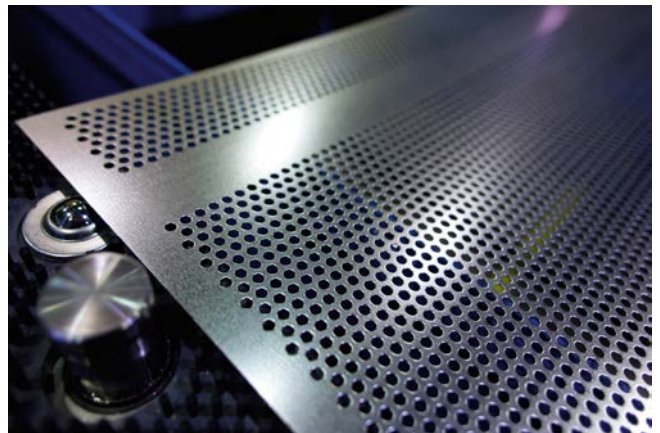



# Unmixed “Bagging”

## RFID Technology more flexibly guides Stamping Remnants in the right Direction

In order to supply bulk bags of unmixed stamping waste in even more variations, a Swabian manufacturer of perforated sheets relies on RFID technology (radio frequency identification) designed for harsh and difficult environments. With RFID, an automatic and highly flexible, order-related assignment of accumulation bins to presses – and beyond that to materials and even slug sizes – is achieved.

The production of perforated sheets (image 1) inevitably results in great quantities of stamping scrap. Around 8000 tons annually of such so-called slugs are “produced” on the side by the MEVACO GmbH, which is based in Schlierbach, Germany. The medium-sized company makes perforated sheets in a wide range of shapes and formats and from different materials including aluminum, copper, mild steel and stainless steel. It has specialized in small to medium lot sizes and besides ready-made in-stock products also provides custom perforated sheets from a lot size of 1. This requires frequent press changeovers and material changes, although they have been reduced to a minimum thanks to a sophisticated job order planning. The quantity of waste is greatest at four high-output all-across presses, which process sheets up 1500 mm wide directly from the coil – around the clock, 365 days a year. At these four presses, MEVACO has always been directly collecting the stamping scrap during the formation – unmixed – for resale. Purchasers include steelworks and manufacturers of die-cast aluminum components or weights of all kinds.



**Image 1:** Custom-made perforated sheets from a lot size of 1 are a specialty of the MEVACO GmbH based in Schlierbach

Answers for industry.



**Image 2:** With the new control and identification utilizing RFID technology (radio frequency identification) by Siemens, MEVACO has made the unmixed collection of stamping scrap much more flexible and future-proof

For that reason, a so-called slug channel is located below the four all-across presses and within it, an automatic transport system with lorries as accumulation bins (image 2). This transport system moves empty or partially filled bins order-related under the presses and back to the buffer zones, i.e., the bins are assigned to a specific material. Full bins are automatically brought to the discharge station, lifted by a hoist and emptied into the corresponding truck containers at the slug depot.

### Increasing Variety, higher Demands

“With the wish expressed by several customers to have the stamping remnants supplied unmixed in so-called bulk bags, we were faced with the task of adhering to a weight of two tons permitted for these plastic bags. For this purpose, the weight must be recorded with each stamping order and added up,” states Jochen Schott, technical director at MEVACO. “Other customers in turn require a higher bulk density in their applications so that only slugs with small diameters can be used, which further increases the number of different scrap products.” To enable a reliable automatic operation, the control system must know at all times the mass of the slugs contained in each of the altogether 23 lorries as well as their quality. With the previous control and lorries, which were permanently assigned to a specific scrap type, that was no longer possible. The operator decided against adding on and instead elected to implement a new, more powerful, flexible and future-proof solution. This solution was to operate reliably for many years to come, be easily expandable if needed and be open to the connection of a wide variety of components.

The execution was entrusted to the Stuttgart, Germany, branch of the Heldele GmbH, an automation specialist, system integrator and Siemens Automation solution partner, with whom MEVACO was already familiar. Together, a sustainable concept on the basis of control components by Siemens was developed and in the end integrated in only a few days.

### End-to-End Automation

The head of the new solution is a SIMATIC S7-300 PLC in the central control cabinet of the press hall, which communicates with MEVACO’s higher-level control system. An Industrial Ethernet switch of the series SCALANCE X116 by Siemens connects the operator units at the presses as well as at the slug depot and establishes a network connection to the slug channel. To record the mass, the bin locations under the presses were fitted with SIWAREX U load cells, which are directly connected to the control. A small decentralized installation at the bottom of the slug channel acquires, among other things, the signals from the fill level monitoring (employing ultrasound and laser light barrier) and forwards them to the control via PROFIBUS.

### IWLAN and RFID provide Clarity

Crucial for the transparency and flexibility of the new solution were – according to Michael Anhäuser, project leader at the Heldele GmbH – the identification of the lorries and the communication between the control components in the control box on the carriage and the main control. For the identification, all 23 lorries were equipped with a credit-card-sized SIMATIC RF360T RFID transponder (image 3), which is recess-mounted on a plastic spacer and well protected against mechanical damage. Thanks to the high IP67 degree of protection, the transponders are predestined for harsh industrial applications – as present here with the constant exposure to oils and cutting fluids.



**Image 3:** All 23 lorries are equipped with a SIMATIC RF360T RFID transponder, which enables a clear recording and assignment of materials and weights



**Image 4:** The SIMATIC RF380R RFID reader reads the bin numbers stored on the transponders and guides the bins in the right direction

The relatively large antenna of the credit-card-sized transponders chosen increases the range and permits greater read distances, i.e., the positioning accuracy required is less. Counterpart at the carriage is a SIMATIC RF380R RFID reader (image 4), which reads the identification number stored on the transponder from a distance of up to 10 cm and matches it with the requirements. The reader is integrated into the accompanying control network using an ASM 456 interface module and PROFIBUS.

“The initial doubts regarding the harsh, metallic environment have turned out to be unfounded,” says Günter Schäfer, who is responsible for the service and maintenance of the electrical systems. “Since the commissioning, the highly challenged RFID system has been running with great stability and reliability.”

The bridge between the carriage and the central cabinet is built by an IWLAN system (Industrial Wireless LAN) comprised of a SCALANCE W788-1 Pro access point at the channel wall and a SCALANCE W746-1 IWLAN Ethernet client module at the moving control box. The access point with two standard antennas reliably covers the entire slug channel so that the originally planned, additional RCoax

radiating cable along the driving route could be omitted. As a result, the order and bin data stored in the data blocks in the main control is automatically assigned to the right lorries and visualized.

The link to the higher-level production planning and control system (PPS) of MEVACO is a SIMATIC IPC227D nanobox PC in the central cabinet, an extremely compact embedded industrial PC. This PC is integrated into the control network via a CP343-1 communication processor and transmits the order data to the production. Vice versa, the product types and weights are transmitted to an in-house web application via OPC (OLE for Process Control), which from now on allows MEVACO customers to retrieve current supply quantities and order from the Internet.

### **More open, more flexible and more efficient than ever before**

Through the use of bulk bags, basically any scrap type can now be collected in any lorry. This was not possible before, since slug remnants always got stuck on the bin wall, which would have contaminated subsequent lots. Now there is a free pool of about 15 lorries, which can flexibly be assigned to different materials. A further diversification of scrap products in bulk bags is thus easily possible.

Another benefit is the greatly increased transparency of the new system. For instance, substantially more diagnostic data is now displayed to the operator. As a result, errors can be more quickly localized and minor malfunctions be corrected by the operator. “In addition, the new solution optimally prepares us for future expansions,” says Jochen Schott. Conceivable could be a lengthening of the slug channel beyond the depot and the use of a second carriage, if the construction of another production hall is given the go-ahead. A next step could (then) also be the enlargement of the RFID solution to cover the truck containers, which would eliminate another error source. “There is no lack of ideas – we now have created the technical prerequisites to also implement them. In this respect, too, we have become decidedly more open and more flexible,” concludes the technical director.

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