



**Customer Stories.**



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## STOPA builds the bridge between two sheet metal storage systems.



Dreeskornfeld has invested in a second automatic sheet storage system, which is designed for four system pallet sizes, including XF, the largest possible format.

The sheet metal processor Dreeskornfeld operates two STOPA UNIVERSAL automatic storage systems in order to permit the provisioning of its extensive range of materials. One of the systems is designed for four sheet sizes, including the largest XF format. The fact that the stores are connected by a passageway at a height of five metres means that any of the laser cutting systems can be supplied from both of the systems.

Marcus Dreeskornfeld, Managing Partner of Heinz Dreeskornfeld GmbH & Co. KG, which was founded in 1961 and is headquartered in Bielefeld, starts his tour of the production facility at the STOPA UNIVERSAL sheet metal storage system. "We started experiencing massive problems in terms of our storage capacity for blank sheets, in particular because we also temporarily store our customers' own materials and these account for approximately 50 percent of our stock. Because it was not possible to extend our old automatic storage system, we invested in a second system. Another major reason for this decision was that we are now increasingly working with XF-sized sheets.



One highlight of the STOPA UNIVERSAL large-scale store installed at Dreeskornfeld is its incoming goods station which makes it possible to store all four sheet formats.

The new automatic storage system, which is approximately 83 metres long, seven metres high and six metres wide, commenced operation in February 2015. Just like the first system, it was supplied by STOPA Anlagenbau GmbH in Achern-Gamshurst. The large-scale stores are designed to handle an extensive range of materials and provide economically efficient space utilisation, direct access to the raw material, a controlled material flow, low-personnel workflows and considerably reduced non-productive times. The load carriers take the form of system pallets for sheets in the small (KF), medium (MF) and large (GF) formats as well as in the largest available format (XF), which measures 2,000 x 4,000 millimetres. With this extension to include the XF format, which the old storage system is not designed to handle, the family-run company has optimised its workflows. If Dreeskornfeld had decided to store the XF format on cantilever racks then the sheets would have sagged considerably. In addition, there would have been a risk of damage because fork-lift trucks would have had to transport the material to the processing machines. What is more, concentrating all the sheets in the automatic storage systems brings the additional benefit of continuous stock control.

### Precisely aligned storage systems

Marcus Dreeskornfeld stands between the two stores. "One particular challenge lay in measuring up the second sheet metal store. STOPA had to align this precisely with the first system so that it was both parallel and axially aligned. What is more, we calculated a minimum clearance below the lower edge of the bridge of 4.5 metres to allow fork-lift trucks to pass below the passageway. For the same reason, no supports could be located in the trucks' way." The sheet metal storage systems, which use the fixed-position storage principle, supply material to the laser cutting systems. The daily turnover of raw materials amounts to between 50 and 60 tonnes. The mid-sized company, which was initially founded as a lathing shop, does not return leftover sheets to the store.

Marcus Dreeskornfeld has climbed up to the bridge that connects the stores. He points to the transport cart that moves back and forth between the systems at a speed of 30 metres per minute. "Thanks to this link, it is possible to supply all our laser cutting systems with all the material grades that we process in the small, medium and large sheet formats. Irrespective of the storage system in which they are located. The only thing that sometimes needs to be taken into account is the longer travel path, meaning that the material has to be requested earlier. We only need the XF format in the new store because this is the only system that is connected to machines that are able to handle this sheet size."

Dreeskornfeld attaches great importance to a high level of vertical integration in its production. Its range of solutions and services includes 2D laser technology and 2D laser-stamping technology, pressing, welding, deburring and dressing. These are complemented by mechanical production steps, surface processing, assembly, engineering design, as well as warehousing and logistics. Christine Dreeskornfeld, Managing Partner along with her brother, shows off samples of her company's products. "We produce claddings, housings, containers and welded assemblies made from sheet steel, stainless steel and aluminium. We develop ideas relating to sheet metal production in cooperation with our customers, most of whom are located in the region." The company mainly manufactures small and large series runs for the agricultural sector, the machine and plant construction industry, the automotive industry and, as of recently, also produces considerable volumes for manufacturers of conveyor technology.

### One station for four sheet metal sizes

One highlight of the new STOPA UNIVERSAL large-scale store (with 725 storage locations) is its incoming goods station which makes it possible to store all four formats. As a specialist in customised solutions, STOPA has developed a concept with a stationary scissor lift table. This is equipped with loading pins that move in and out depending on the format, as well as a chain conveyor. The conveyor possesses support bands for the system pallets, which are arranged in accordance with the sheet metal formats. One special characteristic is that the station is equipped with vertically adjustable sheet stops, which STOPA installed along the side and at the front to meet the needs of the different formats. Marcus Dreeskornfeld watches as the stops installed above the scissor lift table travel downwards. "Thanks to our software-controlled processes, we have no need of the manually inserted stops that are otherwise commonly used. Instead, a corner coordinate system that is adapted for the sheet size in question is formed automatically and is used by the fork-lift truck driver to align the sheet stack during storage and position it precisely. The driver is informed by a visual display when the required position has been reached."

The company, which has DIN EN ISO 9001 and 14001 certification, has a workforce of approximately 100 employees. Production takes place in three shifts, five days a week, and also on Saturdays if necessary. The STOPA UNIVERSAL storage systems supply material to twelve laser cutting systems. Using handling mechanisms, the manufacturing company has automatically connected six machines to the new store, which is designed for the connection of up to nine machines. Three machines are connected in a similar way to the old system. Marcus Dreeskornfeld goes to the system in the neighbouring hall. This started operation in 1998 and was modernised by means of a retrofit in 2010. "The other three machines are not supplied directly from the system but via fork-lift truck. That is why STOPA installed both an incoming and an outgoing goods station in the first of the storage systems to be assembled. Because these two stations possess transfer points for the three sheet sizes that are located here, the on-time provisioning of the manually connected processing machines is also ensured."

### Increased system operating times

The result of all this is greater productivity for the operator. This is further enhanced by the new storage system's twin-mast storage and retrieval unit which is equipped with telescopic forks that can be extended on both sides in order to cater for all four sizes. This achieves speeds of 150 metres per minute when travelling, 23 metres when lifting and 25 metres when performing fork operations. To prevent collisions during storage operations, the SRU, which possesses two loading heights, automatically monitors the loading height at the storage locations above and below the selected location.

Given the efficiency of this solution, Marcus Dreeskornfeld draw a positive conclusion from the company's cooperation with STOPA. "Thanks to the investment in the second automatic storage system, we have been able to increase the operating times of our machines. We also have a permanent overview of the stock of materials and no incorrect stock bookings now occur. Above and beyond this, we also benefit from the reduced fork-lift truck movements, greater availability and, in this way, from having underscored our reputation as a centre of expertise in the sheet metal processing world."



All the laser cutting machines can be supplied with material at any time from either storage system via the bridge-type passageway.

### Solution highlights

- The new STOPA UNIVERSAL automatic storage system in use at Dreeskornfeld is designed for four system pallet formats, including XF, the largest possible format.
- All four formats can be stored via the incoming goods station.
- Thanks to the fact that a transport cart connects the old and new sheet metal storage systems via a passageway, it is possible to supply all the processing machines with various sheet metal grades in the small, medium or large formats from both systems.

## STOPA tower storage system brings productivity boost.

Thanks to the use of a STOPA TOWER Flex sheet metal storage system, the company Büchel Blech AG is benefiting from versatile material handling coupled with cost and time savings. Together, these advantages have resulted in increasing value-added and, ultimately, improved productivity.

By investing in a STOPA TOWER Flex, Marco Büchel, Managing Director of Büchel Blech AG, a company founded in 1981 and headquartered in Balzers in the Principality of Liechtenstein, has taken a decisive, forward-looking step towards increased economic efficiency. "We are able keep a

sufficient supply of sheets on hand in the high-bay storage and cut the material ourselves without having to buy ready-to-use cut sheets."

This has proved to be a smart decision. Especially as the contract manufacturer has been able to achieve cost reductions and time savings despite the cost of the sheet metal storage system, a laser cutting system and the additional personnel required. This is due to the fact that it is now able to manufacture the components and semi-manufactured parts for its products in its own factory. This is an advantage that allows it to react without delay to market requirements, for

example by responding speedily to inquiries and making rapid decisions. What is more, thanks to the uniform material grade used, it can achieve identical results in consistent high quality at all times.

The storage system developed by STOPA Anlagenbau GmbH in Achern-Gamshurst ensures an efficient use of space, faster access to sheets, improved organisation and careful material handling. In addition, the storage system is a vital prerequisite for process-optimised manufacturing, for which the flexible material provisioning of different sheet sizes and thicknesses is essential.



Marco Büchel, Managing Director of Büchel Blech AG (left), and Ralf Gerber, Technical Manager at STOPA, consider the key benefit of the investment to be the increase in productivity it has made possible.

the finalisation of the storage system. In this context, the decision in favour of STOPA was also dependent on a definite promise to meet the desired commissioning date. If the manufacturer had not been able to meet this deadline then production at Büchel, which primarily supplies the semiconductor industry, plant manufacturers in the semiconductor coatings and vapour deposition sector and the automotive and other industries, would have come to a standstill. STOPA even had to revisit its plans and reduce the loading capacity of each of the pallets from a maximum of three to one and a half tonnes because the factory foundations had already been laid.

Ralf Gerber, who is a Technical Manager at STOPA, points to the confined space within which the company installed the tower storage system with millimetre precision. "Due to the limited space under the factory roof resulting from the structure of the building, the already installed laser cutting system and crane rails, it was a real challenge to assemble the storage system, which had been designed with a dual-block configuration. Our fitters solved the problem by using a tracked vehicle equipped with a crane."

Marco Büchel believes that the system will pay for itself in five years and looks back at the decision-making process with satisfaction. "We consider one of the great benefits brought about by the investment to be the increase in productivity due to the growth in our value-added. I would also like to emphasise STOPA's considerable consulting expertise, which gave us the confidence to come to our decision. All the issues that had to be clarified before the contract was awarded were discussed frankly and the decisions adhered to. What is more, the STOPA TOWER Flex is a tried and tested storage system. This was confirmed to us by the operator of a reference installation which we visited."

### Simple material handling

Marco Büchel comments on how the laser cutting system is supplied from the sheet metal store. "Simple material handling is important because this work step is time-consuming compared to a mass production scenario. That is why we have invested in two transport carts that simplify parallel operations and consequently increase our flexibility. One example of this is the ability to perform storage and retrieval operations simultaneously."

Staff transport the sheets the short distance to the lasers using manual transport carts, which they also use to return leftover sheets to the store. To ensure that the same material of uniform thickness is always present on the system's 40 flat pallets, each of which has an effective area of 1.525 x 3.050 millimetres, they return these leftovers to the original load carriers. Because the manual transport carts are numbered, the material movements can be tracked by the operator's ERP system.



By choosing the STOPA TOWER Flex, Büchel has taken a decisive, forward-looking step towards increased economic efficiency.

### Solution highlights

- Büchel benefits from great flexibility in its material handling as well as from cost and time savings.
- The increased value-added results in enhanced productivity
- The sheet metal storage system is able to supply sheets in sufficient quantities for Büchel to be able to cut the material itself whenever required, without having to buy ready-to-use cut sheets.
- The operator can respond to market requirements without delay.

The contract manufacturer, whose extensive portfolio of products and services goes from design through to laser cutting, pressing, deburring, welding, rounding, blasting and barrel-finishing and on to cleanroom and assembly work, uses the STOPA WMS 4.0 for its warehouse management. The Warehouse Management System (WMS) performs all the functions necessary for the operation of a high-bay storage system with fixed-position storage, including administration and automatic control. The function scope as well as the table view and interface language of the WMS can be configured on a customer-specific basis. The system also has other outstanding features, one of the most important of which is the batch tracking capability. A Microsoft SQL Server Express database manages and backs up the data as standard.

Marco Büchel, whose business enjoys annual sales of approximately four million Swiss Francs, has very clear ideas about the sheet metal storage system, in which he stores large and medium-sized sheets. "Another vital element in the decision was the fact that STOPA was the only manufacturer to offer two front-mounted stations as standard. The other companies we contacted would have had to build special solutions."

These stations take the form of a scissor lift table and a fixed-height transport cart. Büchel uses the scissor lift table, which is equipped with loading pins and insertable stops for setting up a shared corner coordinate system, for input and output. The transport cart which, like the scissor lift table, is equipped with a pneumatic pallet locking system, is used for output. Light barriers check whether the system is within the applicable permissible loading height.

Thanks to the compact design of the tower storage system, the operator, which processes 60 tonnes each of chromium steel and aluminium each year, together with 20 tonnes of special steels, is assured an ideal balance between storage capacity and space

requirements. The company also benefits from a high level of economic efficiency. To make optimum use of the height of the system, Büchel opted for two pallet loading heights. Material that is processed in large quantities is stocked in the lower storage area, which has a maximum loading height of 275 millimetres. The company also uses this area to store material directly from the truck without having to repackage it, thus dispensing with the need for an unpacking table. The remaining pallets are configured for a loading height of 90 millimetres.

The system components of the STOPA TOWER Flex, which operates on a single-shift basis, are controlled by a real-time soft PLC which is integrated in an industry PC. The PC is equipped with a touchscreen and is used to operate the system and display its states. This capability includes, for example, the graphic visualisation of the store and the twin-mast storage and retrieval unit as well as permanent plain text status displays.

Marco Büchel leans on the tower storage system's ergonomically designed operating terminal. "The system is easy to use. Alongside this terminal, STOPA has installed four more in our offices. When we initiate removal orders via the WMS, a light flashes in the store as soon as the material is available. We don't use the movement order pre-programming function. If necessary, we enter the orders individually.

### Coherent solution package

The STOPA TOWER Flex, which is approximately eight metres high, 4.7 metres long and 6.3 metres wide, started operation in September 2017 as planned. Büchel, which manufactures customised individual parts, series and assemblies, requested proposals from various vendors, three of whom were included in the final shortlist. One considerable challenge lay in the fact that the relocation of the ISO 9002-certified company was scheduled to take place in parallel with



The solution with two transport carts performing simultaneous storage and removal activities makes Büchel even more versatile.



## STOPA UNIVERSAL

The STOPA storage system with a length of over 100 meters went into operation in summer 2010 and handles 40 to 45 tonnes of material every day.



## STOPA automatic storage systems as production hub.



At BINDER, the STOPA COMPACT II sheet metal store acts as the internal logistics centre.

Since the system, which operates on a three-shift basis and is equipped with 696 storage locations, has been operating as the company's internal logistics centre, it has been automatically provisioning almost all the processing machines. The exception to this rule remains the manual transport operations to the press brakes, which the operator also intends to automate.

The automatic storage system possesses a sophisticated energy management concept. This economical use of energy results, for example, from the greatly reduced weight of the storage and retrieval unit (SRU), which uses two lighter, high-performance drive motors, as well as from a more compact lifting beam. What is more, the regenerative drive energy that occurs during braking and lowering is re-used because the system can supply it directly to another drive in the form of motor energy. Frank Heilemann, Head of Technical Services and Project Management for the STOPA COMPACT II, greatly appreciates these benefits. "We also use the optional capability of feeding back the regenerative energy, which would otherwise be dissipated as waste heat, into the power supply network. This is especially important because we have invested in an ultra-modern building in pursuit of our vision of a factory that provides its own energy."

### High handling capacity

A front-mounted scissor lift table with loading pins, insertable stops for setting up a corner coordinate system, a pneumatic pallet locking system and a light barrier for monitoring the maximum loading height acts as an incoming/outgoing goods station

and as the starting point for the automatic workflows.

Thanks to a patented weighing facility that is integrated in the SRU's lifting beam, BINDER benefits from considerable transparency regarding the amount of material available. Lars Hoffmann, Head of the Sheet Processing Centre, is highly appreciative of the SRU's variable acceleration capability. "We set the values for coated and fully galvanised sheets individually in order to prevent any slipping. In the case of non-slip materials or when the SRU is not loaded, we accelerate at the maximum values. This results in increased process reliability and optimised cycle times."

The SRU, which is equipped for loading heights of 90 and 275 millimetres, achieves speeds of 150 metres per minute when travelling, 23 metres when lifting and 20 metres when pulling. To prevent collisions with the stored material, it is equipped with a device for checking the loading height which verifies the space below and above the currently selected storage location. In addition, the SRU operates with a contour checking capability, which monitors the correct position of the metal stack on the pallet when material is returned to the store.

Two longitudinal scissor lift tables act as the outgoing goods stations. Both of these are equipped with two fixed pedestals and light barriers for monitoring the maximum loading height. There are also energy supply lines with lengths of up to 14 metres that are laid in underfloor ducts. The screw-on covers of the ducts can be driven over by fork-lift trucks with a load-bearing capacity of two to three tonnes.

Additional longitudinally mounted scissor lift tables use automatic handling devices to supply the stamping machines. The scissor lift tables that are used as loading carts are equipped, depending on requirements, with the 'last sheet recognition' function, a rotary encoder for exact positioning or with spreader magnet units. The unloading cart possesses a light barrier for monitoring the maximum loading height as well as a rotary encoder. The operator temporarily stocks the punched parts in the store until the time of the next processing step, at which point a transport cart automatically removes the material. STOPA has installed a tandem change function in order to connect a bending cell to the system.

A real-time soft PLC integrated in an industry PC controls the system components. The PLC communicates with the TRUMPF TruTops Fab Module Storage, which displays the stocks and controls the flow of materials. Hoffmann emphasizes the great variety of small, medium- and large-sized sheet-metal grades that BINDER is able to provision in a single system which offers a high degree of space utilisation. "We only use thin sheets. These include blank sheets, stainless steel sheets, aluminium and electroplated material. Alongside the flat materials, we also store three-dimensional corrugated sheets." The system offers 98-percent availability and, every day, handles 50 sheet supply operations to the stamping machines, performs eight blank sheet storage operations, delivers 46 times to the bending machines and completes twelve sheet removals for the bending cell.

### Designed for the future

In its early days, BINDER worked with a single stamping machine and a compact storage system. The family-run enterprise now has four branches and international sales partners and delivers approximately 22,000 devices each year to businesses, institutes and research establishments worldwide. Its customers cover a wide range of industries and are located in all parts of the world.

The decision to invest in the automatic storage system was the result of the company's continuing growth. Another reason given for choosing STOPA was the manufacturer's many years of experience of TRUMPF machines, meaning that no interface problems were to be expected. Heilemann emphasizes the excellent cooperation which gave him confidence as early as the project planning stage. "STOPA installed the sheet metal storage system in a short period from April to July 2017.

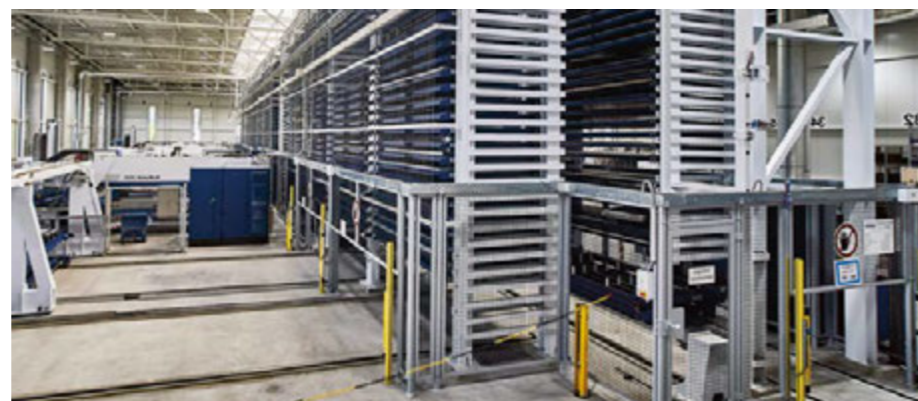
Luippold, who expects the system to pay for itself in between five and seven years, is optimistic about the future. "Due to automation, the factory will be able to make do with between 25 and 30 people in the future. We planned the factory with a view to the future, so that STOPA can extend the sheet metal store to up to 100 metres in our 8,000 square metre production area. The floor and other components have already been designed for this. With this investment, we are helping to ensure our future as an operator in Germany.

At BINDER, a specialist in the field of simulation chambers, an automatic STOPA COMPACT II sheet metal storage system forms the basis for a forward-looking sheet metal production plant. The aim is to maximise automation on the basis of the storage system, which will act as the internal logistics centre. Among other things, the operator benefits from reproducible processes, high-quality manufacturing and unstaffed night shifts.

Thomas Luippold, Director of the COMPETENCE FACTORY at BINDER GmbH, which was founded in 1983 and has its headquarters in Tuttlingen, worked together with his team to develop the concept of an automatic sheet metal production process that is fit for the future. "The sheet metal storage system acts as the hub for our production activities. In order to link together all the stages in the process, we intend to connect all the processing machines to the store. That is why we are also planning further investments in driverless transport

systems because they are ideally suited to unstaffed workflows. As far as production is concerned, the key areas are the reproducibility of the processes and continuous high quality. Apart from that, we also want to minimise the problem of finding expert staff."

According to BINDER, which declares itself to be the world's leading specialist for chambers for the simulation of biological, chemical and physical environmental conditions, end-to-end automation is essential. Irrespective of batch size. To meet the quality criteria it has set itself, the company develops and manufactures its products exclusively in Germany. The decision in favour of the 49-metre long, 5.5-metre wide and 7-metre high automatic storage system supplied by STOPA Anlagenbau GmbH in Achern-Gamshurst was due to the solution's convincing performance, process reliability and economic efficiency.



In order to link together all the process stages, BINDER is planning to connect all the processing machines to the storage system and also to invest in driverless transport systems for the store.



Frank Heilemann, Head of Technical Services and BINDER Project Manager for the STOPA COMPACT II, Thomas Luippold, Director of the COMPETENCE FACTORY, and Lars Hoffmann, Head of the Sheet Processing Centre (from left to right).

### Solution highlights

- Sheet metal store as internal logistics centre
- Maximised automation based on the storage system
- Reproducible production processes with consistently high quality
- Increased process reliability and optimised cycle times
- High handling capacity and economic efficiency

## STOPA sheet metal store with customer-specific warehouse management system.

Aesculap AG, which is headquartered in Tuttlingen, has invested in an automatic STOPA COMPACT sheet metal storage system together with a modified warehouse management system (WMS). The software's special features include, among other things, the management of special stocks and materials that require batch handling, the close-to-machine storage of certain sheets, a customised SAP-PDA-WMS interface for the transfer of order data to the WMS, as well as extensive reporting functions.

The automatic storage system started operation in late 2014 in the new Innovation Factory at Aesculap, a medical equipment manufacturer and the second largest

Thomas Philipp, Plant Manager of the Aesculap Innovation Factory (centre), is proud of his team, which includes (from left to right) Joachim Bludau, Head of the Sheet Metal Segment in the Motors & Containers plant, Gerald Reischmann, Production Planner in the Sheet Forming department, Nadine Weckenmann, Project Manager for IT-related aspects and Volker Huber, Head of the Sheet Separation Group.



Aesculap has invested in an automatic sheet metal storage system with a modified warehouse management system.

division of B. Braun Melsungen AG. Thomas Philipp, Plant Manager in this intelligent factory, which has a workforce of approximately 500 employees, presents the project in Tuttlingen. "We manufacture separately on two floors. The ground floor houses the production facility for aluminium and stainless steel containers, as well as for storage trays in which medical products are kept during the sterilisation process. On the top floor, we manufacture compressed-air and wired motor systems for surgical interventions. During the planning of the Innovation Factory, in which we invested approximately 50 million euros, we placed special emphasis on structural and technical flexibility as well as energy efficiency. Thanks to the generously designed floor bearing loads, we use machines weighing up to 26 tonnes even on the top floor. In addition, the production and administrative areas can also be extended. At present, these cover a usable area of approximately 14,000 and 2,800 square metres, respectively.

Before investing in the automatic sheet metal storage system supplied by STOPA Anlagenbau GmbH in Achern-Gamshurst, Aesculap had stocked the raw material in premises separated from the production facility, thus giving rise to considerable logistical effort and expense. "In view of this situation, we analysed our processes, drew up a requirements specification and compiled an extensive list of activities," says Joachim Bludau, Head of the Sheet Metal Segment in the Motors & Containers plant, who discovered his passion for sheet metal forming at an early age. "Our wish list included, for example, a controlled material flow, direct access capabilities to the raw material and greatly reduced non-productive times. However, our main requirement related to the customer-specific orientation of the warehouse management system."



### Comprehensive modifications

Very extensive modifications were made to STOPA WMS-Extended, whose basic functions include stock and storage location management and the provisioning of the processing machines with material. Thus, on each input of sheets requiring batch handling, WMS-Extended checks whether the operator is storing the relevant sheets on the intended pallets. Before the start of the job, the system calculates the required quantity of raw materials. If the material present is not sufficient then the job is not started and the employee is informed of this. Storage and removal activities are initiated via SAP transport jobs, which the WMS checks for plausibility, while also checking the plausibility of the measured weight.

The other application-specific adaptations include the management of a consignment store, a separate leftover sheet store, as well as a store for locked stocks, which includes all newly stored materials up to the point at which

they have been checked and approved. The WMS also makes it possible to store sheets which have the 'preferred machine' ID close to their place of processing. What is more, the software reserves storage areas for certain materials, provides PDA data and a range of lists, books all storage and removal operations and performs comprehensive reporting functions.

As the Project Manager for IT-related aspects, Nadine Weckenmann was responsible for the VPN connections to the processing machines and the WMS control mechanism. In addition to this, she coordinated the communication between the operator's SAP system and the production data acquisition system as well as between the connected laser cutting systems and WMS-Extended. Nadine Weckenmann emphasizes the exceptionally good cooperation during the preparatory phase. "During the period when STOPA modified the basic warehouse management system to meet our requirements, the cooperation between us was excellent. Before the contract was awarded, our team scoured the market, viewed reference systems and conducted workshops at STOPA and TRUMPF in order to meet our joint objectives on the basis of the requirements specification."

### Space-saving turning devices

In parallel with the STOPA COMPACT, two new laser cutting systems were installed, and the VPN and the RCI interfaces from WMS-Extended to the TRUMPF machines were implemented. At the same time, production continued on existing machines in the old premises in order to avoid any interruptions to customer deliveries. The entire project was accompanied by Volker Huber, Head of the Sheet Separation Group, who has long and comprehensive experience of sheet metal processing at Aesculap, ranging from stamping through to laser cutting. In the future, Huber will support the system in the role of WMS administrator. The workflows were designed jointly by the team before being implemented by STOPA in the

WMS. "We entered all 410 system pallets into storage and calibrated them ourselves over a period of several weeks. One of the manufacturer's technicians was present on site to support us." STOPA had first equipped the pallets with baseplates because Aesculap stores bands and metal strips alongside its 150 different materials.

STOPA also contributed other ideas to the project relating to the removal and provisioning of materials for stamping-laser processing. These included integrating the transport carts used at the stations and equipping them with turning devices. Without this technology, there would have been no other choice but to install the systems transversally to the store. This would have meant there being less space available for the machines, with the result that Aesculap would have had to set up some systems in a second row and put up with the resulting longer transport paths. The software solution for the leftover sheet store, in which the sheets stand upright in a rack, is also interesting. Gerald Reischmann, Production Planner in the Sheet Forming department, demonstrates the advantages of the solution. "When the operator taps on the touchscreen, the WMS shows them the location at which a leftover sheet suitable for the job is present in the store. In such cases, the operator can choose between the leftover sheet and a new sheet from the storage system."

### Highlights of the modified warehouse management system

In addition to the basic functions, the STOPA WMS-Extended warehouse management system that has been tailored to meet Aesculap's customer-specific needs, also offers:



STOPA adapted the warehouse management system to meet Aesculap's customer-specific requirements.

- A check of the correct storage of every input of sheets requiring batch handling
- Calculation of the required raw material quantities before each job is started
- Plausibility checks, including the measured weight, on storage and removal operations
- Management of a consignment store, a separate leftover sheet store, as well as of locked stocks, which include all newly stored materials up to the point at which they have been checked and approved
- Storage close to the place of processing of sheets with the 'preferred machine' ID

### Design and equipment from a single source

Aesculap had a number of reasons for deciding to install the 42-metre long, 8-metre high, 4.7-metre wide automatic storage system with its 685 storage locations. In addition to the advantages mentioned above, these include the possibilities for removing material in accordance with the FIFO principle, a high level of user friendliness that ensures excellent occupational safety, ongoing inventory control, stock level reporting and

harmonisation with the SAP system and, ultimately, outstanding economic efficiency. Independently of this, an SAP-PDA-WMS interface, which transfers data from the production plan to the machines and the WMS, ensures reliable communication between the SAP system and WMS-Extended. Due to their many years of experience, there are also no interface problems between the two suppliers: STOPA and TRUMPF. In addition, it has been possible to chain together multiple machines, some of which are equipped with automatic air jet and suction technology

or lubrication and stamping-laser technology. Bludau considers the fact that STOPA constructed and developed the storage system entirely on its own to be particularly noteworthy. In addition to its outstanding expertise, STOPA also guarantees a rapid spare parts supply over a period of many years. Joachim Bludau also points to another reason for the success of the project: "STOPA fulfilled every agreement and also addressed issues that arose subsequently."



The purpose of the incoming goods station is to simplify the storage process for raw sheet metal. The stamps enable the uncomplicated storage of the material by means of forklifts or cranes. The lowerable stamps make it possible to also use the station for outgoing goods.



## STOPA tower storage system: an economical entry-level solution.

Because the tower warehouse could buffer material for further processing machines given its capacity, KW automotive has invested in the future.



Stefan Weihbrecht, Head of Production at KW automotive GmbH



Axel Ausländer lets a system pallet pre-drive by typing the start and finish coordinates at the central control panel.

**With the STOPA TOWER Eco tower storage system, KW automotive has laid the basis for efficient sheet metal processing. From this compact store, the company supplies material to a laser cutting system that produces welded attachments for high-end vehicle chassis.**

Stefan Weihbrecht, Head of the Production Department at KW automotive GmbH, which was founded in 1995 and is based in Fichtenberg (Baden-Württemberg), holds a component in his hand. "We produce welded accessories for vehicle chassis from the metal sheets that we temporarily store in the tower storage system." KW automotive, a globally active group with a workforce of some 200 employees, has, in its own words, made a name for itself in the field of premium products for car tuning and automobile refinement. It supplies products to industry customers and motor sport teams, primarily in the form of an extensive range of high-end chassis. In addition to the chassis solutions, the company also manufactures, for example, patented wing door conversion kits, which are available for almost all commonly driven car models.

### The need for speed

Speed is vital, not just on the race track but also when provisioning the metal sheets. This production requirement is met by the fast blank sheet access capability provided by the STOPA TOWER Eco, which was developed by STOPA Anlagenbau GmbH in Achern-Gamshurst. However, the one-sided tower storage system with puller unit used by KW automotive, and which measures approximately 4.5 metres high, 2.9 metres long and 3.6 metres wide, also has other advantages. These include the space-saving storage of the sheets, the very low level of damage to the material as well as the improved organisation, which results in more efficient searches. In addition, the modular concept underlying the STOPA TOWER Eco, which has been designed for a payload of 1,200 kilograms per shelf or system pallet, provides an economical way into the world of automatic sheet material provisioning.

Weihbrecht stands in front of the tower storage system. "Because we only process medium-sized sheets, we opted for a single shelf block with the corresponding system pallets. In addition, we chose a fixed vertical spacing for the 60-millimetre loading height because this permits an optimum loading density for the parts geometries we handle." On request, STOPA can also supply the tower storage system with a vertical spacing between shelves suitable for a loading height of 200 millimetres. This makes it possible to store thicker materials or, for example, wooden pallets.

The STOPA TOWER Eco in use at KW automotive has 26 storage locations. The system pallets consist of a self-supporting frame construction with side members and sliding rails. In addition, they have a usable pallet area of up to 1.250 x 2.500 millimetres as well as the maximum, laser-controlled loading height of 60 millimetres. Due to the fixed position storage configuration, each pallet is assigned a defined position in the shelf block, whose longitudinal connections and diagonal bracing, combined with anti-slip stops at the rear, ensure a stable steel structure. The stationary lifting beam possesses a push/pull device and all the functions are monitored to guarantee reliable operation. An absolute and load-independent digital travel measuring system performs height positioning.

### Semi-automatic sequences

The task entrusted to the STOPA TOWER Eco, which is used on a single-shift basis at KW automotive, is to store metal sheets for the provisioning of the TRUMPF TruMatic L 2530 laser cutting system, which is installed opposite the store. System operator Axel Ausländer uses a crane to lift the delivered sheet metal stacks onto the fixed loading pins of the storage platform, between which the lifting or load beam of the tower storage system has deposited a system pallet. If no empty pallet is available, he sets down the sheets as filling material on a pallet that already contains identical items. The operator considers the system to be easy to use. He chooses the storage location and brings the load carrier forward by entering the start and finish coordinates at the central system control panel. When he releases pallets, these return to their shelves.

All storage and retrieval operations are performed semi-automatically as long as the operator continuously holds down the Enable key. KW automotive does not as yet have any need for the automatic mode which STOPA offers as an option and which permits the automatic processing of individual orders once the start and finish coordinates have been entered.

The sheets handled by the tower storage system are made from steel and stainless steel. The company also temporarily stores aluminium panels here. The materials vary between one and 15 millimetres in thickness. Stock management is performed in the ERP system implemented by the operator, which has a total production and useful surface area of 23,000 square metres at its headquarters in Fichtenberg.

Axel Ausländer stands at the operating panel of the programmed compact controller (PLC), which is equipped with an LCD display and a touch-sensitive user interface, and considers the position of the sheets in terms of operating safety. This is an additional check. Because the sheets have to be stored in a defined location and taken up and delivered securely, the tower storage system is considerably safer than manual handling. To initiate material removals he enters the number of the shelf from which the pallet is to travel out into the removal position. If material is to be removed from one of the lower two storage shelves then the storage platform can be moved when empty. The operator uses a crane to lift the sheets from the tower storage system's lifting beam and passes them to the laser cutting system in a single step. Leftover sheets are generally returned to the store.

### Metal sheets point the way forwards

In early 2019, the commissioning of the STOPA TOWER Eco, which provides almost 100 percent availability, sounded the starting gun for sheet metal processing at KW automotive. Weihbrecht is happy. "We have made an investment in the future because the capacity of the tower storage system means that it can temporarily store material for other processing machines."

### Solution highlights

- Fast access to raw metal sheets
- Optimal packing density
- Space-saving storage
- Less search effort
- Minimized material damage





Since Winkhaus processes sheets weighing some 160 tonnes every year, its investment in this storage system is a step with an eye on the future.

## Optimum loading density

Birwe paces out the small area taken up by the system: "We benefit from the high degree of space utilization, from minimized damage to materials and from rapid access to blank sheets. On top of that comes a markedly reduced search effort, based on better order, and a short-term return on investment."

The most important thing is, as Birwe stresses, the reliability the STOPA TOWER Eco stands for. One factor in this is that the panels can be stored in a defined way and also reliably inserted and withdrawn. All the sheet metal grades used, for example stainless steel, aluminium or high-strength steels in thicknesses from a half to eight millimetres, are buffered in the tower. Thus storing the sheets upright can be dispensed with.

The family-owned company, established in 1854, is replacing with this system a floor stacking method and a manually operated drawer shelving system in which sheets were placed at a height of up to two metres. Birwe says that now the space requirement has been halved and the employees are under less physical strain.

The tower storage system, which operates six days a week in three shifts, in a reliable process offering almost 100 percent availability, was commissioned early in December 2018. Birwe points at the shelf tower, fitted with longitudinal connections and diagonal bracing in the frame plus a push-through preventer on the rear side: "We decided on fixed-position storage and on a fixed vertical spacing of 60 millimetres. As this solution matches the quantities of the metal sheets we order, we get an optimum loading density." If the need arises for a vertical spacing of 200 millimetres, for example to stock taller items or pallets, the shelf tower can be retrospectively equipped with doubled loading height.

## Ergonomic and safe procedures

Fork-lift trucks supply the STOPA TOWER Eco with the delivered sheet metal stacks, and set them down on the fixed plungers of the taking-in platform. Before that, Alex Gutjahr, who operates the storage system, enters the number of a bay at the central system terminal to request an empty system pallet from it. The control unit then makes the selected pallet move automatically out of its storage location and onto the stationary lifting beam of the tower. The beam then lowers the load carrier between the plungers of the platform, so that the panels can be picked up as soon as the fork-lift truck has put them down. During the following insertion, a photoelectric barrier checks that the maximum loading height is maintained. Gutjahr himself also benefits from this solution: "The clearly structured control panel simplifies interaction with the storage system."

From the sheet metal store, the company (which employs about 2,200 people worldwide) supplies two TRUMPF punch laser machines, of the models TruMatic 6000 and



Uwe Birwe, a qualified engineer and Head of Industrial Engineering at Aug. Winkhaus GmbH & Co. KG, Telgte, Germany



The operator makes the system pallet exit the tower and then lifts the metal panels ergonomically using the crane.

7000. The operator initiates removals by entering the bay number of the pallet for interim storage and pressing the Enable button until the removal position has been reached. The requested sheets are removed from the pallet, which rests on the low-wear and low-maintenance lifting beam, using a crane. The beam, provided with a push/pull device and with functions that can be monitored to ensure reliable operation, attains speeds per minute of eight metres when lifting and four metres when pulling.

For optimum distribution of the sheet metal grades inside the storage tower that fits in with day-to-day needs, 40 shelf bays and system pallets are available. The load carriers are designed for payloads of up to 1200 kilos. STOPA has also fitted them with limiter plates and with a self-supporting frame structure provided with side members and sliding rails.

If an addition to stocks is due, the operator is by necessity compelled to select for the new material a load carrier which already holds metal sheets. First the operator makes the system pallet exit the tower, and then lifts the already present panels ergonomically using the crane. The newly delivered material is then placed onto the pallet and the older panels are stacked on top of them.

To return load carriers to their bays, the operator once again presses the Enable button. In addition to blank sheets, Winkhaus also stores leftover sheets. To ensure that the beam, which STOPA has provided with an absolute and load-dependent digital travel measurement system for its height positioning, can go to the two bottom shelf bays too, the pedestal in the empty state in front of it can be moved.

The STOPA TOWER Eco is equipped with a compact controller or a programmable logic controller (PLC), including LCD display and touchscreen interface. If an error occurs, it is displayed as a text message. The warehouse management software runs on the SAP system of the company, which mainly supplies customers in western Europe and in Poland. Customers include building owners, door and window makers, locksmiths, construction element/fitting dealers and architects.

"The online service offered by STOPA, enabling an order list with up to ten movement orders to be automatically processed, isn't used by us," says Birwe. "Our orders are too small-scale for that. In most cases we need just one panel."

## A decision with an eye on the future

Since around 160 tonnes of the some 30,000 tonnes of steel annually processed by Winkhaus are metal sheets, investment in this storage system can be regarded as a step with an eye on the future. Birwe indicates a stack of trade journals:

"We've analysed the market and gained a lot of information about the systems of other manufacturers. The STOPA storage tower fits in with what we envisaged in terms of height, compactness, ease of maintenance and price/performance ratio. Another positive is that the medium format of 1250 x 2500 millimetres at STOPA is standard, unlike at alternative suppliers." Apart from that, the sheet metal storage system permits, with its modular concept, an inexpensive start to the automatic stocking of flat materials.

## Highlights of the solution

- High degree of safety when handling metal sheets
- High degree of space utilization
- Rapid access to blank sheets
- Considerably reduced search effort
- Minimized material damage
- Short-term return on investment

By investing in a STOPA TOWER Eco Tower Storage System, Winkhaus, a German company which makes building fittings, has improved reliability when handling metal sheets, and so increased its efficiency. Other advantages include, for example, space-saving storage options, the ability to access blank sheets quickly, reduced material damage and a more orderly system.

Uwe Birwe, a qualified engineer who heads Industrial Engineering at Aug. Winkhaus GmbH & Co. KG in Telgte, Germany, is standing in front of a tower storage system that's six and a half metres tall, four metres long and three metres wide: "We process only metal panels of medium format to cover our product range. So we don't need a storage system for large-format sheets, and we wouldn't have considered it anyway in view of our tight space situation." Just the installation of the compact tower, which had to fit into the available space with millimetre accuracy, was a challenge in itself. The STOPA TOWER Eco, designed by STOPA Anlagenbau GmbH in Achern-Gamshurst, meets all the expectations that Winkhaus, as a leading supplier of top-quality window technology, door locking systems and access management, had placed in its investment.



STOPA is a leading manufacturer of automated parking systems and storage systems for sheet material and long-span goods in Europe. The product line ranges from stand-alone applications to integrated automated modules. Our independent company possesses unique know-how with regards to product quality and process security, process automatization, and software development.

### 3 REASONS FOR CHOOSING STOPA:

#### 1 INDIVIDUAL SOLUTIONS

STOPA solutions are tailored to specific requirements and individual customer wishes. Thanks to our expertise, you are guaranteed a smooth adaption to your special storage and material provisioning concept. For more planning reliability and future security.

#### 2 INTELLIGENT AUTOMATIZATION

More than 1,900 systems installed worldwide – that's where STOPA gets its unique know-how in the automatization of intralogistic processes. A proprietary software platform provides interfaces to machine tools and plants.

#### 3 WE'RE ALWAYS THERE FOR YOU

The STOPA experts are always there at your side. From the analysis of needs, to Best-Practice recommendations, all the way up to going live with the installations, preventive maintenance, and modernization. You thus are assured of having the most-qualified partner there to support you.

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