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The Crane Control Specialists



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Case Study: New Steelworks Crane

55t Slab Handling Crane

Tata Steel - Scunthorpe

Features and Benefits

- **Smooth load control**
- **Refined positioning**
- **High Reliability**
- **Fully programmable**
- **Squirrel cage motors with Inverter Control**
- **Load weighing system to 0.1% accuracy**
- **Compliance with modern safety standards and regulations**

The Challenge

The existing slab handling crane had developed severe cracks in the girders and was removed from service with very little warning. A new slab handling crane was required within the shortest period possible to avoid plant delays, which may have resulted from relying on a single crane for the throughput of slabs. Kranbau Köthen GmbH were successful in winning the contract for the supply of the new crane and MHA1 were specified to be the electrical control system supplier.

The crane was to be designed and manufactured to operate in a robust environment where radiant heat from recently cast slabs caused girder and cabin temperatures to exceed 55° C. The crane is located in the open and exposed to rain, dust and snow.

Five motions: Main Hoist, Dogging Hoist, Long Travel, Cross Travel, Slew

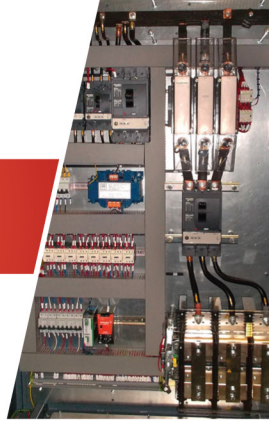
The Solution

MHA1 performed the design, manufacture and commissioning of the new control system. This involved the specification of new squirrel cage motors to match the primary performance factors specified by the end user.

Wölfer Motors were selected as the motor supplier due to their success and experience in the design and supply of motors to the crane industry. Vacon NXP inverters were selected to provide the necessary speed and torque functions required for this specialist crane application.

A full Risk Assessment was carried out in accordance with BSEN ISO 12100-2010 to ensure compliance with existing machinery regulations and numerous modern Electrical Control and Safety Standards. Required Safety Integrity Levels (SIL) were determined and compliance proven through the application of Sistema SIL evaluation software.

Key Project Elements



Motor and Drive Technology

- New Wölfer squirrel cage motors on all 5 motions
- Forced ventilated motors rated for inverter control with encoders for closed loop monitoring
- Range: 15kW to 75 kW
- Vacon NXP inverter with integral brake chopper for electrical braking and lowering
- Crane specific inverter software for integral brake control
- Allen Bradley PLC system with 12.5" colour touchscreen HMI's located in the cab in the electrical room
- Wired Ethernet comms between remote IO in cabin , motion panels and PLC panels
- SIL 2 rated long travel service limits for collision prevention



Benefits

- Smooth and accurate control of all motions
- Safe and predictable load control and placement
- Brake shoe wear eliminated
- Compliance with modern safety standards - Safety Integrity Levels (SIL)
- EMC compliance
- Excellent reliability of solid state inverter drive and squirrel cage motor
- Fault diagnosis and HMI annunciation and interrogation of drive system and control



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