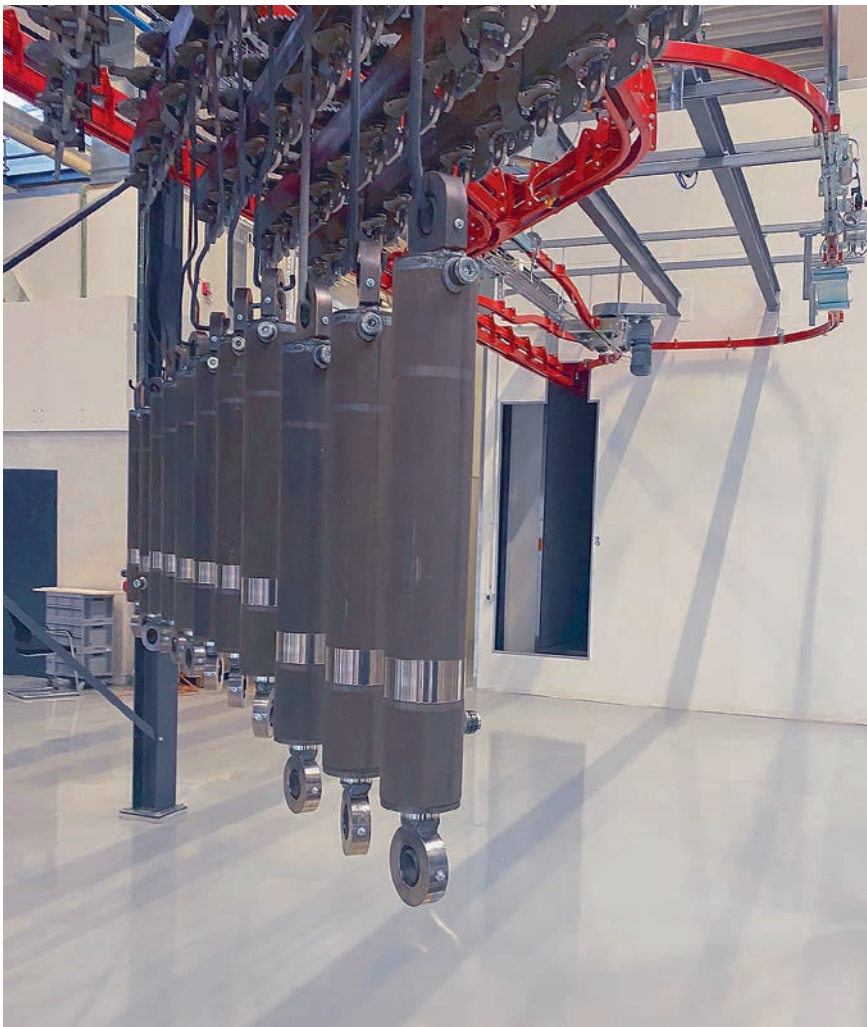


Integrated Production Concept with Power-and-Free Conveyor

The German company Strautmann Hydraulik invested in a new manufacturing building and a new paint shop for the production of a variety of different hydraulic cylinders. A power-and-free conveyor system is responsible for transporting the components through the paint shop and for the loading and unloading process which takes place in a separate building.



The buffer area for unfinished products enables the system to operate flexibly.

Strautmann Hydraulik was founded in the German town of Melle in 1883 and today is part of the Strautmann Group, one of Europe's leading suppliers of high-quality hydraulic cylinders to the agricultural machinery, automotive and materials handling industries. Strautmann designs, manufactures and assembles cylinders for individual applications and in larger volumes. They range in diameter from 20 mm to 750 mm and in length from 50 mm to 8000 mm. The largest cylinders weigh 5000 kg.

In order to meet all its customers' requirements in-house, in 2018 Strautmann decided to invest in a new paint shop for the hydraulic cylinders. First of all, it brought in external consultants and, using the data they collected, drew up a requirements specification. As a completely new building was needed for the new paint shop, individual specialist companies became involved at an early stage.

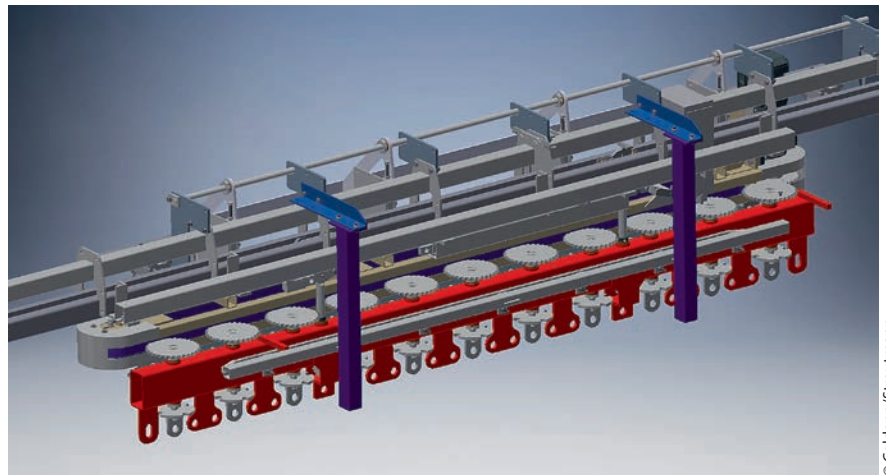
Caldan began advising Strautmann almost from the start of the project, with the aim of planning the transport of the cylinders not only through the paint shop but also to and from the coating area. The throughput figures from the requirements specification were used as the basic data, but the transport system that had been originally planned was replaced with a power-and-free conveyor. Luterbach was the general contractor responsible for constructing the new paint shop and worked alongside Caldán.

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The special feature of the load bars is that eleven cylinders can be suspended vertically at the same time and can rotate around their own axis automatically in the spray booth. Large cylinders can be suspended horizontally.

Highly flexible and efficient painting system

The first phase of construction involved installing a painting centre with a pre-treatment facility, an automatic blow-off station, a drying oven, preparation areas, a spray booth, a flash-off zone and a curing oven. The trolleys are oscillated in each chamber of the pre-treatment system by a transfer section of the conveyor. After this the cylinders are automatically blown dry. The drying oven has its own chain circuit which transports the cylinders continuously at a variable speed ranging from 0.2 to 2.0 m/min. This was one of Strautmann's special requirements to allow for different drying times.



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Ahead of the four preparation areas is a buffer zone that enables the system to operate flexibly in order to meet the needs of individual jobs. Before the spray booth there are three buffer zones where the batches can be assembled for painting to make the painting process as efficient and flexible as possible. Components can be returned to these buffer areas after painting if special multi-layer coatings are needed. Fast-moving trolleys can bypass the planned buffer areas if required.

Four-minute painting cycle

The paint will eventually be applied using robots and only components in special sizes will be painted by hand. However, because of their size, weight and throughput, these components will not be transported using the power-and-free system but instead on a manual bypass conveyor. The spray booth is followed by a flash-off zone. The access to the curing oven has a bypass to allow components that need



Painted cylinders collect in the buffer area for finished products.

inders up to 1.6 m long can be suspended vertically from each load bar. The bars can support a maximum weight of 1000 kg. This, combined with the short cross bars, makes the Caldan P&F 400 power-and-free overhead conveyor with dual trolleys the ideal solution. The special feature of the load bars is that eleven cylinders can be suspended vertically at the same time (maximum diameter 160 mm and length 1600 mm) and can rotate around their own axis automatically in the spray booth.

In the loading area all the relevant coating and processing data is assigned to each trolley and displayed or transferred to the workplaces. This data and the data from the spray booth are available in real time in Strautmann's EAP system. The control unit for the paint shop was supplied in this case by the general contractor.

Additional building for loading and unloading

The first construction phase of the project has now been completed and the parts are being loaded and unloaded in the painting centre. However, as Strautmann has an integrated production concept, the loading and unloading areas will in future be moved to a separate building to keep movements within the paint shop to a minimum. For this reason, a new building is currently under construction and here the power-and-free conveyor will be responsible for the logistics.

to spend a shorter time in the oven to be cured more quickly. This function also makes it possible to coat the cylinders using a wet-on-wet process.

The paint shop is set up for a four-minute painting cycle, which includes double trolleys. The entire system is designed to process around ten load bars per hour in a cycle time of six minutes.

Eleven cylinders suspended vertically and rotating simultaneously

The power-and-free trolleys on the conveyor have load bars that are 3000 mm long and cross bars 400 mm in length. Individual cylinders up to 3 m long can be suspended horizontally or eleven cyl-



The process of planning the paint shop also involved the construction of a completely new production building.

A lifting unit will move the parts up to the second floor and they will then travel through the new building to the adjacent one. There they can be loaded in three areas using drop and lift stations before the trolleys are returned to the second floor by a second lifting unit and then transported back.

Caldan was involved in the process of planning this logistics concept. The layout was designed so that only one lifting unit is needed in each building for raising and lowering the parts. This was a cost-effective solution for connecting the buildings which represented an affordable in-

vestment with the added benefit of fewer forklift truck movements.

The conveyor began transporting the first parts at the end of January and Christian Strautmann is very pleased with the work carried out by the companies involved. "The cooperation between Caldan and Luterbach, the general contractor, was the ideal concept for me. Caldan's solution was technically impressive and their people worked well with our team. They were able to meet our special requirements such as electric activation of the stoppers and switches. Also they took a constructive approach to our requests for changes

and are doing so again because we now want to install additional drop and lift stations to give access to all the production processes. Together we have created a reliable, low-maintenance paint shop." //

Contact

Caldan Deutschland

Bad Hersfeld, Germany

Frank Berg

fb@caldan.dk

www.caldan.dk