



Automation International

Shipyard Crane Refurbishment GOVAN SHIPYARD

Features and Benefits

- Improved control integrity and safety
- Complete control system FMEA
- Control of load more precise and predictable
- Smooth Load Control
- Ease of fault finding and repair
- Improved customer satisfaction
- Increased Reliability

The Challenge

The old contactor control system failed during a luffing motion and the boom fell to the ground causing substantial plant damage and stress to personnel. The crane drivers refused to continue to operate any of these cranes. The investigation into the incident reported that the failure was directly attributed to the luff motion contactor control system. It was considered that the Auxiliary Hoist and Main Hoist motions were at similar risk and that a modern control system should be installed. In addition, a complete failure mode and effect analysis had to be carried out to ensure confidence returned to the control of the cranes.



80 tonne Clarke Chapman Rope Luffing Crane - Govan shipyard



The Solution

Together with partners Clarke Chapman Services, MHAI proposed a modern digital DC converter control system. This provided an economical and reliable solution utilising the existing DC and AC motors and AC supply. The system design was undertaken by MHAI engineers, and a full FMEA was carried out using Relux reliability software. The DC drive employed is manufactured in the UK by SSD Parker drive. The design and manufacture of the control panels was undertaken by MHAI and delivery completed within 8 weeks. The control system was designed and manufactured to current standards and within legislation of the companies ISO 9001-2000 quality approved environment.





PLC and Control Technology

- Installation of new joysticks which comply with H&SE legislation
- Independent motor and control monitoring via PLC
- Introduction of positional control and zonal software limits via encoder feedback into the PLC
- Current and historical fault information available via Human Machine Interface (HMI) which is networked to all crane PLC's via CC Link

Benefits

- Easily programmable software limits to improve operational requirements (these are an addition to hard wired safety limits)
- Real time and historical information to assist in fault finding therefore reducing downtime
- Continuous control system monitoring

Motor and Drive Technology

- Removal of redundant Ward Leonard generator and associated control equipment
- Retention of existing DC shunt and AC slip ring motors
- Installation of closed loop, digital AC-DC converter for DC shunt motor control
- Installation of closed loop digital THYROMAT slip ring motor controller for AC slip ring motors

Benefits

- High motor torque characteristics retained and enhanced for both AC and DC motors
- Smooth and accurate control of both motor speed and torque
- Zero current switching of contactors and fewer moving parts(contactors) therefore increased reliability and less maintenance

