Control-Disk™ Butterfly Valves Enable Throttling Control In Rolled-Steel Cooling System

RESULTS

- Avoided piping changes that would have cost $10K per valve or $90K
- Reduced water usage by up to 50%
- Reduced the amount of blanched or wasted steel

APPLICATION

Water pressure and flow control

CUSTOMER

Severstal North America in Dearborn, Michigan

CHALLENGE

Severstal North America operates a fully-integrated steel mill in Dearborn, Michigan that produces more than 3.6 million tons per year (2007) of hot-rolled sheet. Initially, the mill had on/off butterfly valves (Jamesbury Series 830) controlling the water pressure in the Roll Coolant system. Nine valves, installed along an 8-inch pipeline, controlled the flow of water through pumps and spray nozzles to cool the molten steel during the rolling process. A typical roll is 80-inches wide and 3/16th-inches thick. Until recently, the sheet of steel was consistently the same thickness, which meant that adjusting process pressure was not required. In early 2009, however, the mill began producing sheets of steel in multiple thicknesses. This requires more precise control and varying coolant-water pressures.

With these new application requirements, the 830 Series valves with quick-opening characteristics had some performance issues. For one thing, they would not throttle. For another, they had no monitoring capabilities and could not control the flow of water based on temperature. Mill managers began to look for replacement valves with equal percentage or even linear characteristics that would provide better control and monitoring.

SOLUTION

Team Emerson, including engineers from Cornerstone Controls and the Fisher division's Rotary Design group, met with mill managers to discuss the application requirements. Initially, the customer requested a Design V150, but that ball-valve assembly would have required significant piping changes, costing up to $10K per valve. Instead, Team

Up to nine Control-Disk valves, like the one in the foreground, will be installed along this hallway, controlling the flow of water to pumps and spray nozzles.

FISHER

EMERSON™
Process Management

Emerson suggested a Control-Disk™ butterfly valve, which would provide throttling control and meet the existing face-to-face dimensions. A FIELDVUE™ DVC6020 instrument with Advanced Diagnostic (AD tier) capabilities would monitor the valve's performance.

When the performance data provided by the Fisher-Rotary team sounded too good to be true, mill managers decided to test of new valve for themselves. They replaced one of the nine Jamesbury valves in the line with a Control-Disk and conducted side-by- side comparison tests. (They turned a pump on, opened each valve in 5% increments, and charted the results.) Their data, point by point, replicated that supplied by the Fisher factory team. The Control-Disk valve was less expensive and worked as well or better than either the Jamesbury or the Vee-Ball™.

RESULT

The mill's first Control-Disk valve shipped to the site on time in August 2009 and was installed the second week of October. By avoiding costly piping changes, it paid for itself right "out of the box." It provided throttling control based on temperature and helped the mill reduce both its water usage and the amount of steel wasted or "blanched" by too much water.

In November 2009, Severstal ordered four more, eight-inch Control-Disk valves with 1052 actuators and FIELDVUE DVC6020 positioners. The balance of the units (making a total of nine) were ordered in January 2010 and will replace the remaining Jamesbury valves in the line. Five have been installed to date.

Using Fisher digital valves throughout the process is expected to reduce the mill's water usage by up to 50% and may, eventually, enable them to eliminate one pump—a projected, long-term benefit that could save the mill about $1M per year or more.

Jamesbury valve — BEFORE

Fisher Control Disk valve — AFTER

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