Innovative braking technology for heavy-duty hoists

After their re-engineering, the electro-hydraulic disc brakes of the DX series from RINGSPANN are currently proving to be a trendsetter in the implementation of holding and emergency stop systems for the hoists of heavy-duty and container cranes. The first harbour crane builders decided to use these innovative industrial brakes shortly after the rollout at the end of 2024. Designed for a high number of switching cycles on fast-rotating discs, and equipped with new angle levers and energy-efficient electrohydraulic thrusters, they offer a lot of added value – both in the design of the hoists and in their operation and maintenance.

"The last few weeks have shown us that we are on the right track with the re-engineering of our DX disc brakes. Because we already received the first orders from the circle of manufacturers and operators of harbour cranes during the market launch in autumn 2024," reports Martin Ohler, Business Developer Brakes at RINGSPANN. One important reason for the high acceptance of these electrohydraulic brakes of the new DX generation is likely to be that they embody a convincing solution in every respect for the implementation of assembly-friendly, user-friendly and service-friendly holding and emergency stop systems for the hoists of heavy-duty and container cranes. There are primarily three factors that make these disc brakes an innovative solution: the substitution of numerous cast components with components made of flame-cut steel, the redesign of the angle lever and the use of a new type of electrohydraulic thruster. The small envelope dimensions of the new DX brakes are also striking. Martin Ohler explains, "Thanks to their compact design and the mounting dimensions of the base plate, they can be easily integrated into existing environments and can replace other models without modifications".

Courage to innovate demonstrated

These are extremely innovative steps that the RINGSPANN engineers have implemented in the fundamental revision of the DX disc brakes. The design of important components (e.g. the brake lever) in steel alone results in a whole bundle of advantages: the brake is slimmer, achieves a low unit price and the expense of maintenance, servicing and general overhaul is significantly reduced. The new design of the angle lever also offers decisive advantages. As Martin Ohler explains, "As a functional connection between the

Martin Ohler
RINGSPANN-
Business Developer
Brakes

electrohydraulic thruster, brake spring and brake levers, the angle lever must absorb both bending and torsional forces. However, to ensure that these forces do not have a negative effect on the brake levers and bushings, we have recalculated the angle lever and designed it to have the same high torsional rigidity as a traditional cast iron solution. In addition, the new angle lever consists of only a few parts, which is why it is easy to install and replace."

Designed for fast closing times

RINGSPANN has also achieved great success with the addition of new electrohydraulic thrusters to its portfolio. They are tailor-made for use in demanding crane technology applications such as main hoists and trolleys, generate lifting forces of up to 8 kN and score with very short closing times of <80 ms. They use a gear pump to generate pressure and the layout is 100 percent analogue – so no circuit board is required. As usual, they have a 3-phase connection. In addition, they impress with their high energy efficiency, because when the brake is open power consumption is very low thanks to pressureless circulation operation. The installation of the electrohydraulic thrusters contributes to the compact design of the brake, and its easy maintenance should please every crane operator. As Martin Ohler points out, "Wearing parts, such as solenoids, can be replaced while the thruster is installed in the brake".

Self-centring and automatic wear compensation

Apart from all this, in the course of re-engineering RINGSPANN equipped the DX brakes with a functionality that makes it easier for the OEM designer to integrate the brake into their drive system and makes life easier for crane operators and MRO personnel. For example, a standard, maintenance-free self-centring system ensures that the brake levers open synchronously, which means that the air gap on both sides of the brake disc always remains the same – even if the brake pads suffer wear and tear due to operation. A different compensation mechanism ensures that the brake pads are always parallel when released. "The distance between the pads and the brake disc is therefore decoupled from the V-position of the brake levers and is the same everywhere. This mechanism can be easily adjusted with adjusting screws," explains Martin Ohler. Another great advantage: the wear compensation of the brake pads can be readjusted not only manually, but also automatically. This is done by a maintenance-free freewheel mechanism. Since the wear compensation compensates for the increasing distance between the brake pad and the brake disc due to operational reasons, the brake can always develop the same, high clamping force.

The electro-hydraulic DX hoist brakes from RINGSPANN are spring-operated service brakes that close in the event of a power interruption and open by means of a an electrohydraulic thruster. They are designed for a high number of switching cycles on high-speed discs with diameters of 355 to 1,000 mm and provide clamping forces of up to 80 kN, depending on the design. At 230 mm and 280 mm, their brake center heights are in line with the market standard. In addition, these disc brakes from RINGSPANN are available in special versions for maritime, very cold and very warm environments as well as explosion-proof models. <<

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Ventilation device alternatives and sensory intelligence

The DX brakes can be equipped with various ventilation devices manufactured by RINGSPANN. They are suitable for braking torques from 1,700 to 28,100 Nm and clamping forces from 9.5 to 80 kN. Their function is to release the brake via an electrohydraulically generated counterforce to the brake spring. To do this, an electric motor, an impeller or gear pump and a piston cylinder interact inside them. Also important: RINGSPANN offers a large selection of sensors for DX brakes. Inductive sensors are standard for monitoring brake release, brake locking, pad wear and manual unlocking. Sensors of other types are optionally available, measuring probes with ATEX certificate and SIL approval, load measuring pins for measuring contact force, analogue sensors for checking reserve stroke as well as wear and temperature of the brake pad.

Innovations for harbour crane hoists

In a new brochure, RINGSPANN has clearly summarised its drive solutions for main and boom hoists and trolleys of harbour cranes. Designers, operators and maintenance staff of harbour and container cranes will find valuable information here on electro-hydraulic disc and drum brakes, pin and jaw couplings with brake discs, emergency stop and storm brakes, hydraulic power units and systems for efficient brake control and operating status monitoring. In addition, RINGSPANN describes how intelligent braking technology can be used to eliminate harmful flank changes in the gearbox and minimise the risk of overspeed and gearbox failure. Last but not least, the reader learns how to achieve gentle, safe and low-wear hoist operations with adaptive braking technology.