

Sustainable Building with Wood

DEMOGRAPHICS CAUSE
CHANGES IN OUR LIVING
CONCEPTS

Review Expert Meeting, October 2023
Industrial manufacturing in timber construction

Unpacking and fine cleaning of 3D printed metal parts
Automated box unpacking

Setra Group Långshyttan
Timber frames for green building



Foreword by Dr. Alexander Kawalla-Nam

A Shift towards Additive Manufacturing?

Dear customers, business partners and colleagues,

There are many possible paths for a transition to a climate-neutral industry: compared to conventional manufacturing, additive manufacturing is attributed great potential for CO₂ savings. For years now, Reichenbacher has had its own competence centre for AM technology with the objective of developing additive manufacturing systems for industrial use that possess a unique selling point. How do we reach this objective? In co-operation with renowned partners from the industry.

Thus, we have needed only a few years to bring closed and efficient solutions for SMEs onto the market. In 2023, the specialists from Solukon, who automate the unpacking from the building container and the de-powdering in a single system, complemented our initial cooperation with Siemens and Weber Additive. The Ophir BeamPeek analysis system from MKS Instruments has recently provided us with the technology to ensure production quality by permitting the optimum adjustment of our large-format systems with multiple laser sources. Multec and its patented HexaMove 6-fold print head will take 3D printing to an entirely new level in the future with lightning-fast tool changes and filament tracking with automatic control.

Our other areas of expertise also have a lot to offer: an exciting report on Holzbau Bauer shows how sustainable building with wood works. Since the beginning of this year, a VISION with a working area of 20,000 mm x 3,100 mm has been in operation at one of Sweden's major wood industry companies. Davis Müller explains the processing of very large CLT panels for house walls, ceiling and roof elements at Setra.

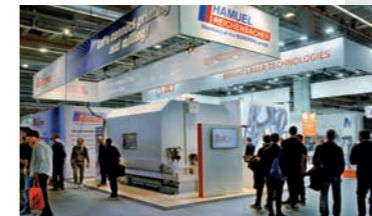
Moreover, we look back on the Expert meeting 3.0, the Formnext trade fair and numerous inspiring team events that will go into their next round in 2024.

I hope you will enjoy reading this issue.

Dr.-Ing. Alexander Kawalla-Nam
Head of Additive Manufacturing Technology
Reichenbacher Hamuel GmbH



4-5 *Reichenbacher Hamuel GmbH*
Review expert meeting, October 2023
Industrial manufacturing in timber construction.



6-7 *Reichenbacher Hamuel GmbH*
Review Formnext Fair, November 2023
Sustainability – the meta-trend.



8-11 *Partnership with Solukon*
Unpacking and fine cleaning of 3D printed metal parts
Cooperation between Reichenbacher and Solukon brings together essential post-processing steps and for the first time permits automated box unpacking.



12-15 *Cover Topic: Bauer Holzbau GmbH*
Sustainable building with wood
Demographics cause changes in our living concepts.



16-17 *Machine pre-acceptance at Reichenbacher*
Setra Group Långshyttan
Timber frames for green building.



18-19 *Reichenbacher Hamuel GmbH*
Strong team spirit = together successful
Team Events.

Imprint

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Review expert meeting October 2023

Industrial manufacturing in timber construction.

It was for the third time that numerous representatives from the timber construction industry came together at our expert meeting at the end of October 2023. As in the years before, moderator Andreas Leopold Schadt was the refreshingly quick-witted presenter of the event, which focused on "production in timber construction". Around 30 guests were present live in Dörfles-Esbach, while 90 followed the speeches online, which dealt in an industrial context with the idea of thinking and manufacturing based on a modular concept.

In his welcoming speech, host Thomas Czwielong reminded the audience that the construction industry must grow in order to create affordable living space, meaning that standardised components and automation in prefabrication processes will become even more important. He also remarked that a year ago he would not have believed that world affairs could become even more challenging. Reality has taught us otherwise, and with consequences: The economic slowdown, high interest rates and a shortage of skilled labour mean a tough time for many companies today. Particularly in timber construction, he sees the solution in the use of highly industrialised systems.

Philip Ehrenfried, Head of Engineering at timpla by Renggli, explained how this could be possible. His credo: digitally integrated series production were more than the sum of its individual parts. What did he mean by this? Companies from the automotive industry prove that a significant reduction in production hours is possible by production-optimised engineering. He pointed out differences, however, when applying this to timber house construction: on the one hand, there are more and, above all, different parties involved in the process, such as building owners, architects, structural engineers, fire protection officers or timber constructors, each with their own requirements. On the other hand, the building as a product itself requires more flexibility because, for example, divergent building regulations apply in each of the German federal states and buildings as such are not identical. The systemic solution: on the part of the process participants the use of openBIM, in terms of flexibility the application of the modular system. Thus, it will be possible to manufacture customised buildings, modules and elements from standard parts. If something changes in the building regulations or the design, only a few components will require changing. This approach avoids unnecessary planning and construction steps and a complicated building can be realised by the simple adaptation of components and intelligent combination of existing modules.

The linking of different trades and system components was another important topic. Managing Director Stefan Barbaric and Sales Manager Manfred Haslmayr from Barbaric GmbH in Linz spoke about automated and efficient solid wood and panel handling. In their presentation, they countered rising building material prices and labour costs, disruptions to supply chains and escalating bureaucracy with the potential of automation, which can reduce production and construction times, increase output through modular construction and improve quality by eliminating manual processes. They explained optimum fully automatic process control and recovery of scrap materials using the example of feeding a framing station: starting with the storage of the bars, feeding the cutting and joinery systems, handling the individual parts after joinery and just-in-time material provision at the framing stations. The same procedure applies to the automation of panel processing by handling a wide variety of panel materials with sophisticated gripper technology and feeding them into the CNC processing centres fully automatically. Finally, they pointed out that the implementation of an efficient overall concept will only be possible if professional software is available to process all the data. The perfect transition to the second part of the afternoon.



The experienced audio and video team had everything under control.



About 120 visitors attended the machine demos live or online.



Panel discussion with moderator Andreas Leopold Schadt and all speakers (from the left: Philipp Ehrenfried, Stefan Barbaric, Andreas Leopold Schadt, Stefan Jack, Franz Xaver Völkl, Thomas Czwielong).

Prof Stefan Jack from Bern University of Applied Sciences defined business intelligence as the manufacturer-independent interlinkage of software and machines. "The problem is that along the value chain in a wood processing company, we are talking about 6 to 14 databases," he gave his expert opinion. Data exchange between different machines were often not possible, as there is normally no common data storage for data transfer and processing – the source of errors. His proposal is to harmonise the parameterisations and to create interfaces with common data formats and a shared database. In other words, precise mapping of the individual business processes and sub-functions of the various trades will be necessary in an interlinked production system. Thus, the workshop of the future should have a platform with digital transformation of the production environment on a 1:1 scale.

The last presentation was by Frank Xaver Völkl, Managing Partner of the software developers direkt cnc-systeme GmbH, who spoke about flexibly automated production in sophisticated object and module construction and referred to the experiences gained in the development of CAM systems and the machine-independent WOP programme NC-HOPS. In his opinion, standardised formats should permit users to completely automate the transfer of entire construction projects from all common timber construction CADs via btlx import, meaning that it would be possible to check parts in btlx viewer and in NC-HOPS, to create individual parts fully automatically according to material and selected processing strategy, to check them for collisions, and to transfer the files to the machine. Völkl emphasised that, in view of the staff situation many companies are facing, the focus should be on intuitive entry dialogues for new users without losing sight of the high requirements of experienced users in terms of automation, performance and interfaces. Using Bauer Holzbau as an example, he illustrated how the nesting function of the software has made the automatic processing of various materials for high-quality modular property construction possible in the first place.

On principle, all the participants in the concluding panel discussion agreed that straight-through data processing and the associated optimum automation of production facilities should be the predominant goal. Thomas Czwielong pointed out that the effort involved must also be manageable for smaller wood processors and called in this context for a sustainable business approach by not always just focussing on new plants. After all, there exists the possibility to make even older systems fit for the future by retrofitting them with new control systems and new technical details.

Review Formnext Fair November 2023

Sustainability – the meta-trend.

In its ninth year, in November 2023 Formnext impressed with an increase of 11.1% in visitor numbers to 32,851 experts and managers from Germany and other countries. 859 exhibitors, 59% of them from abroad, presented their innovations on an exhibition area of 54,000 m² and Formnext surprised with a record result. Thus, Frankfurt once again became the centre of global additive manufacturing and of modern production technologies.

By participating as an exhibitor, Reichenbacher wanted to consolidate its own reputation as a supplier of customised systems for additive manufacturing. Key Account Manager Johannes Reiser confirms that they have succeeded in doing so: "Basically, you can say that the topic of hybrid has reached the minds of decision-makers in additive manufacturing. Our ECO HybriDX-LT enabled us to emphasise three important points at the trade fair: We specialise in the construction of customised systems and we place seamless process sequences and automation at the very heart of our machine developments. The feedback we received from the visitors attending the fair showed that we were successful in demonstrating the overall process of the industrial production of large-format and sturdy components. Numerous interested parties approached us with specific projects and applications. This is very positive, as we are now obviously also recognised in the additive world as an established system manufacturer."

There is only a limited number of manufacturers of hybrid machine technology worldwide, and each of them pointed out its own focal points to set itself apart from the competition. It is now up to the users to evaluate, which technology and which supplier is most suitable for their own project applications. "In this context, we also realised that many project managers have come to understand that there is no alternative to the precision of a portal milling machine. This is exactly what we have repeatedly emphasised in recent years: you are not buying a printer that can mill, but a milling machine that can print," Johannes Reiser stresses once again. The topics themselves were the same for almost all the projects notified: mould making, hand laminate post-forming, thermoforming and the use in autoclaves. A guesstimate is that around 42 enquiries related to precisely these topics.

Steffen Löffler, who is responsible for strategic market development at Reichenbacher, has a very special anecdote to contribute: "A considerable number of visitors were explicitly interested in our exhibits and asked the stand team whether they could also order these chairs from us. Interior designers in particular were present in large numbers at the trade fair, and even a major lamp manufacturer was interested in our printed designer chairs (see photo). In addition to 3D-printed lamp stands, he would also like to offer seating furniture in the future, and was immediately hooked when he saw our chairs."



Here we previewed the next Formnext and the filament printer developed with our partner Multec.



The core additive manufacturing team from the Reichenbacher-Hamuel Group.



The appearance was complemented by a new design, which emphasised our two areas – Hybrid and AMS.

Apart from the remarkably high quality of the expert discussions at Formnext 2023, compared to previous years Reichenbacher registered a significant increase particularly in the number of specific enquiries. "This shows that we are on the right track, because additive manufacturing continues to gain ground. The high density of innovations, decision-makers and experts at this trade fair is unrivalled and ensures a unique trade fair experience, as established and young companies come together here to present new additive manufacturing technologies," summarises Dr Alexander Kawalla-Nam, Head of Additive Manufacturing Technology at Reichenbacher.



The chairs and the table made of cellulose-reinforced material made a great impression on the visitors.

Unpacking and fine cleaning of 3D printed metal parts



Cooperation between Reichenbacher and Solukon brings together essential post-processing steps and for the first time permits automated box unpacking.

The removal of loose powder is a key step in the post-processing of metal parts produced by additive manufacturing. For years, Solukon systems have been automatically removing the powder from components manufactured using the LPBF process. A joint project between Solukon and Reichenbacher Hamuel now takes this a step further and automates both in one system, the unpacking from the building container and the de-powdering.

At the end of the LPBF process in the AMS 400 system, the printed component sits in a building container in a so-called 'powder cake' consisting of unused metal powder. Unpacking the component, i.e. freeing it from this powder cake, is usually done by suction and clearing. Once the component has been uncovered and taken out of the building container, there follows the clamping in a Solukon system to remove the loose metal powder from the inside of the complex component automatically. Programmable 2-axis rotation and vibration make the powder flowable and thus it can drain from the internal channels in a controlled manner. This is the usual procedure for removing powder from complex laser-fused metal parts. The Reichenbacher and Solukon project, which combines both process steps in an automated system for the first time, addresses this very issue.



The AMS 400 3D printer from Reichenbacher and the SFM-AT1000-S powder removal system from Solukon for the automated unpacking and fine cleaning of 3D-printed metal parts.

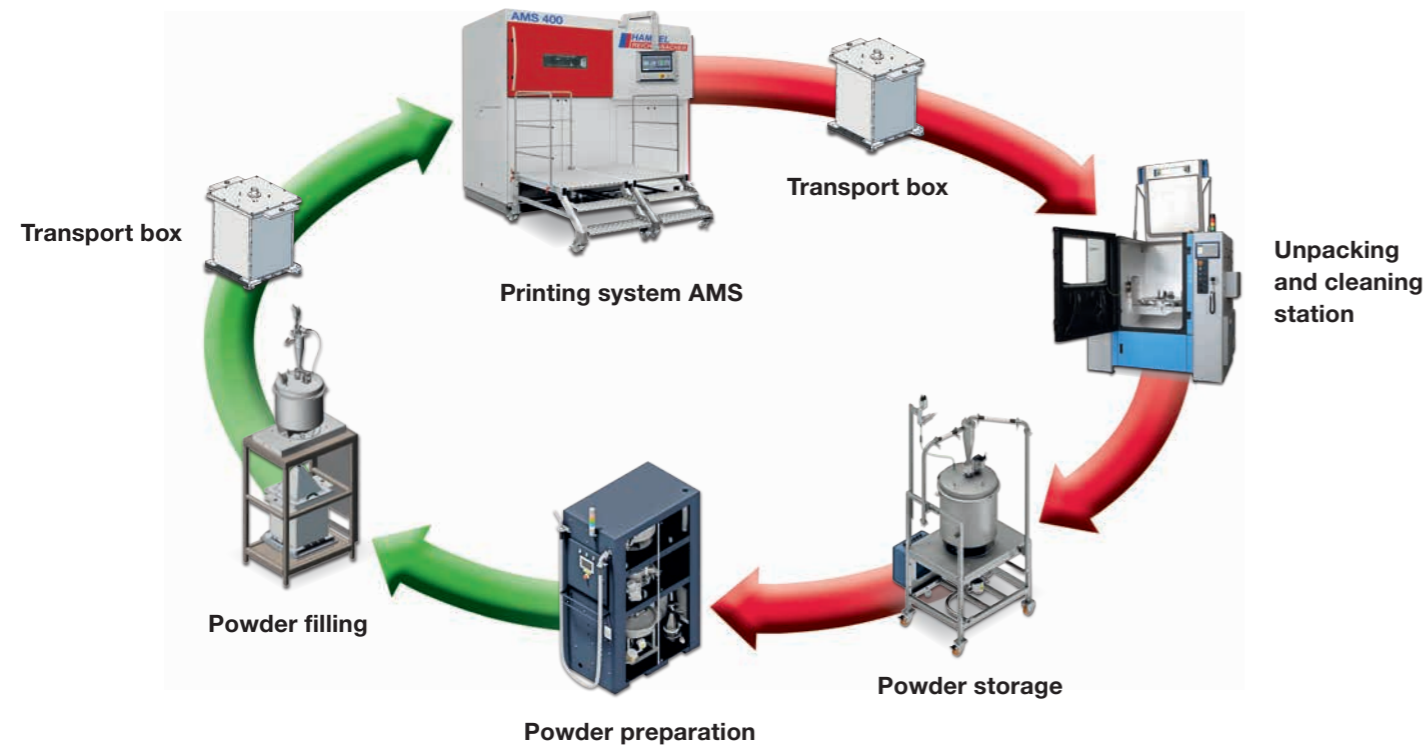
The combined solution is already in use at a leading manufacturer of steel moulds for the concrete industry.

The operating principle of the combined unpacking and cleaning station

The central feature of the project is that, rather than the component alone, the entire building container with the component inside is loaded into the SFM-AT1000-S system. Once fixed by a zero-point clamping system, the Reichenbacher building box, whose base and walls are separable, is turned upside down and the loose powder of the powder cake is emptied. The powder removed goes directly into an external material preparation station.

The user then takes off the box frame by means of an external mobile lifting device to make the component freely accessible. Subsequently, the Solukon system (in the version with a short swivel arm) cleans the component as usual using the unique SPR technology® with programmable 2-axis rotation and targeted vibration excitation. Thanks to the SPR-Pathfinder® software, the Solukon allows the convenient and fully automatic advance calculation of the movement sequence based on the component's CAD file. The SFM-AT1000-S can handle building boxes weighing up to 800 kg and uses a high-frequency knocker to loosen even the most stubborn powder clumps in the internal channels of the component.

Compact end-to-end solution



"Featuring box unpacking, the SFM-AT1000-S is a system with a high degree of automation. Moreover, we show the flexibility of our systems for individual customer solutions. As a competent system supplier, we support Reichenbacher in their project for the box unpacking of laser-fused metal parts. Together, we provide our customers with a real competitive advantage," says Andreas Hartmann, CEO and CTO of Solukon. Thus, in cooperation with the Additive Manufacturing team at Reichenbacher led by Dr Alexander Kawalla-Nam, an automation solution suitable for industrial use has been created in record time. "With Solukon, we have another system with a truly unique selling point in our portfolio and are setting ourselves apart from the standard solutions on the AM market in the area of post-processing, too. As a result, we are now able to cover the entire 3D printing process chain," adds Dr Kawalla-Nam. The combined SFM-AT1000-S system with box unpacking has already been field-tested. It has been successfully in use for months at a leading manufacturer of steel moulds for the concrete block industry.



The building box with component and powder is unloaded from the Reichenbacher printer and inserted into the Solukon system. There, the box is turned upside down first as a whole before (after removal of the frame) fine cleaning takes place without the box.

Sustainable building with wood

Demographics cause changes in our living concepts.

Demographics in Germany have a huge impact on the construction market. Over the last 30 years, the share of 25-44 year olds has decreased, while the share of older people aged 65 and more has increased. This has consequences for housing concepts, as the number of people wanting to build single-family homes is falling, while the demand for multi-family homes and property construction is rising at the same rate. Bauer Holzbau is focussing on these growth markets and is responding with modern production methods to these changing conditions.



Machine operators Genci Rama and Stephan Wucherer with Managing Director Walter Bauer (from the left) in front of the VISION-III-TTT-H 5-axis.



Company building Bauer Holzbau GmbH.



Managing Director Walter Bauer says that the company slogan Heute. Zukunft. Bauen (Building.Future.Today) is part of the company's DNA. Together with architect Martin Szymanski, the construction engineer is the fourth generation to run the family business founded in 1884, and he emphasises that their buildings shall still be the benchmark for sustainable construction in 30 years' time. As President of the HDI, he is also the one who gives timber construction companies a voice and is passionately committed to bringing timber panel construction into building class 5. At his side, Martin Szymanski is pushing his idea of building a bridge directly from the executing companies to the planners. Being an architect he knows the processes from the scratch and is convinced that ideal solutions ensue when all parties involved bring their respective expertise into the planning and construction process as early as possible.

At Bauer Holzbau, timeless construction has been a tradition for almost 140 years. The combination of craftsmanship with progress is exemplified in the form of modern production facilities and logistics concepts. Everything comes from a single source, from architecture, design and specialist planning to the overall completion of a construction project. Turnkey single-family homes, property development models and residential buildings are realised using their individual prefabrication method and sustainable building materials. The modern VISION-III-TTT-H 5-axis CNC machining centre with a grooved HPL table plate has been in use in the efficient prefabrication of building envelopes, façade elements, ceilings, walls and exterior components since November 2022. At a length of 9,000 mm, a width of 3,600 mm and a Z-stroke of 780 mm, the system in the new hall building in Satteldorf, Württemberg, immediately catches the eye.

Area Sales Manager Florian Mauch explains how this came about: "Apart from applying the timber frame construction method, Bauer Holzbau also produces solid wall and ceiling elements, as well as elevator walls for multi-storey buildings. Here, they use wood and plasterboard, fibre cement, HPL panels and large-format, thick CLT panels. The variety of materials is one thing, but they also had the far-sighted desire to be capable of realising exceptionally high walls or arches, for example for columns up to 3,800 mm without joints." "The larger a panel, the more waste-optimised and therefore economical we can work. We have significantly enhanced the prefabrication process with this system size, the nesting function and a comprehensive NC-HOPS software package developed by software specialist direkt cnc-systeme GmbH that integrates our BTLx interface," adds Walter Bauer.

The company, which has extensive expertise in building physics, particularly in fire and noise protection, offers its clients especially in property construction invaluable benefits – quality and cost-effectiveness. In addition to the material mix and the large geometries, the 24 kW work spindle guarantees a high machining capacity, while the machine achieves precise work results thanks to its stable, low-vibration design. The special 2-channel extraction system extracts wood in the first channel and in the second channel gypsum or cement dust from the non-combustible panel materials. Jürgen Hornung, CNC Project Manager, also refers to the various groups of stops and the additional solid stops for cross-laminated timber. “Thanks to a special table extension and the nesting function we can process on the system even panels 320 mm thick and 3,600 mm wide and up to 14 metres in length. Here, we push a finish-milled panel five metres beyond the machine table to permit the processing of the rear part of the panel. This becomes possible owing to the so-called coordinate transformation of the software. In the case of CLT, such a large panel weighs up to five tonnes and we move it like any other panel using a vacuum lifting system.”

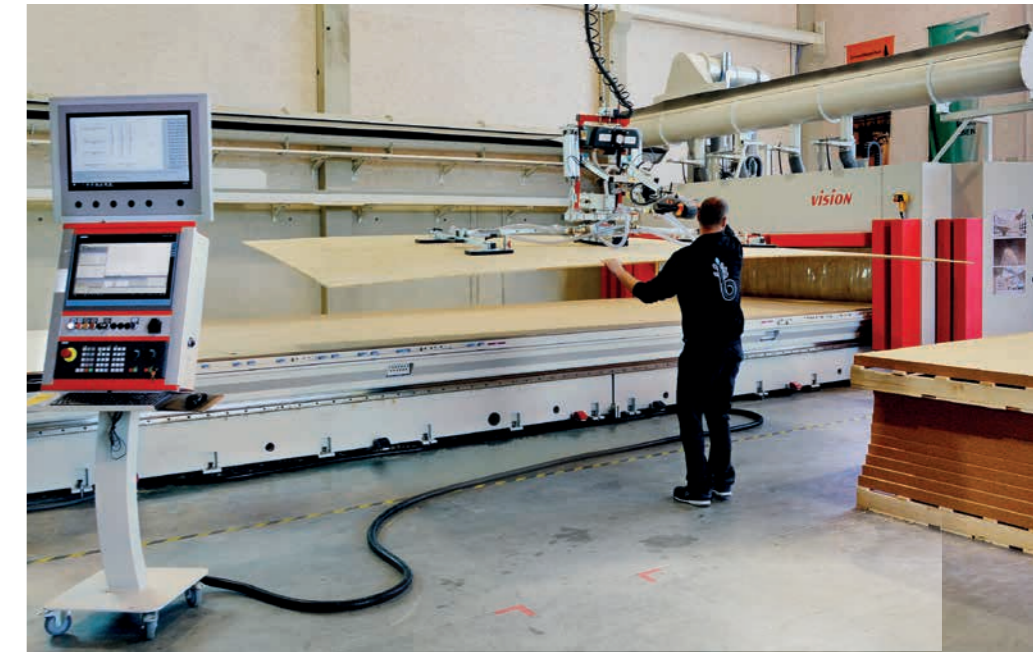
Currently, up to 80% of the machining centre’s capacity is used for panel processing, but the aim is to produce complex free-form shapes under cost-efficient conditions. Looking at the buildings of the future, Martin Szymanski is confident: “The first thing is to find out what is possible. AI provides me with support during phases of creative brainstorming; subsequently, designing and modelling requires the input from a team. We have the expertise regarding the material, the design capabilities and the familiarity with the potential of our production facilities, which enables us to develop new planning and production processes.”

In this context, Walter Bauer refers to the Tectofix assembly table developed by the company itself. It permits the processing of simple to complex or interlaced wall, ceiling and roof elements by fixing joists or rafters in flexible clamping shoes on movable longitudinal beams. The weather-independent prefabrication of roof landscapes and wall heights of up to 5.80 metres allows for capacity splits resulting in an increase in capacity plus considerable time saving.

The senior partner views genuine craftsmanship as the foundation of quality and innovation. The upcoming fifth management generation, Iris Kompauer, will remain true to this philosophy. Thus, a naturally healthy atmosphere, inherent cosiness, reduced energy consumption and active climate protection are a guarantee for buildings of lasting value that will fulfil the criterion of sustainability for decades to come.



Processing table with special table extension and stops.



Loading with a vacuum lifting system.

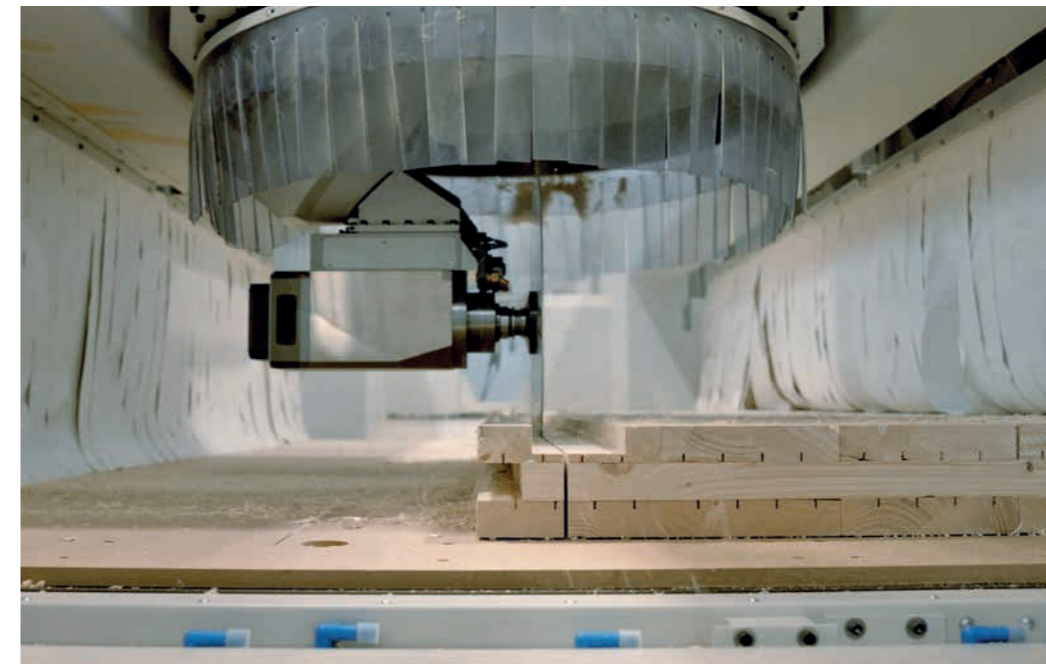


Plate processing by saw cutting.

Prefabrication system Tectofix.



Lip channel extraction and push-off unit, which permit the processing of panels up to 14 metres in length.



Setra Group Långshyttan

Timber frames for green building.

A cat lover's breath catches when he or she sees this mouser clambering around on the raw parts. However, as we are talking about very large components, the pet has enough time to escape the massive tools.

The Reichenbacher VISION-III-TT 5-axis system, the series designation of which in itself promises something extraordinary, was installed in Langshyttan in central Sweden at the end of 2023. Equipped with a steel beam table with wooden supports and conveyor, the system features an impressive working area of 20,000 mm x 3,100 mm. This enables Setra Långshyttan to process very large CLT panels for house walls, ceiling and roof elements.

Setra is one of Sweden's major wood industry companies with a workforce of around 850 people. Sustainability is at the centre of the company's philosophy, which is why the wood only comes from responsibly managed forests in Sweden, one of the world's best softwood regions. All over Sweden, the company has seven sawmills and a processing unit where the forest raw materials are refined into climate-friendly products such as glulam, planed timber and building elements for the construction industry.

A little over a year ago, our sales partner Sågspecialisten contacted us for the first time because Setra wanted to replace an existing CNC system. "After several visits to Sweden, the wishes and requirements had been defined and we were also able to identify the problems that had been encountered with the previous system purchased from a competitor," explains Davis

Müller, who is responsible for International Sales at Reichenbacher. In collaboration with Managing Director Thomas Czwiolong and Design Manager Johannes Karl, he worked out a solution that had a lot to offer. "Thanks to our innovative concept, we set completely new impulses that Setra hadn't even thought of yet and impressed across the board," emphasises Davis Müller.

What is so innovative about this concept? "We are talking about a system with a completely automated workflow that requires no manual intervention whatsoever. Nesting ensures the optimum removal of the building elements from the wooden boards, thus minimising waste. With millimetre precision, the CNC then provides the construction parts, which are precisely tailored to the requirements of the respective building project, with holes and cutouts for doors and windows as well as recesses for cables. The concept of this machining centre is one of high performance, both in terms of dynamics and of milling capacity. This system is significantly more efficient than those of our competitors, as we guarantee 3 to 4 times higher feed rates for sawing and milling, as well as for formatting, since manual intervention is no longer necessary. This leads to a considerable reduction in production time. Our CNC milling machine can process a CLT component equally well as a furniture part. It is sawn and milled with millimetre precision so that the elements fit together perfectly; a particularly important criterion in the modular construction of buildings," emphasises Davis Müller.



The 5-axis VISION-III-TT has an impressive working area of 20,000 mm x 3,100 mm.

"This system scores with its speed, automated workflow and torsion-resistant machine design, but above all with its unique extraction solution and unrivalled chip management. After all, these make the automation of the entire process possible. There are seven different extraction points plus a floor extraction system to collect the chips automatically during the milling process or from the machine environment. The system handles 38,000 m³ of chips and dust per hour. An incredible extraction volume; remnants fall onto the chip conveyor belts. This prevents the system from having to be constantly cleaned, thus ensuring continuous operation," adds Design Manager Johannes Karl.

The main challenge came at the end, because after acceptance this big machine had to be taken to Sweden somehow. Eventually, 14 lorries were required for this special transport. A logistical masterpiece, as the delivery of the individual system components had to have an appropriate sequencing for assembly and installation.

"We have already implemented numerous large-scale systems for timber construction in Europe, each of which had been specially adapted to the customer's requirements. What I remember about this project is that the collaboration with the Swedes was special in its nature: open, constructive, collegial," summarises Johannes Karl. Davis Müller adds, "We achieved four times higher feed rates during acceptance; this exceeded everything the client had expected." Acceptance of the line took place without any questions or outstanding issues, and production started in the third week of January 2024.

"We are currently working on expanding our product portfolio to include beam processing centres and joinery systems. Our aim is to gain an even stronger foothold in the market segment for the processing of big, sustainably produced timber construction elements and we are confident that we will succeed in doing so soon thanks to our ongoing developments based on new insights and new customer contacts," Johannes Karl says in view of future prospects.

The Setra and Reichenbacher teams after the successful pre-acceptance.



Equipped with a steel beam table with wooden supports and conveyor technology, very large CLT panels can be processed.



Surprise visit from a cat, clearly impressed by the size of the machine.



Strong team spirit = together successful

Last year, we launched a new form of team building. With inspiring events, we want to promote team spirit, solidarity and mutual support and to strengthen the identification with our company.



- An early summer **bike tour** to St. Georgenberg, where the e-bike riders had a clear advantage,
- a „Bavarian **After Work Party**“ in the Rödental beer garden with lots of laughter and even more beer and hearty food,
- a **family party** organised by the trainees in midsummer, where the focus was on the families of our employees,
- a **hike** of several hours up the Staffelberg, which pushed some people to their physical limits,
- an exciting **beer tour** covering the history of Coburg beer including a beer tasting session to lift the spirits, were rounded off at the end of the year by
- a joint visit to the Coburg **Christmas market** in the snow.



All of those who had taken part in one event or the other agreed that in a non-work environment it is much easier to get to know each other and to build up a more personal relationship. You feel appreciated and a member of a community. This strengthens the team spirit and facilitates collaboration in everyday working life. After all, when people know each other better, they often have a better understanding for each other – and that undoubtedly has a positive influence on the atmosphere at work.

It should not be forgotten that attractive working conditions, which also include team events like this, could be a valuable factor when it comes to potential employees deciding in favour of our company. At any rate, last year's events were very well received.

Seize opportunities!

Your training with us:
An update for life!



Technical product designer (m/f/d)

Construct innovations



Industrial clerk (m/f/d)

Diversity in one person



Electronics technician for industrial engineering (m/f/d) *All functions at a glance*



Industrial mechanic (m/f/d)

All-rounder in the company



Mechatronics technician (m/f/d)

Mechanics-electronics-informatics in one