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ABB drives to save Tata Steel £250,000 on fume extraction energy costs

A steel casting plant in Rotherham is to save £250,000 a year following the installation of ABB variable speed drives on its fume extraction system.

Completed by ABB system integrator Drives and Automation Ltd for Tata Steel, the project was carried out at the Aldwarke Bloom Caster complex in Rotherham, South Yorkshire. Drives and Automation replaced existing fixed speed direct-on-line motors in the plant with low voltage motors, controlled by four ABB low harmonic variable-speed drives, two at 400 kW and two at 570 kW. The turnkey project included the supply of transformers, a Form 4 distribution panel, inverter cubicles, electrical and mechanical installation, plant room ventilation and integration of a PLC /SCADA with the existing plant control system.

The extraction plant is used to remove fumes produced by the two casting machines and two ladle arc furnaces within the Aldwarke Bloom Caster complex. The fumes are then passed through a filter system where the particles are removed and discarded.

The original installation used four 3.3 kV motors: two 650 kW and two 410 kW. The two large motors were used as the primary extraction motors, with the smaller motors used to provide additional extraction as required. Ben Holroyde, Planning Project Engineer for the Aldwarke Bloom Caster, says: “Due to motor limitations the fans were restricted to four starts per hour, as additional starts would risk damaging the windings. Due to the starting restrictions, the motors would be forced to run-on for 15 minutes even if demand for extraction was reduced. This obviously wasted a lot of energy.”

In addition to the motor 'run-on' issues, several of the motors suffered multiple failures. “We estimate we were spending around £3,000 a year in motor repairs,” says Holroyde, “and although not excessive for these types of motors, the downtime was becoming a major problem. Each failure took up to six weeks to rectify, during which we had to cut back our production to ensure that we were within environmental limits of fume and dust levels. We could incur fines for not meeting the required environmental standards and there was a risk that production workers in the area could suffer from dust inhalation. Fume extraction is a vital part of the process and without it we simply cannot work to full capacity.”

Another issue was that as the motors were 3.3 kV, any maintenance on them required special permits to work.

The company aimed to save in the region of £240,000 a year on energy costs for the extraction plant by more closely matching the speed of the motors to the dust extraction demand. “We also anticipated that using variable-speed drives would cut maintenance by reducing wear and tear on the motors and strain on the duct work, as well as making for a less noisy environment,” says Holroyde.

“Another benefit is the ability the drives give us to ‘fine tune’ the extraction capacity to match demand, due to the infinite variable extraction control we now have. We are continually looking at the plant’s request for extraction and reducing the fan motor speeds still further, whilst still achieving good fume extraction,” adds Holroyde.

Drives and Automation won the contract following a competitive tender. Ian Pickersgill, Sales Manager at Drives and Automation says: “Several companies were invited to make presentations on energy saving products that could be used to improve the fume extraction system and our solution was selected as we offered a turnkey package at a competitive price. This package included hardware supply, a ventilation system, electrical and mechanical installation works, commissioning and integration with the existing plant control system. One advantage came with the ABB inverter cabinet drives utilised that came ready assembled and factory tested, saving us many hours of panel building time.”

Phil Banks of ABB says: “Once Drives and Automation won the contract, they had the ability to get on with the job with the minimum of help from ABB, allowing them to complete the job over the shutdown period with no effect on production in the New Year.”

Ben Holroyde adds: “We are well on target to achieve the projected savings of £250,000 with a payback time of three years so we are very pleased with the outcome of the project.”

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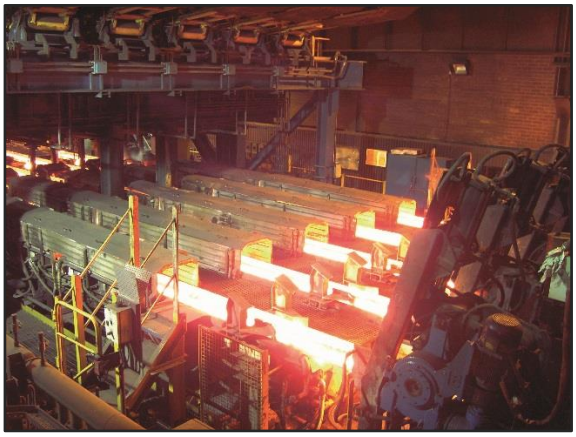

Caption: Tata Steel Adlwarke casting plant is to save £250,000 a year following the installation of ABB variable speed drives on its fume extraction system.

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