 13 m now from this material, too. Moreover, wood is a building material with many advantages: it offers good sound insulation, provides a pleasant indoor climate and, with the right construction method, has a long service life. Dynamic solutions in timber construction are bringing this raw material more and more into focus and automation is playing an increasingly important role.

Dynamic solutions in timber construction
The well-known Tatort actor Andreas Leopold Schadt competently accompanied our guests through the event and first welcomed the President of the Rosenheim University of Applied Sciences, Prof. Dr. h. c. Heinrich Köster, on stage, who kicked off the event with his talk on the future of building activities and timber construction. He spoke of a paradigm shift in terms of resource consumption and energy-saving potential reflected above all in different energy and material combinations. According to his forecasts, interest in buying single-family homes will decline and, in turn, demand for multi-family homes will increase. He concludes that it will hardly be possible to stop the trend towards modular construction and semi-finished products.

Moderator Andreas Leopold Schadt


© Poppensieker & Derix GmbH & Co. KG

Machines for urban timber construction
In their presentation, Volker Budzinski and Kurt Kutschmann covered the aspects of automation and illustrated them by means of three completely different production lines for timber construction that Reichenbacher has developed and implemented in recent years. The decisive feature, Volker Budzinski emphasises right at the beginning, will be to adopt process-oriented thinking in order to meet the desire and claim for a "house at the push of a button". "Timber construction will increasingly move towards industry and away from actual craftsmanship," he predicts, adding: "Industrial production means partial or full automation." Here, the decision as to which work processes to choose for automation, has a decisive influence on the execution of the systems. All those involved have to grow together while many technical steps have to be coordinated so that process steps and structures mesh smoothly. High precision machines with useful chip and storage concepts that perfectly match accuracy and safety requirements will significantly increase the productivity of timber construction companies in the future. Dynamic solutions will prevail in house construction – if one understands the process as a holistic approach.

Intelligent. Networked.
Andreas Czypull, Account Manager & Sales Representative CAD/CAM of COBUS ConCept, elaborated on the topic of software by presenting different systems. He explained the optimisation of work processes through set-up time and tool optimisation and, above all, flexible splitting of machining operations. Czypull used the COBUS lot manager programme as an example to show how to combine different projects into a single production lot. Thus, the optimisation of components for entire wall groups and storeys, as well as waste rate reduction is possible. The data is stored in a SQL database and continuously synchronised, thus allowing the user to get an overview of all current lot conditions within a very short time. In the end, Czypull emphasised that COBUS scores above all with its in-house software development, its strategic focus on timber construction and the fact that it has always been at the forefront of new technologies as a development partner for machine manufacturers.

Perspectives of timber construction
Markus Derix, Managing Director of Poppensieker & Derix, also ventured a look into the future of timber construction. In his opinion, the construction industry is the key factor when it comes to coping with climate change. He compared the carbon footprint of concrete, currently the most widely used building material, with that of wood and explained that wood is much more environmentally friendly because it binds carbon dioxide, whereas the production of concrete releases the harmful greenhouse gas. He explained the concept of cascade use, as wood is a renewable resource that can be used not only once in its solid form, but also as a recycled material and, in the end, to generate bioenergy. As an example of sustainable timber construction, he presented, among other things, the Triodos Bank building in the Netherlands, built in cooperation with Derix. For its construction, 2,700 m^3 of wood were necessary, which resulted in the storage of 2,143 tonnes of CO_2. If it had been built in the conventional way, this would have caused carbon emissions of 2,025 tonnes. Moreover, he referred to the entirely new paths and approches taken in the planning and realisation of this building. Hence, the client regards the object as a ”materials bank“ whose components can and should be reused after dismantling. Derix implements the Cradle-to-Cradle principle by means of a take-back obligation. In this visionary concept, the elements of glulam and cross-laminated timber bound in the buildings are given back at the end of the defined building service life and serve as raw materials for new products – a consistent circular economy in the sense of sustainability.

Panel discussion of the experts (left to right): Markus Derix, Volker Budzinski, Prof. Dr. h.c. Heinrich Köster, Stefan Jack, Andreas Czypull, Andreas Leopold Schadt

Automated prefabrication
Stefan Jack, Senior Account Manager, Modular Construction Elements at Güdel, concluded the series of lectures. His focus was on the presentation of complete manufacturing processes featuring intelligent automation solutions. Entirely in the sense of a smart factory, where production processes are not only networked, but manufacturing plants and logistics systems also organise themselves. He described what switching to automated production means for companies. Most companies already have machinery that, in his opinion, should be integrated into a manufacturer-independent, higher-level system.

The aim of automation is to increase productivity on the existing floor space, to ensure batch size 1 production, to guarantee flexibility in design, to assure high quality and exact adherence to deadlines and to warrant for a clean logistics process, above all in the flow of materials. Here, the most important prerequisite for the success of automation is its acceptance by employees and management. According to Stefan Jack, the benefits of maximum automation compared to automatic joinery and manual production speak for themselves, as the process times for beams and panels, as well as for complete timber elements such as walls and ceilings, are sometimes 20 – 40 % shorter.

Panel discussion
During the final panel discussion, the experts were available to answer questions, on the one hand to introduce the participants to even more complementary aspects of timber construction, but also to discuss the role of research and politics in this context, how recyclable timber hybrid solutions are, what other advantages building with wood has, and much more. The feedback proved that the expert meeting was a very successful event.

Timber construction will remain an important topic for us also in the future, which is why we are continuing this series: according to the current state of planning, the second expert meeting on timber construction will take place in October or November 2022.

Thinking the other way round

Perfect solutions for any building project.

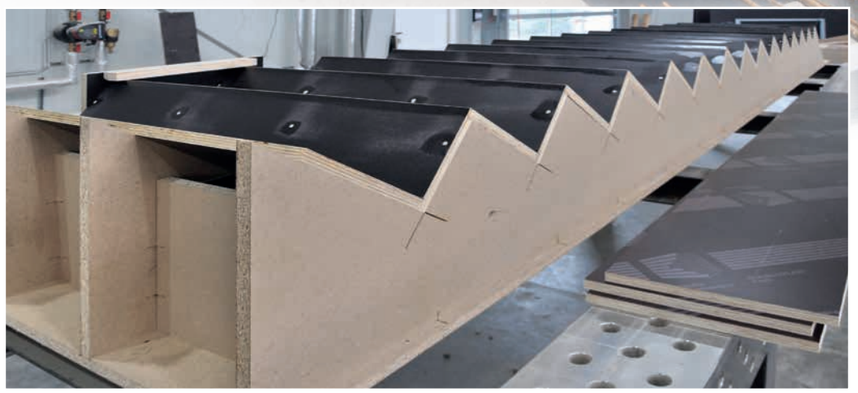
For the production of concrete components, fresh concrete is poured into the formwork, a mould removed after curing. Every mould presents a new challenge, as planners and architects need creative freedom to realise attractive living environments.

The company innbau-Beton, which supplies building contractors with high-quality precast concrete parts, is located just outside Munich. 90 employees create perfect solutions for any building project, which impress by excellent concrete and surface qualities.

At first, it may seem strange to the outsider that one wants to score points with surface qualities in concrete elements. ”The fact is, however, that in the case of balcony and stair formwork, which is complex in shape due to various angles, it makes a considerable difference whether the formwork is made of one or several panels. Joints are clearly visible in the concrete, after all. The result will therefore only be perfect if just one large panel is used as a negative mould for the concrete,“ explains Alexander Kraushaar, Production Manager Special Parts at innbau-Beton.

Although the company has had a modern setup with robot technology since the 1990s, carpenters made the formwork panels by hand with circular saws until 2019. For only two years now, panels in sizes up to 6,000 x 2,000 mm have been produced automatically on the QUANTUM. ”Compared to the past, we achieve time savings of around 25 percent by using this machine,“ Kraushaar emphasises, adding ”and that‘s despite the fact that the variety of components has remained the same. We have only made selective changes to facilitate formwork construction, such as the insertion of dovetail joints, which entail less bolting.“

High-quality precast concrete elements: balconies, stairs, special components, element ceilings, double walls and solid walls.



For making a concrete staircase, fresh concrete is poured into the staircase formwork.

The synchronous motor allows fast sawing with saw blade diameters up to 450 mm.

The CNC can efficiently produce large, as well as small components with dimensions of 1,000 x 500 mm for recess formers or wedges that can be used to create slopes or fix upstands. A 15 kW spindle designed for continuous operation, a synchronous motor that allows fast sawing with saw blade diameters up to 450 mm, a gantry drive that guarantees remarkable surface quality at high feed rates, a drilling unit and an automatic beam table leave hardly anything to be desired. A technically mature 5-axis system for covering even large working areas that, thanks to its high vacuum power, permits the handling of a wide variety of panel materials, each with different permeability levels.

”This investment has made us less dependent on skilled workers and, at the same time, the plant constitutes an additional incentive for young people with an affinity for technology,“ emphasises Managing Director Albin Schuster. ”But let‘s not be fooled, formwork construction is and will remain complex, because as a CNC programmer you need a good spatial imagination just like a carpenter, as with negative forms you have to be able to think the other way round,“ Alexander Kraushaar remarks.

The basic principle of balconies, for example, is usually the same, but relevant parameters change with every construction project: different elevation angles, sizes, projections, upstands or slopes must be taken into account to ensure that the water runs off safely. The experts at innbau-Beton only get a plan of what the precast element has to look like. They have to programme the negative themselves, meaning that they have to define every single step with the help of NC HOPS. For stairs, this means defining all the different variables such as rise ratio, tread width and number of steps. Once the programming is done, skilled workers in the production department can take over the further steps. Then, with the help of the CNC system, components of most different geometries are cut out or milled: round, triangular or square contours, circular milling, multi-side machining, with or without holes – via a control system that can be operated intuitively and easily like a smartphone using the WOP interface on a 24‘‘ touch screen.

A little bit crazy about doors

From a small carpentry business to an expert for doors.

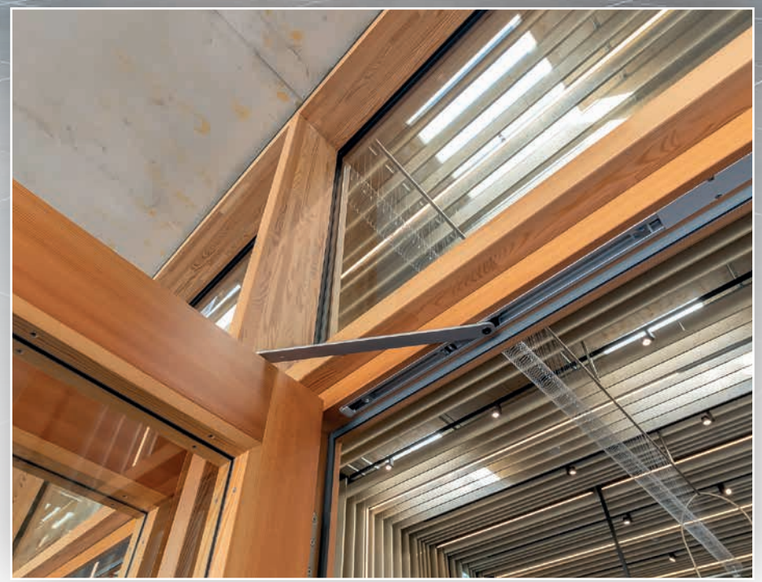
One might think that a company with almost 90 years of history, which shifted its focus to pure door production in 1963 with the patenting of the System S frame, is resting on its laurels. Far from it.

With curiosity and ambition, the company neuform-Türenwerk from Erdmannhausen near Ludwigsburg is constantly exploring trends, questioning the familiar, taking up new challenges and designing trend-setting solutions. The result are doors that are an exceptional combination of aesthetic design, precise engineering and passionate craftsmanship.

As the product portfolio had become more and more customer-specific with batch sizes starting from 1, and the series machines were getting on in years, the company had to reposition itself in 2015. A prerequisite for producing doors in large series with automatic loading are modern machining facilities. Market research indicated that, apart from long delivery times, the investment volume would be particularly daring, because normally one would have to expect a value in the almost 7-figure range for just one of the desired CNC systems. Thus, there was the need to find another solution, and luck was not long in coming.

A Dutch door manufacturer, who had exclusively used tropical woods and dealt with one-off production, put up three of his Reichenbacher units for sale. The neuform team went to Holland, got an overview and was thrilled. After all, the implementation of the idea of complete machining from batch size 1 plus low set-up times was within reach with these systems. Here, service manager Matthias Wolf acted as their advisor. ”We had no experience with 5-axis technology yet, but we immediately realised that an extensive technical conversion was necessary,“ explains Daniel Wacker, Technical Manager at neuform. Matthias Wolf, on the other hand, was well aware that through retrofit the systems could be perfectly adapted to the door manufacturer‘s needs.

Processing of leaf sizes up to a maximum of 3,200 x 1,400 mm and thicknesses of up to 90 mm is possible on the system.



© Thomas Möller für neuform-Türenwerk

Unlike hardly any other component, doors are subject to daily wear and tear. Often, it is a balancing act to harmonise unconventional design with the legal and structural requirements and to integrate it into an overall creative concept in the end. You will find the brilliant door concepts in hotels, hospitals, kindergartens, public buildings, as well as in schools or cultural institutions. Impressive examples of this include the German Embassy in Beijing, the ESO Supernova planetarium in Garching and the Elbphilharmonie concert hall in Hamburg. No matter whether fire, smoke, sound, burglary or radiation protection is required, or whether bullet resistance or an antimicrobial door concept is involved – the specialists always demonstrate exceptional flexibility in terms of design and variety of execution.

Hidden beneath the surface of doors, countless requirements for protection, durability and strain resistance can be realised. When neuform bought the three identical CNC machines of type VISION-II-UT with portal loading system at an auction, they were around eight years old. When they arrived in the industrial area of Erdmannhausen by special transport and special purpose cranes moved them, it almost had the character of an event.

Moved by special cranes, it went around corners, over ramps and down narrow alleys.

The U-shaped portal structure is equipped with two cardanic 5-axis units.

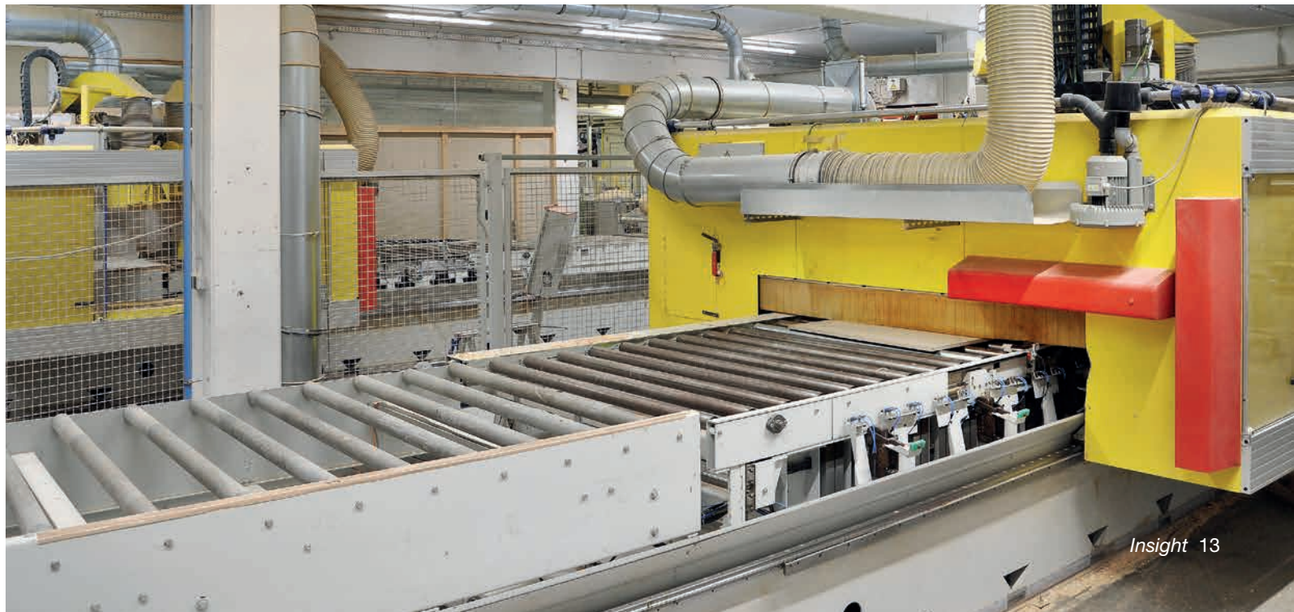
The biggest challenge, however, was yet to come: all the conversion work had to take place in parallel with ongoing production. An enormous logistical task. While the old plants were producing, we had the opportunity of upgrading production progressively in a compressed form. The lack of space, however, made the prompt dismantling of the old machines, which ran in two shifts, an absolute necessity. On them, gradual capacity reductions took place, while at the same time an increase in unit numbers on the new ones ensured a smooth transition.

Daniel Wacker is still convinced of the investment: ”A Reichenbacher is built for eternity, what should break.“ The U-shaped portal structure of each of the three identical VISION-II-UT systems features two cardanic 5-axis units, which allows a great variety of variants thanks to the possibility of choosing between parallel and single machining. A 60-place chain tool magazine supports the tool change of both units during machining. The through-feed table has a driven roller track with lifting device. Moreover, there is a fixed suction bar at the front, and one at the rear, which can be adjusted via the NC axis and is equipped with individually selectable vacuum cups and positioning stops.

These CNC systems can machine anything: cable ducts, lock cases, light panel cut-outs, concealed hinges, three-dimensional hinge systems, multi-point locks and much more. Since neuform only works on an order or object-related basis, it is possible to create with the in-house configurator more than 1.2 million different door versions. No door is like the other, and therefore one cannot resort to existing data. Production planning automatically programmes each component with NC HOPS, generates on this basis all the necessary data and, if required, creates a simulation using a digital twin. The subsequent machining process on the machine is then a rather simple one. Even where leaf dimensions of up to 3,200 x 1,400 mm and thicknesses of up to 90 mm are involved.

The company‘s intention is apparent from a statement by managing director Michael Glock: ”For us, there is far more behind every door than just the material. What counts are the people behind it....“ This is a reflection of their philosophy of being able to provide individual advice and impetus for each building, area and task. The only way to create consistent door solutions for the respective building project: from almost invisible, discreet elements to visually unusual stylistic elements that have a defining effect on the architecture.

CNC system type VISION-II-UT with portal loading system.



The through-feed table is equipped with a driven roller track with lifting device.

Quickly on site – service in the Benelux

Interview with Wim Braekers.

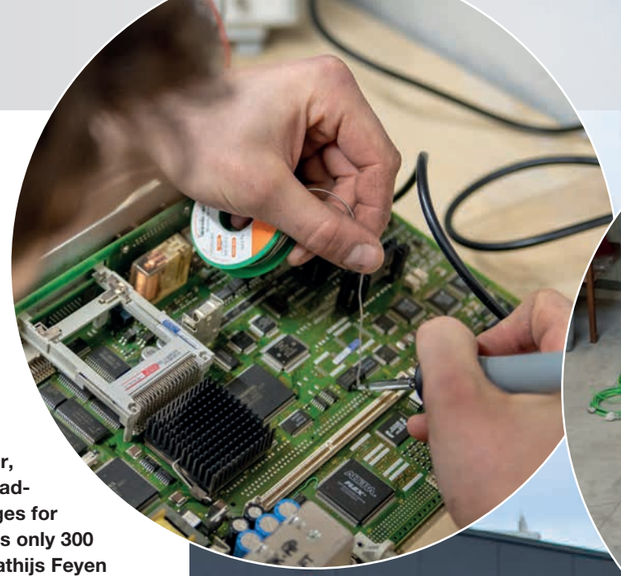
As of 2008, we had had a service partner in the Benelux countries, and since 2016 Wim Braekers had been working there as a fitter. In 2017, he took over this company as managing director, renamed it CNC Tech BV in 2018 and relocated the company headquarters to Pelt in Belgium. This last step has decisive advantages for his work as a service partner, because the company's location is only 300 metres from the motorway, meaning that he or his employee Mathijs Feyen can be at the border crossing to the Netherlands in just 1 minute and therefore on site at all customers in the Benelux countries within 3 hours.

A look at his curriculum vitae shows why Wim Braekers is the perfect professional service all-rounder for us. "My father worked as a manager in a woodworking company and they had the first CNC system at all in Belgium. I was there since I was a child when my father repaired the CNC in the evenings. This means that I have had a taste of CNC from an early age and have discovered my love for this technology and milling. After my studies as an industrial engineer in automation (M.Sc. Automation), I started directly as a fitter at Reichenbacher." The perfect match is Mathijs Feyen, who worked for us as a trainee and then as a fitter during his training to become a maintenance technician (B. Maintenance).

With his own company, Wim Braekers now serves, together with his colleague, all Reichenbacher customers in Belgium, Luxembourg and the Netherlands, who almost exclusively call him directly, as it is simply more comfortable for them in their mother tongue. He then arranges the planning of the interventions with our service centre. This proximity to the customer is an advantage not to be underestimated. Another plus is that he already has spare parts in his car, which are needed according to experience, and can therefore help quickly and easily in the case of about 60 % of the interventions. Our service centre sends bigger spare parts, which the fitters need also during normal service visits, directly to the customer by express, and due to perfect coordination Wim Braekers or Mathijs Feyen are always at the customer's site on time.

"Apart from machine installations and commissioning, our daily work is full of maintenance, repairs and modernisations as part of the retrofit programme. About 50 % of the machines we service are woodworking machines, the other half are CNC machining centres for aluminium or plastics. In other words, we have to have a detailed knowledge of almost all series, including the new OPUS series." All this is challenging and exciting, not least because he gets around in many industries and not only looks after craftsmen's businesses in staircase, window and door construction, but also, for example, yacht builders.

Wim Braekers is convinced that the high degree of customer satisfaction is due to their guarantee to be on site in the shortest possible time to solve any problem. Customers depend on their equipment; a craft business with 10 or more employees and only one CNC machine has a problem if it comes to an unexpected standstill. The promise to get the system up and running again within 24 to a maximum of 48 hours creates security and trust. "And I also enjoy trust at Reichenbacher; I can call anyone in service and get great support," he concludes.



Their daily work is full of maintenance, repairs and modernisations.

Spare parts that they need more often according to experience are stored on site; this renders quick and easy help possible in the case of about 60 % of the interventions.

From left to right: Wim Braekers and his colleague Mathijs Feyen

Job entry opportunities

Start your professional career at a future-proof company.

Exciting, diverse and with perspectives: We are looking for enthusiastic young people who want to start their career at a successful mechanical engineering company. A qualified vocational training with supplementary in-house and external training measures, attractive tasks and great development prospects await you.

On top of all this, we offer further training for employees, as well as practical experience on an international basis and individual support and encouragement for students within the framework of project work.

Electronics technician for operating technology (m/f/x)

Keeping an eye on all functions

You will learn how to install, maintain and repair electrical operating, production and process equipment.

Industrial clerk (m/f/x)

One person with a great variety of tasks

At our company, you will learn all the basics for your future career in the areas of materials management, human resources, finance and accounting, marketing or sales.

Industrial mechanic (m/f/x)

All-rounder in the company

It is your responsibility to put the complex CNC machines back into operation after functional tests.

Mechatronics technician (m/f/x)

All-in-one mechanics-electronics-informatics

You will take care of the assembly, installation, commissioning and maintenance of the CNC systems.

Technical product designer (m/f/x)

Inventiveness and creativity are your strengths

Among other things, your task is to draft detailed designs for the CNC machining centres on a 3D CAD system.

HAMUEL REICHENBACHER
Members of the SCHERDELGroup

A new era of hybrid manufacturing

Two building areas, simultaneous processes.

Interview with Dr Kawalla-Nam.

The developmental progress in hybrid technology is fast-paced. The HybriDX-Pro system we have developed in cooperation with Weber Additive reaches an entirely new level. Dr Kawalla-Nam, Head of Additive Manufacturing Technology, explains three specific concepts pursued at Reichenbacher.

The **first concept** is the well-matched **interface** between a 3D printing and a milling machine, which allows for uninterrupted machining operations right up to the completion of the component. The **second concept** comprises the **production processes** such as printing and milling in **one building area**, as is the case with the ECO-LT. Here, the plant combines Fused Granular Fabrication (FGF)-based extrusion with machining. 5-axis machining takes place after or during printing to ensure accuracy and optimise surfaces.

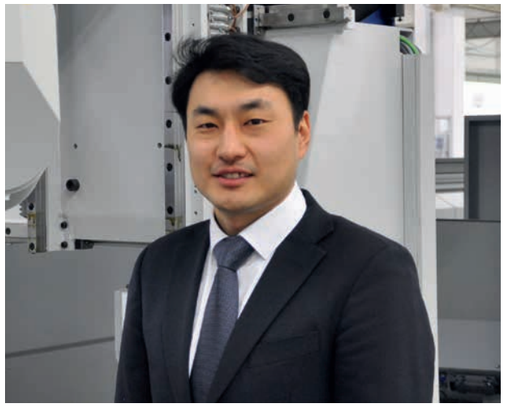
The impetus for the development of the **third stage** with **two building areas** resulted from the desire to achieve comprehensive exploitation of hybrid technologies with the aim of making processes significantly more efficient in order to be able to produce large quantities in a short time at competitive costs.

Interviewer: What exactly is so visionary about the new HybriDX-Pro?

Dr Kawalla-Nam: Compared to the ECO-LT, where printing and milling take place in the same building area, with the HybriDX-Pro we work with two separate building areas: one independent printing area and one milling area. The system is equipped with two portals and two movable tables, the current configuration featuring a 3-axis extruder with a maximum output of 35 kg/h (depending on the printing material) on one side of the portal and a 5-axis milling unit with a power rating of up to 55 kW on the other side.

The idea of generating a perfect combination of technologies, materials and different AM technologies in a single control process prompted this development. We call this "agile process technology" and refer to the fact that work processes no longer take place one after the other, but instead occur simultaneously and independently of each other. This gives us a great deal of flexibility, as one table is in the print building area where printing takes place, while the other table is in the milling area where finishing proceeds.

The use of two extruders in the print building area would be a further stage of expansion, providing the option of printing with two different materials at the same time. Or else you can work with two different nozzle diameters: massive parts are printed with a higher output and more delicate parts with a correspondingly lower one. The same applies to the milling area, where the use of two 5-axis units would also be possible.



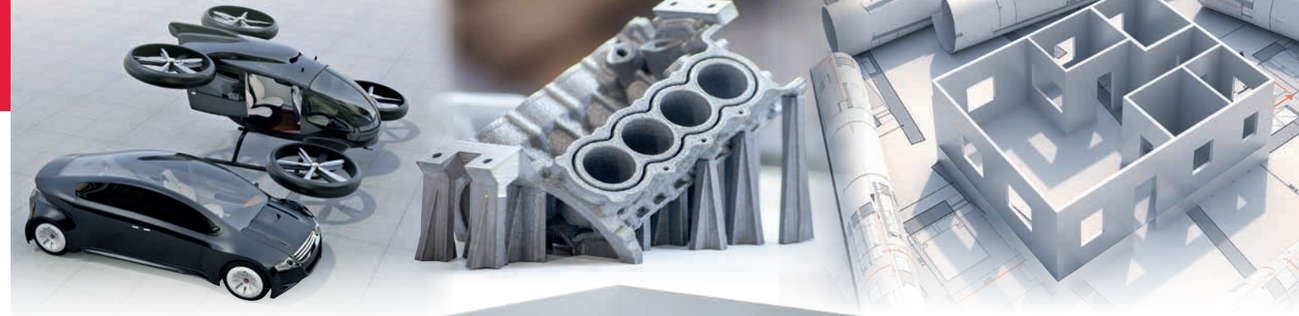
Interviewer: What precisely do the process operations look like?

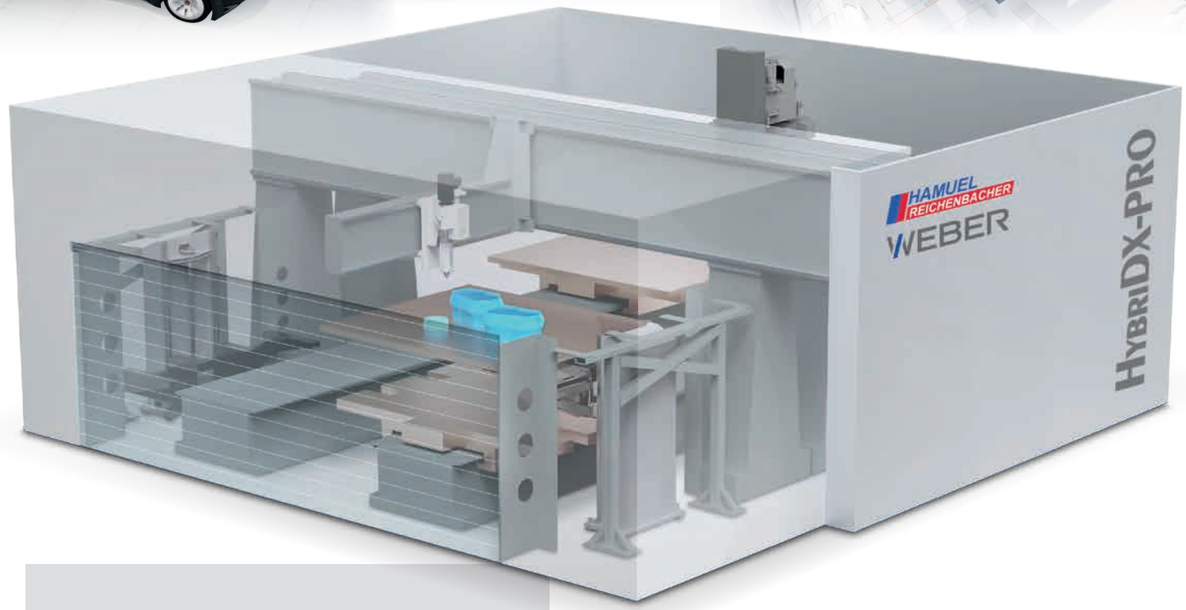
Dr Kawalla-Nam: In the printing area, printing is from above in the Z direction, and then the table moves to the milling area, where 5-axis machining of the component takes place. Here, the two movable tables handle components with a printing and milling volume of 2,500 x 2,000 x 1,000 mm. Since you can couple the tables, the user even has a building volume of 5,000 x 2,000 x 1,000 mm at his disposal; this provides for the possibility of producing also very large components. Fixing of table dimensions is possible according to customer requirements.

Process times are very different, however, as milling is around 10 times faster: depending on the component, the printing process can take two hours, the downstream milling process only a few minutes, subject to the complexity of the component. The highlight: if the machine is to work continuously (24/7), the user can be completely flexible in the milling area in the free time intervals and, for example, mill other components until the second table is to enter the milling area with another printed component. The objective is to keep the system constantly in operation, thus reducing downtimes to a minimum.

Interviewer: What are the advantages for the user?

Dr Kawalla-Nam: Apart from the large printing volume, the use of technical and high-performance thermoplastics is particularly noteworthy. These are characterised by the fact that working is at elevated temperatures, which is a decisive advantage for industrial users in the automotive or aerospace sectors.





The HybriDX-Pro has two separate building areas: one independent printing area and one milling area. The system is equipped with two portals and two movable tables.
Thus, two processes can be combined and take place simultaneously.

Thermoplastics are used, mainly polypropylene (PP) and polyamides (PA) and in the future polyetheretherketone (PEEK). The latter is a high-performance plastic, a subgroup of thermoplastics, which stands out from the others in particular due to its temperature resistance and mechanical properties and is primarily applied in aerospace and nuclear technology. These plastics require printing under elevated temperatures, meaning that you need a building area heater and corresponding extruders.

The maximum temperature for heating up the tables is 200 °C for the HybriDX-Pro, and the maximum building area temperature during printing is 120 °C. In addition, we have equipped the printing chamber with an exhaust system to filter the vapours and particles, some of which are harmful to health as they are respirable, and an efficient chip extraction system exists in the milling chamber. Hence, this system design also comprehensively accounts for safety aspects.

Interviewer: For which applications is the system ideally suited?

Dr Kawalla-Nam: We have already mentioned industrial users, as the HybriDX-Pro involves higher investment costs, and the space requirements for this machine are greater than for other machines. Its use will be particularly interesting for users in mould and prototype construction; but also, for example, in pipe technology, where certain connecting elements for pipes are needed, or for the production of various elements for façade construction. In essence, this is the case wherever one wants to replace conventional production methods or to print smaller series of medium-size components.

Interviewer: Are there any other highlights, also compared to our competitors?

Dr Kawalla-Nam: This is hybrid manufacturing in the truest sense of the word. With this plant, we have succeeded in combining two processes and letting them take place simultaneously. It was important to us that the operator can command both operations in one control process. This also means that it is no longer necessary to measure the components, as all processes run via a control system and the milling process adopts the position of the printed part.

In addition, the ECO series provides the basis for the HybriDX-Pro and thus, from a mechanical engineering perspective, a system design well proven for decades.

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03/22