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CENTUM CS 3000 and Exaquantum PIMS Improve Production Efficiency at Chinese Synthetic Rubber Plant

Location: Huizhou, Guangdong Province, China
Order Date: April 2006
Completion: March 2008
Industry: Chemical

BRIDGESTONE

Executive Summary

In response to growing global demand for synthetic rubber, the Bridgestone Corporation has built a synthetic rubber plant at the Daya Bay Petrochemical Industrial Park in Huizhou, China. The new plant is operated by the Bridgestone (Huizhou) Synthetic Rubber Co., Ltd. (BSRC), and the high-quality synthetic rubber produced there is mainly used in top-of-the-line automobile tires.

At this plant, which has raw material (butadiene and styrene) storage tanks and other facilities, synthetic rubber is produced through continuous and batch processes that include the adjustment of additives, polymerization, styrene recovery, blending, and drying. The batch processes are controlled by a production control system (PCS) that normally receives certain parameters from a production computer system, but is designed with the capability to control all production operations in an emergency.

To control operations at this plant, Yokogawa installed its CENTUM CS 3000 and an emergency shutdown system based on the STARDOM network-based control system. The company also installed an Exaquantum plant information management system (PIMS) for the collection and analysis of process data and a simulator that is used to train plant operators.

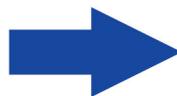
The Challenges and the Solutions

1. Improved information display

At first, operators at this new plant had to scan three different human interface station (HIS) screens, but it was found that they sometimes missed important alarms when multiple alarms were issued. The decision was made to install one large screen in front of the HIS terminals, allowing operators to see at a glance important alarms and trigger an interlock sequence in a timely fashion. On this screen, four windows display process alarms, operator guidance messages, important annunciators, and important interlocks.



During plant commissioning



Today

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2. Operation data management and analysis

With continuous processes, it is important to have up-to-date information. To improve the collection of process data, Yokogawa installed the Exaquantum PIMS. To improve access to that information so that production decisions can be made more quickly, it also placed client terminals at multiple locations around the plant and connected them via a local area network. This PIMS accomplishes the following:

- Reduces operator workload by automatically generating daily reports
- Facilitates troubleshooting and quality improvement activities by outputting trend data when a malfunction occurs
- Makes possible a more proactive maintenance approach by generating data on operation time and number of batch campaign
- Provides data on long-term trends needed to make improvements to plant processes

3. Training system

A Yokogawa plant simulator was installed to give operators the training needed to ensure a quick and smooth plant startup. The training system features the same functions, database, and graphic displays as a standard CENTUM control system, and is used to bring new operators up to speed on plant operating procedures as well as provide periodic refresher training to veteran operators. This system is also used to carry out simulations to verify software modifications.

4. Sustainable manufacturing

Many kinds of environment-related data have to be carefully monitored using the CENTUM CS 3000's alarm and trend functions. The data is strictly managed and monthly reports are submitted to the local government. In compliance with government regulations, power consumption data from a motor control center as well as data on steam consumption and industrial water usage are monitored to reduce energy consumption and implement sustainable production processes.

Customer Satisfaction

"Thanks to Yokogawa's highly reliable CENTUM CS 3000 production control system, we have complete confidence in our ability to operate this plant."

"By having clear access to all kinds of process data, our plant operators now have an up-to-the-minute understanding of what is going on with a process and can take quick and decisive action."

"We are always looking to make improvements in production processes and product quality, and seek to improve production efficiency using the data from both the system and laboratory data. We plan to repeat the PDCA activity cycle based on Yokogawa's platform."