

Application Profile

Dockside crane performs electronic acrobatics with Parker SSD control

A crane control refurbishment project at Clydeport's Hunterston terminal relies on Parker SSD AC890 series system drives to deliver pinpoint control in the unloading of coal from vessels. The massive crane can lift up to 36 tonnes of coal in a single grab, allowing loads to be deposited reliably and accurately into the dockside hopper, even in inclement Scottish weather and winds of 40mph or more.

The long travel dockside crane at Hunterston is one of the largest in the UK, but at over 30 years old its control system was beginning to show its age. Relying on mechanical brakes and thruster brakes, operation could be a nerve wracking business in the typically challenging weather conditions. In addition, mechanical wear and damage were ongoing problems, with the squaring of wheels and worn

out tracks. Modern ports demand absolute efficiency, and demurrage – the compensation paid to the owner of a vessel which has been delayed in port beyond the agreed time – can be considerable.

To inject a new lease of life into the crane, Clydeport decided on a major refurbishment of the control system, and put the project out to tender. Among the keys to success would be the ability to integrate seamlessly with the existing Ward Leonard field control system, and to provide regenerative braking with an active front end (AFE) tied to the dock power supply. The former would maintain Clydeport's own engineering personnel's familiarity with the system, giving them increased confidence, while the latter would be key to increased control and energy efficiency.

The tender was won by Stockport based system integrator T&M Machine Tools, with owner Tom Yates developing a control system built around Parker SSD AC890 series drives with AFE technology for regenerative braking. Yates comments: "AC drives normally dissipate braking energy by using dynamic braking resistors. However, crane applications can operate much more efficiently with an active front end. Here the drives are on a common DC bus where the overall system shares the line's energy, with the active front end providing a clean, efficient method to regenerate the drive's braking energy directly back into the line as required."



Clydeport operates Scotland's main west coast ports, with Hunterston located on the Clyde Estuary in North Ayrshire providing a world class bulk coal facility. Hunterston has the natural advantage of having one of the deepest sea entrance channels in northern Europe; does not have to be dredged on an annual basis, and is flexible enough to cope with even the largest vessels afloat – up to 350,000 tonnes.

Formerly known as the Hunterston Ore Terminal, the facility was built on reclaimed land in the late 1970s by the former British Steel Corporation to land iron ore and coal, the raw materials for the Ravenscraig Steel Plant (Motherwell). Ravenscraig closed in 1992 and the terminal was bought by the Glasgow-based Clydeport port management company to handle coal.



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Each of the crane's legs has four 37kW motors. The control solution developed by Yates divides these into eight paired sets, each under the control of an AC890 drive.

The control panel itself was built for Yates by the systems department at Parker SSD's Littlehampton facility, which also provided full engineering support for the wider upgrade project.

“This is another job where I shall definitely be working with Parker SSD”

of energy to be dissipated very quickly, giving very accurate control even in heavy winds,” says Yates.

The crane can lift up to 36 tonnes of coal in a single grab, raising it 100ft or more out of the vessel and into a dockside hopper, which feeds the coal onto a conveyor system away from the dockside. In a business where speed is critical if demurrage is to be avoided,

ing efficiency. They can drive the crane faster, confident that they have pinpoint accuracy of traverse movement. **“Even in high winds, the crane can perform electronic acrobatics,”** says Yates. **“Also, mechanical wear is significantly reduced, so maintenance requirements are simplified, and further potential for demurrage is eliminated.”**

Testament to the success of the upgrade is the fact that T&M Machine Tools has been awarded the contract for a second crane.



Yates worked closely with Parker SSD to develop the AFE regenerative braking system, with the full regenerative operation giving the crane drivers pinpoint joystick control of the traverse movement of this massive crane. “The AFE regenerative braking allows a lot

the Hunterston terminal boats unload at speeds of over 2000 tonnes per hour, ensuring a quick turnaround for carriers. “The operators find the refurbished crane much easier to drive, which gives them a lot more confidence, and so helps to boost unload-

“This is another job where I shall definitely be working with Parker SSD,” says Yates.

“The products are extremely capable, and the engineering support from Littlehampton is excellent.”



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