



Gaining control

New variable-speed drives at Port Talbot have given Tata Steel improved efficiency and control

ABB has installed variable-speed drives (VSDs) at Tata Steel's Port Talbot plant on blast furnace number 4, as part of a major refurbishment project.

Solutions supplied include what are believed to be the largest low voltage air-cooled VSDs in the UK, delivering 2.7MW at 690V on the fume extraction systems, as well as other drives, motors and controllers for the stoves combustion air and water tower cooling.

The existing fume extraction systems already used VSDs but their age meant that these were now ready for upgrade. Chris Court, electrical project engineer for Tata Steel, said, "The refurbishment was a chance to renew our drives for this application by taking advantage of the latest drive technologies."

Detailed upgrade plans

A major part of the refurbishment project was the design, manufacture, supply, installation and commissioning of the transformer, drives, motors and control systems for the stove combustion air fans, cooling tower fans and fume extraction fans.

The drives' solution was supplied by Iconsys, an ABB System Integrator partner. Chris Court said, "We gave Iconsys the drive sizes we required – 90kW, 600kW and 2.7MW – and they quantified the best drive set up to fit our requirements, incorporating drives, motors and ABB controllers.

"We also detailed the specific ranges of ABB drives we wanted, ACS800s with harmonic reduction. The plant engineers had a preference for ABB and for air-cooled over

water-cooled drives and the 12 pulse ACS800 was the only way we could get the drive power in an air-cooled frame.

Tata Steel wanted to replace the existing direct-on-line motor starters on the stove combustion fans and cooling tower fans with low harmonic VSDs, along with new transformers and motors to achieve greater energy efficiency.

The stove combustion air fans comprise three 600kW ACS800 VSDs, with speed determined by duty cycle and combustion air demand. The fans operate as two duty and one standby, although they can operate together at a reduced speed. The control and speed set points are derived from an ABB AC800 PLC over a Profibus DP link.

Each combustion air fan system consists of 3300V/690V supply transformers, a 600kW ACS800 low harmonic variable-speed drive and local operator stations at the drive, transformer and motor.

"The three combustion air fans were previously 3.3kV direct-on-line, with one fan for each stove. When a stove was lit, the fan was operating at full speed – there was no speed control. The three new fans can now control fan speed to give a constant air pressure, while saving energy," added Court.

The new drives were fitted with internal ducting, which removes over 50kW of dissipated heat from the drives.

For the water cooling tower fans application, the existing fixed speed systems were replaced with new ACS800 low harmonic 90kW VSDs. The speed and number of fans

driven is varied to maintain the set delivery water temperature, while the control and speed set points are derived from an ABB AC800 PLC over a Profibus DP link.

The VSDs and five switch fuse supplies, together with local operator stations located at each motor, are housed in a IP54 steel container designed for this application.

The two fume extract fans were previously driven by 'Synchdrive' VSDs. "The drives were obsolete and very problematic, suffering numerous component failures. They were complicated, difficult to maintain and had a wound rotor with field controller," said Court. "These have been replaced by simpler, three-phase drives with squirrel cage motors."

"We have been very pleased with the applications since they were installed"

The drives for the fume extract fan application are two 2.7MW ACS800s air-cooled VSDs. Each system consists of 11,000V/690V supply transformers, a 2.7MW motor including bedplate, coupling and guard, and local operator stations.

These drives are also housed in their own IP54 steel container, which is fitted with forced air to keep the drives cool and dust free.

One of Tata Steel's requirements included a cost-effective way to maintain the G5/4 harmonic standard. To achieve this, Iconsys supplied the 2.7MW drives with active filters using a diode front end. The smaller drives use passive filters.

"We have been very pleased with the applications since they were installed last year. Any minor issues have been quickly resolved by Iconsys' service department," said Court.

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