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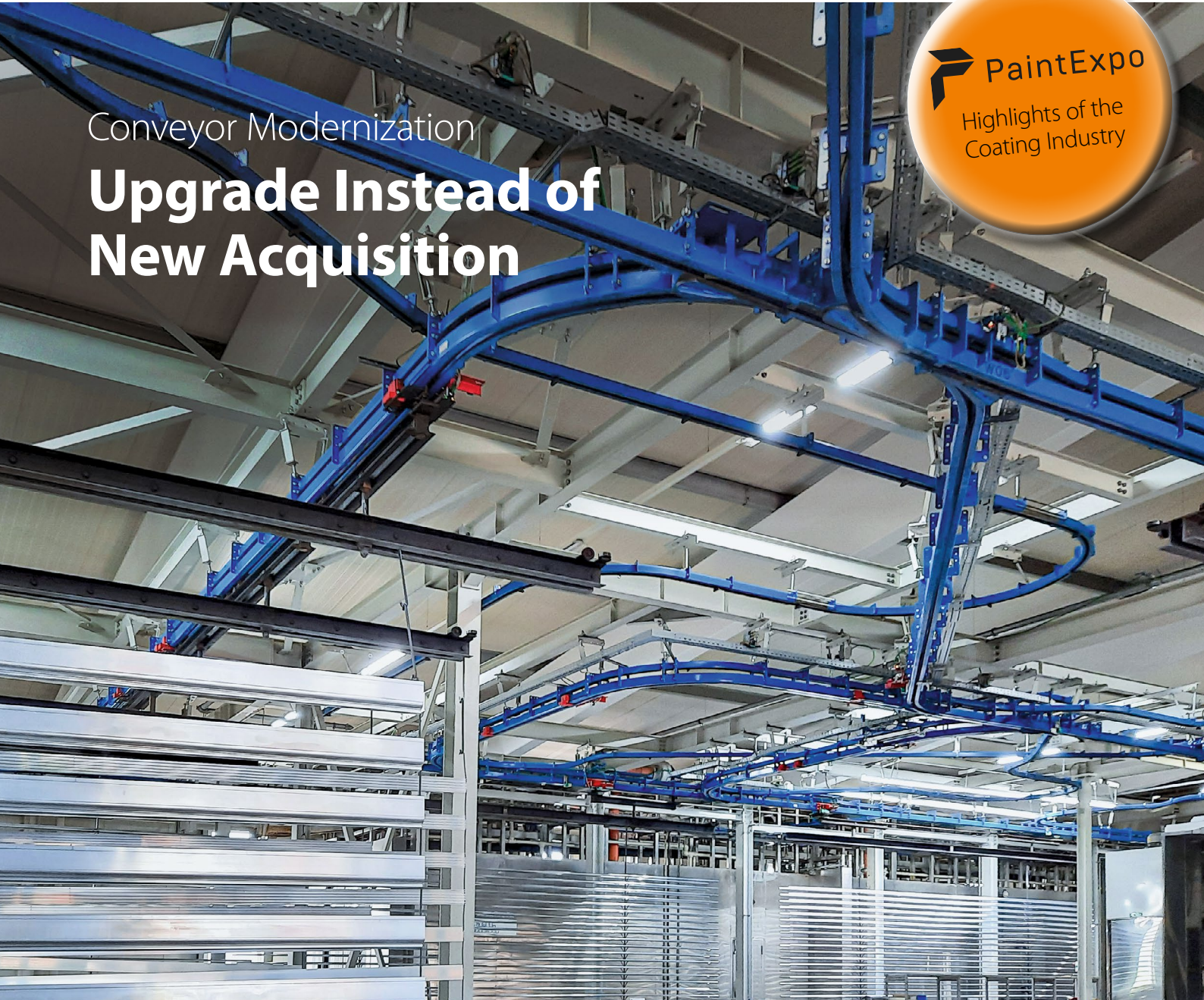
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Another Step on the Path Towards Digital Electroplating

Electroplating and finishing specialist C. Jentner has been progressing towards digitalisation since 2015. The most recent project is a radio-controlled, automated operation for surface finishing. JOT spoke to Marcel Scheidig, who as Head of Technology played a decisive role in the conceptual design of the process developed in-house and now running in live operation.

Mr Scheidig, what prompted Jentner to develop an automated surface finishing system?

For several years, now, the topic of digitalisation has been an integral part of everything we do. Our path to process automation and digital electroplating began in 2019 when we integrated RFID technology into the production data acquisition (PDA) system we had developed in-house; this led to a significant increase in the efficiency of our production processes. We wanted to take this innovation a step further and develop a much more comprehensive, integrated processing system that would be based on radio control of PDA. Above and beyond mere documentation of all workflows, we wanted to ensure that all plating processes from goods receipt to goods issue are seamlessly and comprehensibly managed, monitored with the aid of artificial intelligence (AI), and minutely controlled.

How did you go about this in the project?

At our own initiative, we set about designing of our automated solution, IPS 5.0 – which stands for ‘Intelligent Plating Surveillance’. At certain points along the way, we sought support from specialists in digital transformation and robotics, from software architects and web developers. At the same time, we centrally merged the rectifiers previously installed at each bath into two cabinets and cre-

ated two separate networks in the production hall to manage and link the RFID system and the PLC.

And how exactly does this process work?

As part of a closed loop, the goods to be finished are visually inspected upon receipt, i.e. they are removed from the tray and photographed – and the photos are loaded into the Microsoft Azure cloud. If there should be defects later on at the quality-control stage at the end of the finishing process, the photos can be consulted to determine whether the raw material may already have been conspicuous to begin with, or whether there were production defects involved. As part of a university project, we are currently experimenting with a collaborating robot – a ‘cobot’ – that will place the workpieces on the goods rack in a precise – and, specifically, a position-documented – manner.

What happens after this receiving inspection?

Each order contains all items along with their electroplating instructions. From baths 1-n, proceeding step by step and chronologically, IPS 5.0 takes over the workflow, using all the settings stored in the master – such as dwell times, current levels and voltages, switching options for goods movement, ultrasound and pump flow. Tracked by the RFID system, the loaded goods racks pass through the process,



Marcel Scheidig, Head of Technology at Jentner, played an instrumental role in the project.

and an HMI panel notifies electroplaters of the activities to be performed. Feedback is also automated and provided via RFID. We are already thinking one step ahead here, too: electroplaters will soon receive instructions in the form of a push message sent to a smartwatch. This clarifies the entire process even more, so employees will know precisely what to do and when – including any pending maintenance or additions of electrolytes. To ensure the highest quality, we track the entire run and employ algorithms to monitor it at appropriately defined measurement intervals. The moment a value falls outside of predefined ranges, the system sounds an alarm, triggering a production stop if need be.



An impression of the provider's electroplating systems.



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The system guarantees control, management and tracking of all production processes.

And where does AI enter the picture?

When, at the end of the process chain, the finished goods are taken down and scanned by the camera again. During the detailed inspection, an AI solution compares actual values against the stored target values. We spent several months in trial operations, collecting and refining the necessary training data. Following a production stop, all of the data collected during the process, together with the recorded quality of the raw materials, are used to identify the specific reason for the production fault. To accomplish this, the AI must learn iteratively what layers, scratches or dents look like. That way, later on, it can identify these as patterns – and the more data we have, the higher the degree of automation, and the more accurate the optical recognition.

How does this benefit your customers?

High quality and seamless traceability are both particularly important here. Customers can access a secure customer portal in the cloud for a transparent view of the final quality control. This means there may be times when they can even forego their own inspections of incoming goods; this saves a lot of money, particularly if there are high-tech workpieces involved. This gives them constant information about what happens with the manufactured parts, thanks to fully transparent access to all inspection results and the current status of processing.

Where do you see the concrete benefits to you as a company?

Setting up and optimising AI components for new production lines naturally

Benefits of the automated process in figures

- 12% reduction in the use of precious metals
- Delivery reliability improved by 25%
- Efficiency improved by 18%
- 100% documentation, for complete safety and transparency

requires investments of time and money. In exchange, this gives us the benefit of absolutely precision-plated workpieces and seamless traceability – making the process ultimately more economical and more secure as well. This allows us access to completely new target groups from the high-tech sector, including customers in medical technology, aerospace or even defence. We have already applied for a patent of the process. //

Thank you very much indeed for your interesting insights, Mr Scheidig.

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