

Grab Crane Drives, TATA Steel, Scunthorpe



Variable speed drive system reduces downtime on grabbing crane at the TATA Steel Works in Scunthorpe.

TATA Steel, Scunthorpe have increased the throughput of their Grabbing Crane located at the Bloom and Billet Mill, by replacing the existing outdated slip ring motor control with a new variable speed drive system provided by Drives and Automation Limited.

The existing crane drive system was based on three slip ring motor starters. Speed control for each motion was provided via joysticks switching a number of resistance stages.

The crane has been in operation at the Scunthorpe works since 1978 and maintaining and fault finding was causing major maintenance and downtime problems at the works.

DnA proposed a new control system in a stainless steel enclosure that was to be located on a platform next to the operator pulpit.

The existing motors and brakes were retained while minor modifications were required to short out the slip rings and allow the motors to act as standard induction motors.

The new cubicle contained an Allen Bradley Micrologix PLC and three Control Techniques Unidrive SP inverters. DnA carried out heat loss calculations on the proposed panel and confirmed the fitting of fans and filters to the cubicle doors were not required due to the intermittent duty of the crane and the minimum heat loss of the inverters during usage.

Having no fans or filters has the benefit of both maintaining a high panel IP rating, as the cubicle is located outdoors and open to the elements, and also reducing the maintenance associated with such equipment.

Dynamic Braking was utilised to dump excess energy while the drives were overhauling. The resistors were suitable for outdoor use and installed in the same location as the existing slip ring resistor banks.

The new system provided three axes of movement which included Grab Hold, Grab Close and Cross travel.

The existing joysticks were utilised to allow the crane operators to maintain their familiarity with the crane operation. The joystick electrical connections were buffered via relays to the PLC controller and the speed references are internal preset speeds within the drive modules. Ramping between speeds provides a responsive and smooth operation resulting in less shock to the cranes, motors, gearboxes and ropes. All these benefits will extend the life of the crane and reduce maintenance.

Technical Details

- Control Techniques Unidrive SP Inverters
- Allen Bradley Micrologix PLC
- Rittal Stainless Enclosure
- Preventa Safety Relay
- Cressall Dynamic Braking Resistors

"We are extremely pleased with the way the project was handled by DnA" quotes Keith Drury engineer at the Bloom And Billet Mill. "From project conception through to commissioning DnA showed great professionalism and would be highly recommended on future projects."

The three Unidrive SP Inverters provided were all rated the same at 7.5kW and de-rated accordingly to the existing motor requirements.

Having a standard inverter size allowed one unit to be held as a spare, thus reducing stores stock requirements.



Drives and Automation (DnA) based near Sheffield, provides a comprehensive system design and build or retrofit service for control systems, encompassing drives, PLC systems and complete projects.



The Control Techniques Unidrive SP covers a complete drive spectrum from 0.37kW to 1.9MW. All drives share the same control interface and can be operated in either servo, closed loop vector, rotor flux vector, open loop vector, v/f control or regenerative control.

The Unidrive SP supports a wealth of communications options and a powerful second processor.

Problem Solved

- Existing controls obsolete
- Limited spares available
- Fault finding time consuming

Solution

- New control system
- Variable speed drives
- PLC control
- Documentation package

Benefits

- Crane Downtime Reduced
- Smoother operation with VSD control
- Production increased
- Easy to maintain and fault find

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