



STOPA automatic storage systems as production hub

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.

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



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

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

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.

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



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

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

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 electro-plated 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.



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)

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.

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