SUCCESS STORY

Configuration of Complicated Procedures in Exapilot Leads to Operational Excellence

Location: Omi, Niigata Prefecture, Japan
Order Date: September 2006
Completion: 2007
Industry: Cement

Company Overview
Established in 1915, Denki Kagaku Kogyo Kabushiki Kaisha (DENKA) pioneered the production of electro chemicals in Japan. The mission of DENKA is to manufacture and sell calcium cyanamid (chemical fertilizer). The company has six plants in Japan and four plants in other countries. A comprehensive chemical manufacturer, DENKA develops and supplies a diverse range of products including organic materials, inorganic materials, plastic products, electronic materials, and cement. DENKA has produced carbide and calcium cyanamid at its Omi plant since 1921. In 1954, the company expanded its operations in Omi by building a cement plant. This is currently the largest cement plant along the Sea of Japan coastline. DENKA aims to contribute to a sustainable society, not only by using the latest technology to save energy, but by recycling and reusing as a fuel various types of industrial waste and raw materials at its cement plant.

Background Information
The three main processes at the cement plant are material preparation, burning, and finish grinding.
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The plant is operated by crews of two to three operators working in three shifts. They monitor and control 1,500 devices throughout the plant, and need to start up facilities such as the raw material mill, which is done manually from a human machine interface (HMI). A mistake at any point in this procedure can lead to a shutdown. DENKA wanted to standardize this operation, reduce workload, and prevent operator errors.

The vertical raw materials mill dries raw materials and then grinds and mixes them to specific compositions. The mill start-up is normally quite complicated, so if an operator is less knowledgeable or skillful, abnormal shutdowns are common. Excessive vibration of the mill can also put stress on it and its equipment, which raises maintenance costs, takes a long time to correct, and raises safety issues. The operation of a raw material mill is demanding work.

With the finishing mill, the process monitoring speed can be much slower than the actual manipulation of materials, so operators can sometimes forget to execute an important procedure.

To put in place a program that will automate such processes, it is necessary to first check the results achieved by specific procedures under a variety of conditions; however, that is very difficult to do when processes are operating safely and stably under the control of a distributed control system (DCS).

In addition, DENKA is looking to improve how the know-how of its most skilled operators is transferred to younger and less experienced operators (technology transfer).

Reasons for Choosing Exapilot
DENKA’s selection of Exapilot considered the following points:
1. The ease of integrating Exapilot with the Yokogawa CENTUM CS 3000 DCS used at the plant, which allows procedural overviews from Exapilot to be displayed on the CENTUM system’s graphic display
2. Exapilot enables both the automation and visualization of operational procedures.
3. Exapilot is easy to configure and configuration changes can be done without high level programming knowledge.
4. Exapilot is separate from the DCS so it is easy for operators to try a variety of procedures while a process is operating in order to find the best procedure.
Benefits

Automation of operations

The start-up procedure for a vertical raw material mill is visualized in an Exapilot flowchart, and certain of the sub-procedures are automated. Operator workload is decreased and the mill operates smoothly and steadily without excessive vibration thanks to a reexamination of many settings, so maintenance work does not need to be carried out as frequently.

Important procedures during the start-up of the finishing mill that have a direct bearing on product quality can be configured in Exapilot. No procedures are missed, operator workload is reduced, and mill start-up can be completed in 20% less time. This is especially advantageous because the plant is operated at night to take advantage of cheaper electricity rates and workers on the night shift often have to perform the start-up and shutdown procedures.

Standardization of operation and transfer of technical know-how

A variety of procedures can be standardized to optimize an operation. To aid in the visualization of an operation, comments can be entered next to an Exapilot flowchart, transforming it into an instruction manual. The visualization of all operational procedures in flowcharts facilitates the review and improvement of all the know-how of the Omi cement plant’s most skilled operators. This enables the plant to continue to make further improvements in the automation of its operations and of course facilitates the transfer of important technical know-how.
Customer Satisfaction
Over the past several years, Exapilot has played an important operation support role at the cement plant. Many Exapilot packages have been installed at the time of DCS system renewal and are being utilized in a variety of applications. Operators can clearly see all the operations throughout the plant and are able to use Exapilot as an educational tool to improve the sharing of operational know-how.

Operators at the Omi plant
From the left, Messrs. Matsuzawa, Jibiki, and Otsu