# Smart and Flexible Conveyor System

The specialist surface finishing company WOB-Wessling needs both flexibility and quality in its day-to-day processes. To meet these requirements, the company has invested in an intelligent power-and-free conveyor system for its new powder coating line.

WOB-Wessling, which is based in the northern German town of Geeste, specialises in high-quality surface finishing. As a service provider which coats products from a range of industries, including parts for cars, agricultural machines and electrical cabinets, the company needs to be highly flexible both in its everyday processes and in its strategic planning.

In 2018 the management team decided to install a new powder coating line at short notice. The project, which included the construction of a new production building, had to be completed and the first parts coated in less than twelve months. EAR Ritterbach, an engineering consultancy firm, was given the responsibility for the basic planning and worked with Klaus Wessling and his team to identify the partners for the construction project. The entire coating line process was designed around a power-and-free conveyor system. WOB-Wessling chose the conveyor specialist Caldan Conveyor A/S to supply the conveyor.

The P&F 400 power-and-free system that was selected was ideal for transporting the loads at WOB-Wessling. The decisive

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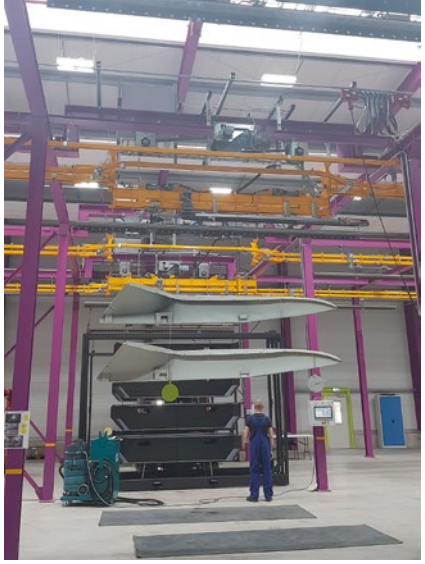
Buffer zone for finished goods which are stored at a 60-degree angle. Individual wagons can be sent to the maintenance area for servicing and repairs.



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The loading and unloading areas are equipped with belt lifters, which allows parts weighing up to 400 kilograms to be lifted ergonomically.

**Partners in the powder coating line project**

- Planning/consultancy: EAR Ritterbach
- Power-and-free conveyor: Caldan Conveyor A/S
- Climatised room: EPS
- Oven: Glasbeck
- Powder booths: Gema

**An overview of the power-and-free conveyor at WOB-Wessling**

- Caldan P&F 400 system
- Wagons: 90 in the system, 12-wheeled wagon design
- Chain circuits: 3
- Chain length: 950 m
- Lifting stations: 7 belt lifting stations with SEW drives and frequency inverters
- Cycle time: 1.5 min
- Steel structure: ca. 95 t
- Control system: Siemens S7, SCADA system with visualisation and connection to MES

factor in the company's choice of supplier was the rapid response and expert advice provided by Caldan.

## Loading heavy components ergonomically

The conveyor company's first contact with WOB-Wessling and EAR Ritterbach was in early July 2018 when the initial layout variants were discussed and the processes and plant logistics systems were explained. During the planning process, Caldan was selected as the conveyor system supplier. The key criteria for Wessling were quality and the tight timeframe for the coating line. "The management team at Caldan gave us a personal assurance that they would meet the deadline and with hindsight it was clear that the project managers always had the overall project schedule at the front of their minds," said Klaus Wessling.

Some areas of the new building were accessible by the start of February, which meant that the assembly of the steel structure for the conveyor could begin. This covered not only the area outside the components of the coating line, but also the entire line itself, and, as a result, the interfaces with the climatised room and the curing oven also had to be coordinated.

In the loading area, the power-and-free conveyor has four lifting and lowering stations which load the materials into the coating line. These stations are needed to ensure that the components, which can be up to 4500 mm long and up to 400 kg in weight, can be loaded ergonomically.

The connection to the Wessling MES system is made in the loading area. Here the specific data for the order is transferred to the wagon and managed by the Caldan control system.

The data is specific to the order and also to the individual parts. As a result, the accompanying work instructions can be sent to the processing stations via the MES and displayed on the Caldan terminals. After the loading area, there are manual workplaces with HMI systems on all four conveyor lines. This allows the relevant work orders, such as masking instructions, to be made available in the preparation areas.

## Cleanliness and consistent climatic conditions

The parts pass through a buffer zone for uncoated components and then reach two automatic powder booths. Both of these are in a climatised room to ensure that the conditions and the cleanliness levels remain consistent. The parts spend a pre-defined period in the gelling zone and subsequently move on to the curing oven. This has two lines to allow the parts to be cured for different lengths of time.

Before the parts are transported to the quality assurance area, they undergo an active cooling process. The resulting waste heat is used for heating the building and for the gelling process. In the quality assurance department, a member of the team decides whether the parts meet the required quality standards or whether they need a spot repair or reworking. The employee can then reroute parts from a control panel. Components that require reworking travel to the reworking stations and then rejoin the coating process via a bypass section. Parts with no problems and those that need spot repairs are transported to the unloading areas via a buffer zone for finished parts.

The three unloading areas are also equipped with lifting and lowering stations and each of them has an operating terminal where the status of the parts can be sent to the MES system. Individual wagons can be transferred to the maintenance area for servicing and repairs. This is outside the coating process and therefore has no impact on the capacity of the powder coating line. Empty wagons are returned to the loading area via a buffer zone. The control system and the communications with the MES system meet all the essential requirements of Industry 4.0.

On this project, Caldan took full in-house responsibility for the data management process. This includes a SCADA system, a full display of the conveyor and communication functions. The company's own software specialists installed the system on site. The deadline for completing the conveyor and bringing it into operation was met.

The rapid growth of WOB-Wessling led to a new project and once again the company opted for a power-and-free conveyor (P&F 400) from Caldan because of its positive experiences. This conveyor is used for transporting parts into a paint spraying system. The contract was signed in April 2019 and the conveyor came into operation in September. //

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