

# Direct hydraulic drives: flexible, simple

Häggglunds Drives South Africa, a Bosch Rexroth company, specialises in direct drive hydraulic motors and control systems that offer variable speed with high torque, which is available across an extended speed and power range. *MechTech* talks to the company's MD, Leif Duwel, and sales manager, Kay Govinder.



Leif Duwel and Kay Govinder.

**W**ith Swedish origins dating back to late 1800, Häggglunds products became part of Bosch Rexroth's global hydraulics portfolio back in 2008. "Häggglunds businesses around the world were then integrated into local Bosch Rexroth entities, In South Africa, however, Bosch Rexroth did not have a presence in its own right, so we remain the only Häggglunds Drives entity in the world," explains Duwel.

Govinder continues: "Currently, all Häggglunds products are available directly from us or via Hytec company branches and its personnel help to identify opportunities and channel our products.

## Debunking the myths

Describing some of the common misconceptions associated with hydraulics, Duwel says that many have come to believe that hydraulic systems are unreliable. "This is not true!" he assures. "As with any system, if one starts by choosing appropriate products that are correctly sized and specified for the drive application, then long and reliable life will result.

"We dimension, design and engineer each particular drive system to meet the functional requirements of the particular application. In so doing, Häggglunds has, for over 50 years, been able to deliver hydraulic motors and turnkey drive systems that have been in operation for many years in harsh environments – and we

incorporate preventative maintenance technologies to further enhance and ensure reliability," he informs *MechTech*.

In addition, he says, "Häggglunds drive systems are very easy to maintain. All that is really needed is to take care of the oil – keeping the temperature within limits, keeping contamination out and changing the filter elements when required."

With respect to leaks, Duwel says that today's piping systems and connections are of a significantly higher quality than they used to be. "We use non-welded piping systems that are leak free if installed by qualified personnel. We have our own qualified team with all the tools and equipment to install a complete system and piping can be fabricated – cut, formed, cleaned and mounted – directly on site or prefabricated in our workshop for guaranteed leak-free performance," he continues.

A lack of understanding of any technology, be it hydraulic, electric or mechanical, according to Duwel, "can make a system appear very complicated". "It's hard to sell a competing technology when a majority of customers are unaware of its key features and advantages," he argues.

With the rise of variable speed drives (VSDs) for motors, it is easy for people unfamiliar with hydraulics to think it is less modern and inferior. "This is also not true. Hydraulics is often a more suitable alternative," Duwel asserts. "Some people selling VSDs can claim that they save energy. But any savings depend on the actual operating conditions and on how well the drive is dimensioned to perform across its whole operating range."

Govinder picks up the argument: "Moving material from A to B requires a certain amount of energy, irrespective of the technology being used. Energy efficient drives are those that operate closer to their design parameters.

"To cater for high start up torque in low speed applications, we can dimension for the operating drive shaft requirements, which does not neces-



The use of Häggglunds direct drives on bucket wheel stacker/reclaimers enables avalanches to be overcome more easily. This has led to these drives being specified on all of Vale's new and retrofit bucket wheels.

sitate over dimensioning due to start-up requirements.

Our Häggglunds direct drive hydraulic systems can, in some cases, operate much closer to the installed power, due to the nature of our drive systems, which produce maximum torque at a reduced speed during start up. The torque requirement then decreases as the speed climbs towards the required operating speed," Govinder adds.

Duwel continues: "At the start, nearly all of the power is used to meet the torque requirement. Then, as the speed slowly climbs, the torque reduces, inherently keeping the system within the installed power capacity. So we don't have to size our systems based on unusual conditions such as start up," he says.

In addition, Häggglunds direct hydraulic drives are more tolerant to shock loading and stalling. "Our hydraulic motors can be stalled at maximum torque, indefinitely, without any resulting damage.

"Following an avalanche on a bucket wheel stacker/reclaimer, for example, which regularly occurs, an electric motor is, typically, overloaded, resulting in delays. With a direct hydraulic motor, all the driver need do is slow the wheel back a little. As soon as the load torque

# and reliable



reduces to below the maximum capacity, the wheel begins to move again," Duwel points out.

This operational differentiator led to the specification of Häggglunds direct drive technology for all the bucket wheels at Vale iron ore ports in Brazil. "Being able to deal with avalanches more easily enables average train loading time to be reduced by several minutes. So Häggglunds drives are now specified on all of Vale's new and retrofit bucket wheels," he tells *MechTech*.

Several bucket wheels in Mozambique and South Africa are also fitted with the direct hydraulic drives technology. At RBCT in Richards Bay, Häggglunds has retrofitted two existing drives while two new machines are due for installation during 2017.

"In 99.9% of cases, our solution saves space and weight. "Retrofit installations are also very clean and simple. The hydraulic motor is installed directly onto the drive shaft, a torque arm being the only other connection to the structure. No shaft or bearing alignments are necessary and once the existing drive is stripped out, it is a simple matter to mount the motor and connect the hydraulic pipe work to the drive unit," he says.

Addressing the modern technology misconception of switching to Häggglunds direct drives systems, Duwel says that the company's control and monitoring system, called Spider, can be run locally



*Spider's use on metal shredders in the recycling industry enables frequent knife jamming to be cleared by automatically and repeatedly reversing the knife blade when a stall is detected.*

from the drive unit or from any customer control system via a field bus, hard wiring or Ethernet," he says.

Built into Spider is a monitoring and protection system allowing warnings and alarms to be easily checked. This enables service engineers to download data to see how the drive has been operated over time. The data can also be accessed remotely via a GPS system if offsite monitoring is preferred.

Citing Spider's use on a metal shredder in the recycling industry, Duwel says that this application is associated with extremely high and variable torques and frequent knife jamming. "When the control system detects a stall on one of these machine, it automatically stops, then slowly reverses for a cycle. It will then attempt to drive forward again. It will repeat this process several times in an attempt to free the shredder blades. If successful, normal operation will resume without any intervention. Only in the worst cases will the drive have to shut down to protect the machine," he explains.

"These systems are not expensive. A retrofit Häggglunds system on a bucket



*Häggglunds direct drive hydraulic motors have a fixed circumferential cam. Under hydraulic pressure, radial pistons with end rollers push against this cam causing the inner to rotate.*

wheel stacker/reclaimer, an apron feeder or a metal shredder can sometimes be sized to use less installed power and to operate much closer to optimum efficiency.

"Our largest motor, the CBM 6000, can produce more than 2 000 000 Nm of torque, weighs only 7.5 t and has a footprint of just 1.5 m in diameter by 1.3 m deep. For low-speed, high-torque applications, there is no better technology," Duwel concludes. □