CASE STUDY

METAL INDUSTRY

SOLUTIONS

- Solution providers:
  - Rockwell Automation
  - Staro Process Control (System Integrator and Platinum Distributor)
- Allen-Bradley® Medium Voltage Smart Motor Controller (SMC™), rated for 180 Amps, 3300 VAC
- Allen Bradley IntelliVAC™ Controllers

RESULTS

- Improved Safety
  - 3 isolated compartments for power bus, power cell and low voltage components
- Reduced Maintenance
  - The new SMCs have fewer parts and less complicated mechanical system
- Reduced downtime
  - 66% reduction in pump-related problems and downtime since the installation of SMCs
- Motor and Equipment Protection
  - The SMC protects the motor pump and water system by gradually ramping the motor up to speed.

Steel producer improves safety and reduces maintenance and downtime with medium voltage Smart Motor Controller

Sheet metal passes through the hot mill at Iscor Vanderbijlpark Steel in Vanderbijlpark, Gauteng Province, South Africa.

BACKGROUND

Current medium voltage soft starter motor control technology offers a solution to safety issues, parts failures, maintenance costs and lost production time.

Africa's dominant steel producer, Iscor Limited, began an intensive re-engineering and restructuring program of its facilities in 1994. It made substantial investment in equipment and continuous improvement programs to enhance safety and efficiency, making Iscor one of the most cost-effective global producers of steel.

Iscor produces 7.8 tons (7,1 million tonnes) of liquid steel and 3.4 tons (3,1 million tonnes) of finished steel per year, which constitutes 84% of South Africa's flat steel requirements. Of Iscor's four facilities, the largest is

The Iscor Vanderbijlpark Steel platemill in South Africa installed Allen-Bradley Smart Motor Controllers with two Allen-Bradley IntelliVACs in each SMC to resolve issues with personnel safety, maintenance and downtime.

Vanderbijlpark Steel in Gauteng province, which in May 2003 invested in Rockwell Automation's medium voltage Smart Motor Controllers (MV SMCs) and IntelliVAC digital control solution, as part of its improvement process. To date, Iscor has purchased 26 of the Bulletin 1562D SMCs for the Vanderbijlpark Steel facility.

CHALLENGE

The 30-year-old starting equipment in the hardening and quenching plate treatment plant at the Vanderbijlpark Steel facility had safety issues and offered no protection for the pumps and only basic protection to the motors.

Starting direct online (DOL), using an air circuit breaker as a starter, resulted in an uncontrolled starting sequence and very high mechanical wear on the air circuit breaker. This dated technology carried high safety risks with several flash-over occurrences inside the air circuit breaker and bus bar chamber.

"Personnel safety was Iscor's primary concern, also bearing in mind the obvious benefits to immensely reduced stresses on all related plant equipment," says Heinz Hauck, Iscor's Engineering Technology Manager in the platemill. "The flash-over incidents could trigger two days of downtime in the quenching plant, requiring production schedules to be rearranged to avoid quenching during the repair period."

Iscor started its existing squirrel cage induction motors with full voltage starters that drive three low pressure and three high pressure centrifugal clear water pumps. Due to the excessive torque produced on start-up, Iscor was experiencing multiple failures of the motor pedestals, motor bed plates, pump pedestals, pump bed plates and the couplings that connect them. Other problems included water hammer, valve failures, strainer failures, and pump shaft failures.

SOLUTION

Rockwell Automation and Staro Process Control introduced Iscor to its Allen-Bradley MV SMC, rated for 180 Amps, 3300VAC with pump control and an incoming line unit to resolve the starting and safety issues.

The MV SMC includes comprehensive metering, diagnostics, and electronic motor overload protection. The pump control starting/stopping mode reduces pressure and surge stress caused by full voltage starting, eliminating water hammer damage to non-return valves, piping, spray nozzles and pipe mounting. Safety features include three separate and totally isolated compartments for power bus, power cell, and low voltage components, as well as clearly visible isolation switch blades, and a grounded isolation switch in the "OFF" position. Also, electrical and mechanical interlocks prevent opening an energized power cell door (or energizing a cell with the power cell door open), and opening or closing the isolation switch when the contactor is closed.

The vacuum contactors interrupt the motor current within a sealed vacuum bottle and provide a safer control room environment. Each MV SMC includes two Bulletin 1503VC IntelliVAC controllers for digital control of the vacuum contactors. IntelliVAC's embedded diagnostics and better coordination between unit power fuses and the vacuum contactor drop-out time enhance reliability. The built-in delayed restart protects the motor and related equipment.The built-in SCANport communications of the Dialog Plus control module, and an optional remote I/O module, allow system monitoring from an offsite location.

RESULTS

Installed in May 2003, with only 18 hours of downtime, the MV SMC motor control units have been running for the past year in the quenching plant. During this time, the units have accomplished Iscor's main goal of

improving safety and reducing system downtime and have also demonstrated many additional benefits such as improved process control information.

The electrical protection for the MV SMCs is much more reliable and there have been no flashover incidents since installation. The risk of injuries and downtime for maintenance is significantly reduced. The new SMCs have fewer parts and use a mechanical system that is less complicated, which also reduces maintenance.

Iscor has noticed an approximate 66% reduction in pump related problems and downtime on the quenching equipment since installation of the Allen-Bradley SMCs almost a year ago.

"The MV SMC solution was clearly the logical way to go," says Heinz Hauck, Manager, Engineering Technology in the platemill. "Starting the equipment gradually prevents mechanical damage to everything downstream. Over a four or five-year period, the return on the investment will show significant savings in maintenance and replacement parts. We will certainly consider the application of this Rockwell Automation product for other future plant revamps."

The results mentioned above are specific to Iscor Limited's use of Rockwell Automation products in conjunction with other products. Specific results may vary for other customers.

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Medium Voltage Products, 135 Dundas Street, Cambridge, ON, N1R 5X1 Canada, Tel: (1) 519.740.4100, Fax: (1) 519.623.8930, www.ab.com/mvb

Publication METAL- AP001B-EN-D – May 2006 — Supersedes Publication METAL- AP001A-EN-D – MARCH 2004