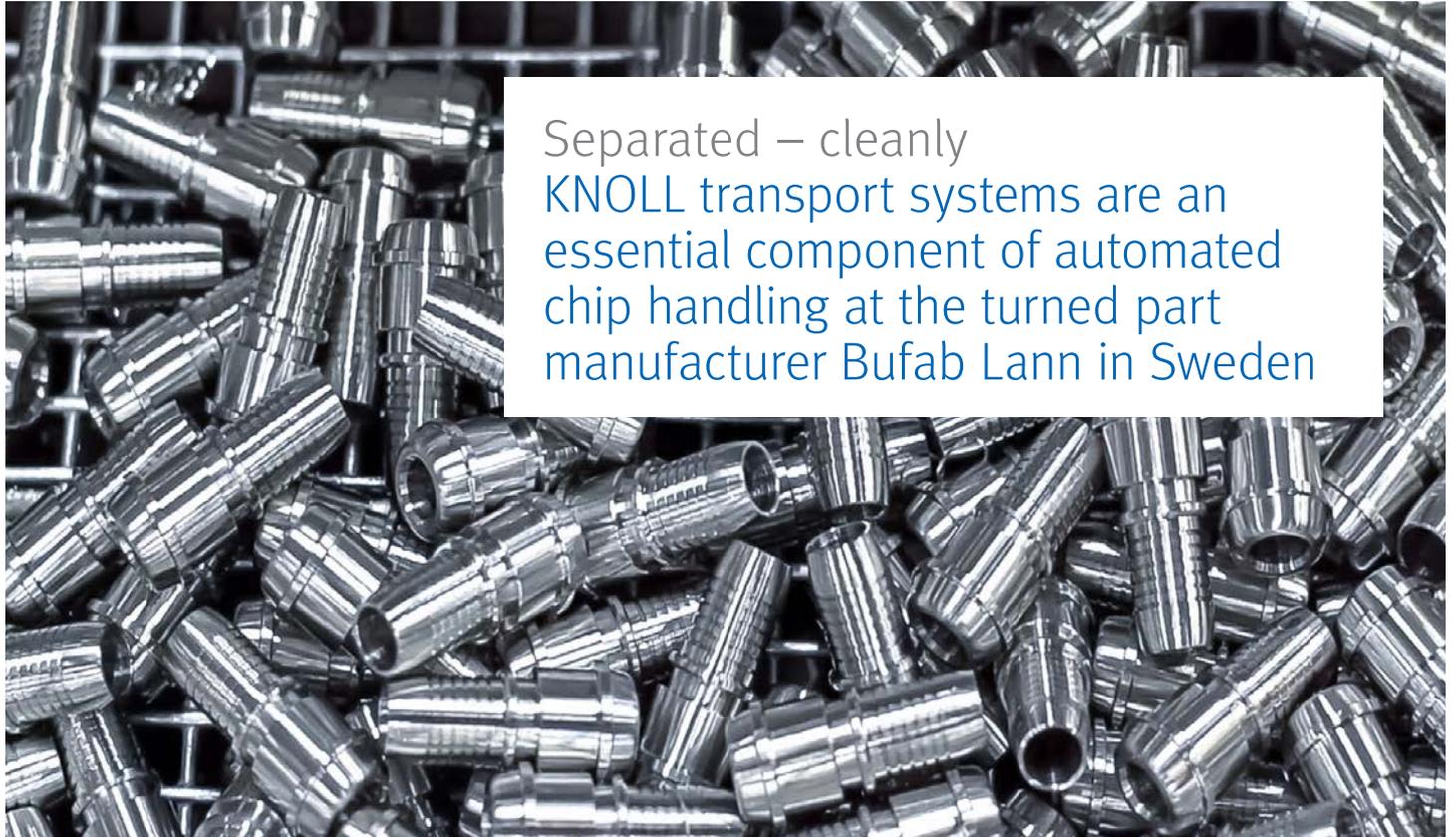


KNOLLREPORT

AT BUFAB LANN IN SWEDEN

User report
KNOLL Maschinenbau GmbH



Separated – cleanly
KNOLL transport systems are an essential component of automated chip handling at the turned part manufacturer Bufab Lann in Sweden

Bufab Lann is the leading turned part manufacturer in Sweden. The company produces 40 million parts per year of steel, stainless steel, and various aluminum and brass alloys.

For Bufab Lann, chip disposal is an important element in the recently implemented process optimization. With a new system designed by Mercatus, the turned part manufacturer has made numerous improvements. Critical for these are, among other things, the conveyor lines for swarf trolleys that are based on the KNOLL TS-S transport system.

Bufab Lann, the leading manufacturer of turned parts in Sweden, creates a lot of chips, for this company headquartered in Värnamo, which employs 100 people, produces 40 million parts per year of steel, stainless steel, and various aluminum and brass alloys. Depending on the batch size, Bufab uses CNC lathes, multi-spindle automatic turning machines, and rotation transfer machines.

In order to feed the chips into recycling properly, Bufab had been using a centrifuge-based disposal system for more than 20 years. It consisted of several small central systems for the various types of material. The supplier of this system was Mercatus Engineering AB, the largest provider of systems for chip processing and cooling lubricant cleaning on the Swedish market. Herman Selin, Sales and Project Manager at Mercatus, reports: “We are in very close contact with

Bufab and have supplied the company with several systems of various sizes over the years. Furthermore, we provide service and maintenance in Värnamo.”

Numerous possibilities for improvement

But even a well-maintained system is no longer state-of-the-art after more than 20 years. The wait times for the machine operator when emptying the swarf trolleys bothered the people in charge at Bufab, for example: it took several minutes before they had the empty trolleys back. This was time that they could use for quality assurance tasks or something else.

The previous centrifuge technology was also far from perfect, for it could only dry short chips reliably. This required an upstream sorting system that separates the end pieces of the rod material from the chips and a chip reducer that cuts the long serpentine chips down to the right size. Unfortunately, it happened frequently that end pieces were not sorted out and they caused sometimes significant damage to the shredder. The costs of this were one factor; worse, however, was the downtime for chip handling and the production downtime that this entailed.



The chip centrifuges are arranged behind the KNOLL transport systems. From there, the degreased chips are taken to the appropriate containers to the right via a portal.

Another fly in the ointment at Bufab Lann was the insufficient drying of brass chips. If with these very small chips, residual moisture is still more than one percent after degreasing, the chips compress in the big bag provided for removal due to their own weight. Oil leaks occur on the hall floor, and during subsequent transport, the recycler has to ensure that no oil gets into the environment.

New system for greater process reliability and productivity

All of these factors drove Bufab's decision to invest in a new chip disposal system. Once again, the trusted partner selected was Mercatus. Herman Selin and the planning team were very happy about this: "For more than six months, we worked intensively with our customer and various suppliers, considering a variety of layouts, in order to find the optimal solution. In the end, we found it in a KNOLL transport system and a Steimel chip centrifuge system."

Mercatus has maintained an intensive partnership with KNOLL Maschinenbau, Bad Saulgau, for about 40 years. "Whether filter systems, chip conveyors or shredders – with KNOLL products, we know that the quality is high," emphasizes Selin. "This also applies for the transport systems that KNOLL has been producing for a few years. We were able to use these to provide optimal chip disposal."

New chip handling with buffer line

With the new system installed in summer 2018, the metal chips from all Bufab production can be degreased and sorted easily and automatically and collected in containers or



It takes only 10 to 15 seconds to move a swarf trolley into the system and remove another one from it.

big bags. Due to the production concept, the machine operators still have to push the swarf trolleys from the machine to the processing plant. However, the automation begins with the insertion of the swarf trolleys into one of two available conveyors. The employee uses a barcode to indicate which are the chips in question – whether steel, stainless steel, aluminum or brass. Usually, right after that, he can take an empty trolley from the return line back to his machine.

The conveyors consist of a 4.5 meter-long elevated KNOLL TS-S/TS-G transport system with a separator and non-return device. These can accommodate several swarf trolleys in a row and thus serve as a buffer zone. Patrick Hörmann, Project Manager at Mercatus, explains: "Because of the numerous machine tools at Bufab, it can happen that three, four or five employees arrive at the central system at the same time to insert swarf trolleys. Thanks to the buffer slots, the KNOLL transport system can balance out these production peaks."

The supplying KNOLL transport system is equipped primarily with straight-lugged chains. Only in the areas where employees are moving around are accumulation roller chains deployed. This provides assurance that the trolley remains standing – if it should come into contact with an employee.

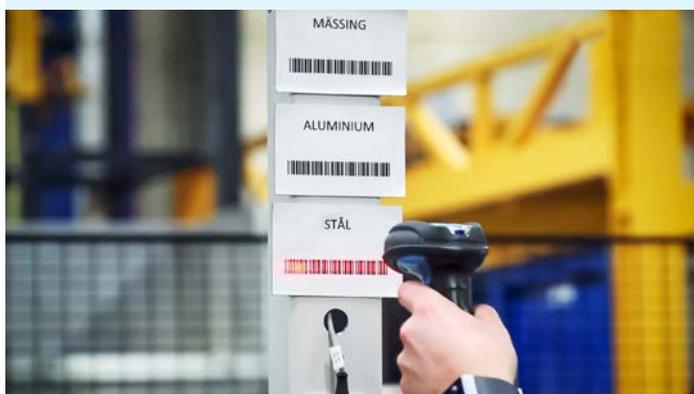
Automatic transfer to centrifuge system

The swarf trolleys inserted meet a crosswise line at the end of the buffer; it, in turn, was implemented based on a KNOLL TS-G transport system. The trolleys move to the centrifuges on it. When they arrive at the centrifuge, the chips are lifted and tipped into drums, which are then placed in the centrifuge. This way, the chips do not come into direct contact with the centrifuge or other mechanical components. “This keeps the system clean and wear-free,” explains Patrick Hörmann, and he mentions another advantage: “Each batch of chips is assigned to an individual centrifuge barrel in which the chips remain until they are emptied into the appropriate container. We can therefore avoid mixing different materials.”

Also important: the modern chip centrifuges are designed so that they can work with short and long chips. Even end pieces do not influence the result. Chip breakers or impact separators are therefore not required.

After centrifuging, the container with the degreased chips is brought to the appropriate collection containers via a portal. Currently, the turned part manufacturer uses two containers for steel, one for aluminum, and two additional ones for rust-free alloys. Furthermore, there are nine big bags ready for additional materials that accumulate in smaller quantities. Overall, with the new system, Bufab is able to process up to 14 different materials separately from one another.

An important function in the complete installation is the control of the KNOLL system. It not only ensures that the swarf trolleys reach the centrifuges with their freight, but also that the chips are emptied into the right container according to



When dropping off the swarf trolley, the employee scans a barcode appropriate for the material.



At the end of the buffer lines, the swarf trolleys are transported across a crosswise line to the centrifuges.

their type. Thanks to the transfer of the data to the centrifuge system, the software is also responsible for ensuring that the degreased chips land in the right container and that the emptied swarf trolleys find their way back correctly. In case of a breakdown of the KNOLL system, the entire system and then, after a brief period production too would come to a standstill. “The system works so reliably that we can guarantee very high process reliability,” says project engineer Hörmann. “This is also why we like to use KNOLL products so much.”

All requirements fulfilled

Bufab is very happy with the new Mercatus/KNOLL/Steimel system, as Bufab Production Manager Tobias Svensson confirms: “The drying results have improved immensely. We are now able to achieve an extremely low residual moisture of less than one percent, so we recover a lot of cutting oil. Cutting oil consumption has dropped by about 45%. Furthermore, we can transfer the chips to the recycling company dry and sorted by type, something that is evident from the greater reimbursement. The former minutes-long wait time has also been eliminated. The machine operator needs only 10 to 15 seconds in order to move his trolley into the system and remove another one from the removal conveyor.”

In addition, the entire system – and especially the KNOLL transport system – is very robust. Mercatus employees perform preventative maintenance in a six-month cycle, whereby the share for the KNOLL components is at most one-tenth of the total effort. “We only have to re-tension the chains and check the sensors for damage,” says Patrick Hörmann, who points out another advantage. “The KNOLL transport system is constructed in modular fashion. If Bufab should expand its production, we can easily add KNOLL modules and adapt the system to the new chip quantities.”

Bufab Lann – Turned parts for all industries

Bufab Lann was established in 1943 and is now one of the leading European manufacturers of turned parts. The company employs approximately 100 specialists and state-of-the-art processing methods to manufacture customer-specific components made of steel, brass, stainless steel, and aluminum.

Bufab Lann is part of the Bufab Group, a trading company established in 1977, which offers its customers a full-service solution for the procurement, quality control, and logistics of C-parts (screws, nuts, etc.). The international company with locations in 28 countries employs more than 1,400 people.

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Tobias Svensson, Production Manager Bufab (center), with Sales/Project Manager Herman Selin (left) and Project Manager Patrick Hörmann in front of the new chip handling system.

Mercatus – Cooling lubricant cleaning and chip disposal specialist

From the very beginning, the family-owned Swedish company Mercatus, which was established in 1973, has concentrated on technical solutions for cleaning and recycling process liquids and components from the process industry. Today, the company employs 30 people and generates annual sales of a little more than EUR 10 million. Important company areas are chip handling and cleaning cooling lubricants for the metal-processing industry, as well as cleaning process liquids with membrane technology, evaporators and ion exchangers for industry, heating, and water treatment systems. Mercatus develops, builds, and supplies both small mobile equipment as well as complete systems. The company also provides service for the systems and complete after-sales service.

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KNOLL Maschinenbau GmbH – Transport systems for assembly and logistics

KNOLL transport systems are ideally suited for assembly and logistics tasks, even for heavy and very large parts. Since the KNOLL systems are modular with regard to their mechanical, electrical, and software systems, the KNOLL development team can assemble custom-tailored solutions. Such systems guarantee a short amortization time and can be expanded nearly at will. The input-side visualization of the controller makes for easy operation. For assembly work – whether timed or continuous – KNOLL focuses primarily on the best ergonomics and assembly "at eye level." Low-building conveyor systems contribute to this, as do additional platforms and lifting units. Turning and/or swiveling workpiece holders ensure perfect accessibility to the object. For logistics applications, KNOLL prefers to use standard conveyor technology that can be designed so that it is cost-effective and reliable. Customer-specific solutions can be built from the existing building blocks on request. Even long lines are possible.

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