KNOLLREPORT

AT MARTIN STAUD GMBH IN BAD SAULGAU

User report of
KNOLL Maschinenbau GmbH

Maximum flexibility thanks to Bibi and Tina

KNOLL installs automation solution with two driverless transport systems at furniture manufacturer Staud

Bedroom furniture manufacturer Staud is the European market leader in the sliding-door wardrobe segment. They supply millions of variations of sliding-door wardrobes to large furniture stores and online retailers.

The production managers at Staud are convinced: Those who work in final assembly have an extremely value-added job and should not be given handling tasks. Staud has succeeded in implementing this with an intralogistics solution installed by KNOLL, in which the two transport robots Bibi and Tina take on a central task.

"Why seek far afield when the good is close by?" is a proverb based on a Goethe poem. Those responsible for production at the furniture manufacturer Staud in Bad Saulgau also shared this thought when they placed an automation order with KNOLL Maschinenbau, a company based in the same town. Dirk Schmidtmeier, Managing Director of Staud, is delighted: "I think it's really great that we, as a long-established Bad Saulgau company, have been able to successfully work together with another large company that is firmly rooted here."

At first glance, Staud and KNOLL are hardly compatible. Staud has a woodworking background and produces bedroom furniture, mainly sliding-door wardrobes. KNOLL, on the other hand, is primarily at home in metalworking – known worldwide as a leading supplier of conveying systems, filter systems and pumps for cooling lubricants and chips.

But for more than ten years now, KNOLL also has an Automation Division, which deals with solutions for challenging assembly and logistics tasks. This includes stationary transport systems with chain and roller conveyors as well as driverless transport systems (AGVs) and the entire software-based interlinking. "That's exactly the kind of partner we were looking for," says Dirk Schmidtmeier. "Because we wanted to bring the intralogistics for our plinth production up to the latest standards."

Cabinet production in line with the latest standards

Around 100,000 wardrobes leave Staud production every year in job-order production – in a high variance, as Dirk Schmidtmeier says: "We produce different wardrobe systems that allow for more than 40 million variants. In order to be able to

New intralogistics solution at furniture manufacturer Staud: Two KNOLL AGVs, christened Bibi and Tina by the employees, take care of the panel transport from the machine line to buffer stations and on to assembly on the plinth line.

cope with this, we have developed a well thought-out common parts system consisting of elements manufactured in-house and those supplied."

Staud sources the chipboard for its furniture in different thicknesses and colours, all already surface-finished. In the so-called machine lines, equipped with sawing, milling and drilling centres, they receive the required format, edges and individual holes.

Since a wardrobe consists of units such as carcass, doors and plinth, Staud's production is also structured accordingly. For instance, on the "plinth line", the bottom parts of the wardrobe as well as shelves and also the cornice are assembled. For this purpose, all the required, finished chipboards have to be ready in time at picking stations on the plinth line. The task of the KNOLL automation project was to optimise the logistics between the machine line and the plinth line, including the buffer stations in between.

Previous solution was inflexible and time-consuming

Staud production is already fully automated. Downstream of the machine line, there are conveyor belts on which formatted chipboards stacked on carrier plates are transported. In the past they were taken by lift to a buffer elevated track at the end of the machine line. This was a roller conveyor about 100 metres long at a height of 3 metres. It contained around 70 carrier plates, which were brought down again at the other end by a lift to the provisioning area on the plinth line.

Dirk Schmidtmeier mentions the problem with this transport technology: "Two different production optimisations collided at our elevated track, which led to considerable time losses."

This is because the machine line is designed to optimise set-up times. This means that many identical items are produced one after the other, which were stored in four stacks one after the other on the elevated track. However, since the plinth line is based on job orders, its needs are different: In general, a maximum of two stacks of identical parts are required. "So the order on the elevated track was never right," complains Dirk Schmidtmeier. "In practice, this meant that if we wanted to get to the tenth stack, we had to take down nine stacks and put them somewhere to get to the tenth."

Together with Daniel David, Head of Production Planning, the Managing Director looked for a solution. The ultimate solution was: "The elevated track must go. We want to use automated guided vehicles (AGVs) to move the stacks of chipboard on the carrier plates from the machine line to buffer stations, store them there temporarily and transport them – again by AGV – to the picking stations on the plinth line as required."

A special device with a stamp ensures that the transport plate is correctly aligned before it enters the transfer station.

Shortly before the transfer to the AGV: The transport plate is brought to a level at the transfer station by a customer-specific lifting device so that the AGV can drive underneath.

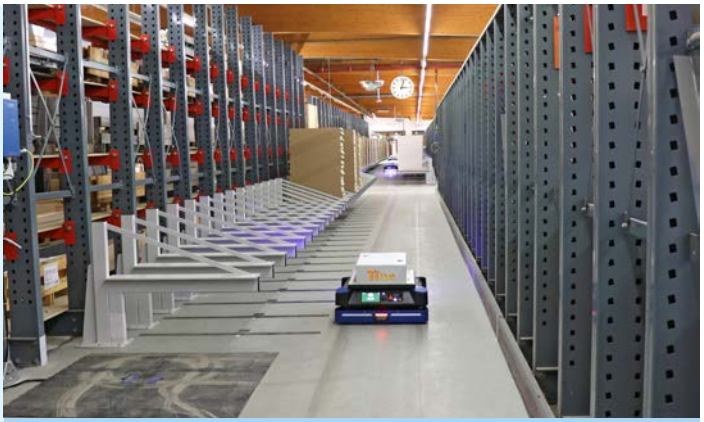
Complete automation from a single source

The search for a suitable automation company turned out to be more difficult than expected. According to Schmidtmeier, there was initially no supplier who could offer the entire project – consisting of AGVs, short stationary conveyor lines, lifting stations and buffer stations – mechanically and electrically, including the software networking, from a single source.

That was until the project team became aware of KNOLL Maschinenbau's automation business. "Of course we have known KNOLL for a long time, but we never had any dealings with the company," says Dirk Schmidtmeier. "It wasn't until we came across trade articles and videos during our research that demonstrated their extensive automation offering that we realised the right automation company was right on our doorstep."

Although the furniture industry was new territory for KNOLL, the Automation Department felt up to the basic requirements. Its head, Christian Spohn, argues: "We have already implemented numerous projects in a wide range of industries and boast extensive knowledge. As far as mechanics and electrics are concerned, we are very well positioned as a mechanical engineering company. Regarding the AGV systems, we have a firm partnership with the renowned provider Safelog. And when it comes to software and networking, we employ specialists in the Automation Department who have already proven themselves in a large number of successful projects."

After setting down, the AGV with the panel stack makes its way to a free buffer station.



Buffer stations arranged in a row. A total of 137 places are now available.

The space is tight. How good that the AGV can turn 360 degrees on the spot and then drive into the buffer station very precisely.

All challenges overcome in a short time

The contract was awarded in May 2022. As Staud already knew exactly what was needed and perfect data material was prepared, the project planning phase took only a few months. During this time, Staud had the elevated track demolished and the entire floor renovated because it was not suitable for AGVs. In addition, a secure, stable WLAN connection had to be installed, which would later be needed as a basis for the data exchange.

The installation took from Christmas to January 6 (Epiphany). Since then the two AGVs, christened Bibi and Tina by the employees, have taken over the transport of the chipboard stacks. "Of course, we had a few challenges to overcome be-

AGV Bibi on its way to the pick-up station on the plinth line.

The pick-up station on the plinth line is characterised by solid mechanical engineering. The transport plate is set down on the short roller conveyor. This is followed by a lowering to the low level of Staud's existing transport path.

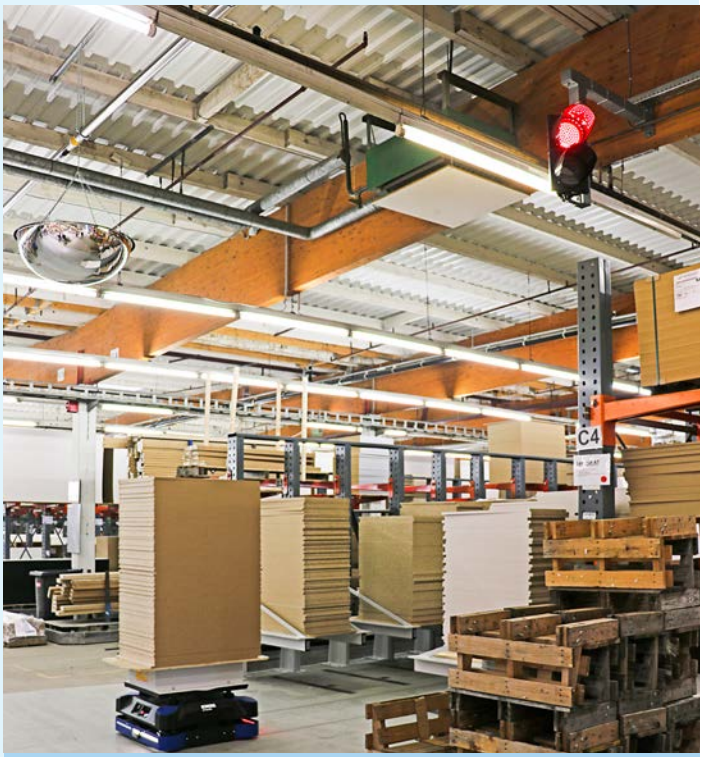
The AGVs spend breaks in transport traffic in the charging station.

fore then," reveals Philipp Miller, KNOLL Automation Sales. One challenge, for example, was the connection to Staud's existing conveyor technology. The overall height of the existing conveyor belts was too low to drive under them with the AGVs and pick up the carrier plates. "We developed a customised lifting station for this," explains Philipp Miller. "Immediately in front of the lifting station we also installed a mechanical device that precisely aligns the carrier plates."

Dirk Schmidtmeier is very satisfied with this solution: "This is rock-solid mechanical engineering that not every automation company can offer." This know-how also paid off for the design of the buffer stations. KNOLL succeeded in arranging 137 stations side by side in a tight space. Philipp Miller describes: "These buffer stations have to accommodate panel stacks weighing 800 kg, but without a lower support so that the AGV can drive underneath. We solved this with a kind of cantilever rack." The narrow aisle to the buffer stations also influenced the choice of AGV. Christian Spohn explains that a new type X1 AGV developed by Safelog is being used here for the first time, which, among other things, enables space-saving turning on the spot.

Successful communication between AGV, PLC and PPS

A special feature was the networking of the two AGVs with the KNOLL PLC and the production planning system from Staud.



There is mixed traffic on the "main road". The two AGVs Bibi and Tina always have the right of way. To avoid collisions with forklift traffic, drivers receive a clearly visible traffic light signal – red or green.

"Every stack of panels that comes off the machine line has a DMC barcode on it," says Christian Spohn describing the process. "We scan it automatically at the transfer station and use it to manage the stack and the respective buffer station in a database. If the employee in picking needs certain chipboards, he also requests them via a barcode to be scanned, and the AGV knows exactly which buffer station it has to approach for collection."

As two AGVs travel between the pick-up and drop-off stations and buffer stations, there are priority rules and each AGV recognises where the other AGV is. "The total volume of data is enormous," confirms Christian Spohn. "In order not to overstretch the computing power – especially with the AGVs – we found a workable solution that streamlines the amount of data."

Random access to the required chipboards

Daniel David, Staud's Project Manager and Head of Production Planning, and his team are fully satisfied with the new automation solution: "The system works perfectly. We now have random access to the items we need without any additional effort. The most important thing for us was to keep the employee on the assembly line adding value and not have to assign them to logistical tasks." Dirk Schmidtmeier adds: "The benefit of this new organisation by means of AGVs and the better provision of items will mean that our investment will have paid for itself in less than three years." Furthermore, he praises the very pleasant, uncomplicated cooperation with the highly motivated KNOLL team. "Of course, the close proximity is also a stroke of luck for us. Because when a problem arises, the distances are extremely short." And Chief Automation Engineer Christian Spohn is also pleased to have Staud as a reference customer right next door: "In a way, it's a win-win situation, because we've agreed that Staud's doors are always open for prospective KNOLL customers."

Staud Managing Director Dirk Schmidtmeier (left) and Daniel David, Head of Production Planning, agree: "We have received an automation solution from KNOLL that we had imagined. It allows us to keep the employee on the assembly line adding value and not have to assign them to logistical tasks."

KNOLL Automation Department Manager Christian Spohn (left) is delighted with the successful installation of the new AGV-based intralogistics solution with Staud Managing Director Dirk Schmidtmeier (2nd from left), Daniel David (3rd from left), Head of Production Planning, and Philipp Miller, KNOLL Automation Sales.

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KNOLL .It works

AT MARTIN STAUD GMBH IN BAD SAULGAU

Staud – modern furniture manufacturer with history

Martin Staud GmbH, commission manufacturer of bedroom furniture and European market leader in the sliding-door wardrobe segment, has a history dating back to 1653. At that time, Matthäus Staud opened a carpenter's workshop in Saulgau, and the love of woodworking was passed on over ten generations. Martin Staud GmbH has been part of the Vivonio Group since 2012. In 2018 a new hall for the production of bedroom furniture was built and put into operation in Bad Saulgau. Today the company employs 170 people.

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KNOLL Maschinenbau GmbH

KNOLL is the leading provider of conveyor systems, filtration units and pumps for metal machining. These transport and separate chips and cooling lubricants. The comprehensive product range offers systems for decentralised or centralised applications. Its Automation Division deals with solutions for challenging assembly and logistics tasks. These include stationary transport systems with chain and roller conveyors. The integration of handling units (robots, cobots) and transport robots (AGVs) enables flexible systems to be created from a single source.

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