

More for less: an official preview of Liebherr's new hybrid power booster system

Liebherr will unveil its new hydraulic hybrid drive system at this year's TOC Europe event – but Port Technology International got a sneak preview

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You don't get something for nothing. That's what logic might tell us, but on a recent trip to the Liebherr-Werk factory in Nenzing, Austria, I was surprised to find that Liebherr's mobile harbour crane design team had found a way to do just that.

At the end of April, Port Technology International was fortunate enough to be invited to visit the factory, where Liebherr designs, tests and develops all its maritime cranes. The Liebherr team had been secretive about the purpose of the visit, only hinting that they had "something special" lined up – and the reveal did not disappoint.

The Pactronic® system

Liebherr's design team revealed they have come up with a new hydraulic hybrid drive system – called Pactronic® – which promises 30 percent less fuel consumption and 30 percent more turnover. Admittedly, at first this claim sounded too good to be true, but – as with all the best ideas – ingenuity sprang from simplicity.

Usually, a hydraulic motor, a pump and a diesel or electric engine drive the hydrostatic hoist system in a Liebherr MHC. With Pactronic, a secondary energy source is added to the drive system. While lowering the load, the reverse power is regenerated, which charges the accumulator along with surplus power from the primary energy source.

When the crane requires peak power during hoisting, the stored energy of the accumulator is transferred back to the system. As a result, the total hoisting power provided by the accumulator is the sum of the conventional hydrostatic power and the secondary energy. Depending on the operational conditions of the crane, this boost in power can be as much as 100 percent.

The accumulator itself serves as a pressure storage reservoir, incorporating gas in conjunction with hydraulic fluid. Energy is stored in this compressed gas to be released on demand, which eliminates the need for a bigger diesel engine with greater output.

Using stored energy rather than an extra diesel engine means that hoisting and lowering speeds are increased substantially, while

at the same time fuel consumption drops significantly. Carbon dioxide emissions are subsequently reduced by 30 percent, increasing efficiency and turnover – ideal for applications such as bulk handling, where peak power is required.

It sounded great on paper, but there was a bigger question in my mind.

But does it work?

Donning hard hats, our tour led us through the vast, dim cavern of the factory floor to the harbour crane test bed.

There stood the LHM550, Liebherr's newest model of mobile harbour crane, and the first model able to come installed with the Pactronic system when the crane goes into production in spring 2011.

The LHM550 is a souped-up version of Liebherr's previous MHCs. The enlarged base (13.5m x 13.5m) decreases corner loads, which enhances the stability of the crane structure. Loads are hoisted on ropes with a smaller diameter than previously, which reduces the overall weight and gives the crane operator more control. Above all, the new model's design has been honed to provide smooth load bearing, which ultimately increases the lifespan of the crane.

First, the crane demonstrated lifting a 30-ton container, powered by the diesel engine alone. Then the Pactronic system was engaged. Hoisting and lowering speeds were almost doubled, but the system was burning around 30 percent less fuel. It was impressive stuff.

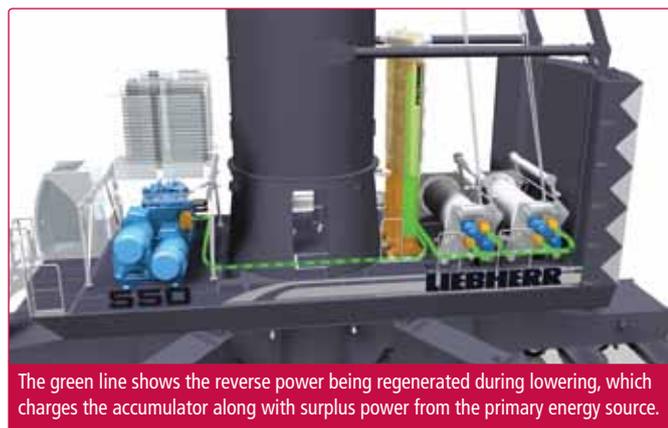
Liebherr estimates that the hybrid drive system will save operators around €20-25,000 a year in fuel alone (excluding the installation and/or maintenance of the additional diesel engine). The Pactronic system will come at around 15 percent the cost of the MHC, but considering the system is designed to be virtually maintenance-free this could prove to be a wise investment.

It just goes to show the simplest ideas are often the most effective.

Liebherr will be officially launching the LHM 550 crane and Pactronic drive system at this year's TOC Europe event, 8th-10th June, Valencia, Spain. With thanks to all at Liebherr Werk-Nenzing GmbH.



The new LHM 550 model with Pactronic, in the factory test bed in Nenzing, Austria.



The green line shows the reverse power being regenerated during lowering, which charges the accumulator along with surplus power from the primary energy source.