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SUCCESS STORY

Complete Automation of Operations Reduces Power Consumption and Operator Workload/Sumitomo Chemical

Location: Ehime, Japan
Order Date: May 2002
Completion: June 2003
Industry: Chemical

About Sumitomo Chemical Co., Ltd., Ehime Plant

Sumitomo Chemical Co., Ltd. is one of Japan's leading chemical companies, with consolidated annual sales of US$ 10.1 billion in fiscal year 2003. The company began operations in 1913 at a plant in Ehime, which is 700 km west of Tokyo on the island of Shikoku. There it produced calcium superphosphate fertilizer, using sulfur dioxide from a local copper mine. Currently, Sumitomo Chemical operates an electrolytic soda plant in Ehime that annually produces 100,000 tons of chlorine gas, which is used in the production of other chemicals.

The Challenges for Sumitomo Chemical

As the number of younger operators was increasing rapidly at its Ehime plant, Sumitomo Chemical needed a better way to transfer its manufacturing know-how to the next generation. In addition, the company required a state-of-the-art production system that would give it an advantage in today's highly competitive chemical marketplace.

Reasons for Selecting Yokogawa's Exapilot and Exasmoc

Sumitomo Chemical was already well familiar with the quality of Yokogawa's products and services, having replaced the existing DCS at their Ehime plant with the CENTUM CS 3000, and this was a factor in their decision to go with Yokogawa's Exapilot and Exasmoc solutions. There was a need at the Ehime plant for every worker to be able to handle all operations with ease, and this required the systemization of manufacturing know-how so that it could be shared among the operators. By introducing Exapilot and Exasmoc at the Ehime plant, Sumitomo Chemical was able to accomplish this goal while also completely automating its operations. Furthermore, it reduced this plant's consumption of electrical power. The features of these two packages are as follows:

(Exapilot)

(1) Easy system configuration - does not require the use of complicated programming languages

(2) Easy system maintenance due to simple flowchart logic

(3) Exapilot data is easy to manipulate in MS-Excel and other general-purpose software applications

(Exasmoc)

(1) Ability to perform Exapilot and Exasmoc operations at a single operator console

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(2) Easy tuning and a wide variety of optimization functions

Results

(Exapilot)

Exapilot helped automate a number of operations that previously were performed manually, thereby making the plant more efficient than ever before. Specifically, Exapilot executed:

(1)Automatic flow rate control of the sodium chloride solution in filter regeneration and automatic load change

(2) Automatic plant startup and shutdown

As a result of these improvements, all operations can be performed automatically and the level of the sodium chloride solution tank can be stably maintained during filter regeneration. If a filter regeneration occurs, the amount of time required to restore normal leave of the tank can be reduced by up to two hours. Previously, operators had to perform flow rate control at least 56 times a day; with the introduction of Exapilot, they no longer need to perform this procedure.

(Exasmoc)

This electrolytic soda plant consumed huge amounts of electric power, and it was a significant challenge to try and reduce this energy consumption. Although this plant's electrolytic baths operate under a variety of conditions, it was possible with Exasmoc to configure a control system that optimally distributes current to the electrolytic baths. Specifically, the soda plant uses the following three Exasmoc controllers:

(1) Optimal bath current distribution controller

(2) Bath temperature controller

(3) Heat exchanger temperature controller

These controllers overcame process delays and ultimately realized an optimal current distribution control by providing the ideal setpoint to each bath temperature controller based on the conditions in each bath. Exasmoc achieves stable temperature control designed to remove disturbances which previously affected bath temperatures. As a result, bath temperature can be accurately controlled at its setpoint, with one-fifth the previous standard deviation.

The operators at Sumitomo Chemical's Ehime plant are satisfied with the successful completion of this soda plant automation project. An operator comments that thanks to Yokogawa the automated operations at the electrolytic soda plant are running very smoothly. With the introduction of Exapilot and Exasmoc, the operators now have more time to perform other tasks such as planning and programming.

System configurations: CENTUM CS 3000, Exapilot, Exasmoc