Driven transport systems for challenging applications

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INDUSTRY	PRODUCT	COUNTRY	PROCESS
Automotive	DTS Belt Driven Track Systems	Germany	Testing System

The challenge: high payloads and a harsh production environment.

Cylinder liners and tubes are not lightweight; the engineered cylinder liners and tubes from Deutz AG, Germany, an independent supplier of diesel, gas and electrified drives, weigh approximately 18kg. In parallel with the heavy payload, dust and moisture in the environment during the final processing stages of these liners and tubes presents a challenge for some guidance systems. Thanks to HepcoMotion's V-guide technology, these conditions are not an issue for the belt-driven Driven Track System (DTS).

When this system was commissioned for a third time by Deutz, HepcoMotion was able to convince the special machine manufacturer mühlbauer Technologie GmbH of the benefits of using DTS in a production cell. The aim of the design was to combine six finishing processes for cylinder tubes and liners, from receiving to stacking, in one cell.

Andreas Vogl, the companies project manager, which operates in fields from automation application to the development of special machines, explains the task in detail: "Previously, cylinder tubes were removed manually from the washing belt by personnel. Visual inspection was carried out, the tube fed to a semi-automatic laser station and labelled. Finally, cylinders were covered in a preservative oil and stacked in a plastic box. The production cell needed to significantly improve the ergonomics of each process and reduce the overall manual effort as much as possible. In addition, the goal was to reduce production time to a travel time of 5 seconds and cycle time of 30 seconds. A positioning system was included on the DTS to improve positional accuracy for laser marking and visual inspection of the cylinders."

A reliable cycle:

It is well noted that reliable and constant operation is essential in a guidance system. Reliability and longevity of the guidance system for the production cell was therefore also for mühlbauer Technologie GmbH of great importance.. A service life of 12 years was required, with minimal maintenance and the company wanted to be able to integrate its own drive into the system.

Whilst the ready to integrate system is usually supplied with an integrated drive, this is not a

prerequisite. In addition, the track- and positioning system also offers a long life, reliability and low maintenance: the design of HepcoMotion's V-system slides and bearings means dirt and debris are swept away by the bearings as they travel around the track system. This is thanks to the unique wiping action, created by the difference in rotational speed of the outside and inside diameters of the bearings. This eliminates the risk of unexpected total failure due to bearing contamination – a common issue with traditional recirculating ball guides. The hardened running surfaces of the rail and bearing also contribute to long service life. Should play develop in the system, the eccentric bearings on each carriage can be readjusted and bearings can be replaced without the need to also remove and replace the slide. The slides have a service life that is two to three times longer than that of the bearings, resulting in a longer overall system service life. These features mean it was no problem for HepcoMotion to achieve the desired service life of 12 years.

In order to guarantee smooth production, the integrated safety mechanism of the DTS trip latches was important for the design engineers: in the event of a system malfunction, the trip latch disengages from the belt and uncouples the carriage, preventing cylinders from colliding. The system also achieved the cell's speed and precision requirements. With a maximum force of 400N, the DTS can achieve speeds of up to 1m/s. Positional accuracy of ±0.05mm is achieved by way of a carriage locking system which locates carriages when they stop moving. To test that the DTS drive belt was compatible for use with the preservative oil applied to the cylinders, HepcoMotion provided the specialist integrator with a small section of belt that was exposed to the oil for a set period of time. Positive results meant that the system could be used in the new production cell.

The DTS system built for the cylinder production comprised of an oval track system with 10 carriages mounted at a pitch of 880mm. The centre distance between pulleys was approximately 3.75 metres. Since its completion the cell has been in daily operation at the Deutz plant in Ulm, Germany. Both the machine builder and the customer, Deutz, are satisfied: "With this cell, we were once again able to implement a tailor-made system for Deutz. From improved cycle times to automatic detection of different cylinder types and automated adaptation of the robotic packaging process, we have met the goals we set out to achieve. This created a largely automated process that did not exist before. Thanks to professional advice and support from HepcoMotion, we have great confidence in the resilience and longevity of the DTS guidance system," said the Andreas Vogl of mühlbauer Technologie GmbH www.muehlbauer-runding.de

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