



## SUCCESS STORY

# Drastic Reduction in Operator Workloads and Faster Plant Startup and Shutdown / Nippon Shokubai Co., Ltd.

**Location:** Kawasaki, Japan  
**Order Date:** April 2002  
**Completion:** October 2002  
**Industry:** Chemical

### About Nippon Shokubai Co., Ltd.

Nippon Shokubai Co., Ltd. (Nippon Shokubai) is a leading chemical company and Japan's largest producer of acrylic acid and superabsorbent polymers. Nippon Shokubai has three factories in Japan, with consolidated annual sales of US\$1.7 billion in fiscal year 2003. The company began operations in 1941 and succeeded in launching the production of phthalic anhydride on an industrial scale. Since then, it has been recognized as having the world's most advanced oxidation and catalyst technology. Its state-of-the-art acrylic acid production technology has been introduced by many major chemical manufacturing companies, and accounts for more than 50% of worldwide production.

### Reasons for Selecting Yokogawa's Exapilot

Nippon Shokubai considered the following merits of the Exapilot operation efficiency improvement package when making this selection:

- (1) Exapilot greatly simplifies the task of creating automatic operational sequences.
- (2) Advanced debugging functions can be used while a plant is in operation, ensuring seamless, trouble-free plant operations.
- (3) Operators do not require any specialized engineering training to configure sequences.

### The Challenges for Nippon Shokubai

In 2001 Nippon Shokubai built a new NVP (N-vinylpyrrolidone - a raw material used in pastes and photoresist coating) plant that used state-of-the-art technology. The prestigious Chemical Engineering Magazine subsequently conferred its Kirkpatrick Honor Award upon the company in recognition of this plant's safe and clean production of NVP using an innovative vapor phase continuous reaction processes and a new dehydration catalyst.

Nippon Shokubai faced a challenge in constructing an automatic start-up and shutdown system for production processes using this plant's DCS (Distributed Control System) as the new technology used in the plant produced frequent changes in operating conditions. As the DCS was not the best platform for controlling the plant through sequence programs, the company installed Exapilot so that start-up and shutdown sequences could be automated quickly, in spite of the demanding operating conditions.

## Results

Exapilot succeeded in reducing operators' workloads dramatically at the time of plant start-up and shutdown. Before Exapilot was introduced, an operator had to constantly make manual adjustments to the DCS. Exapilot achieved a fully automatic system as follows:

- (1) A drastic reduction of DCS manipulations: from 4,350 times per month to 0 (zero)
- (2) DCS monitoring time reduction: from 138 man-hours per month to 1 man-hour per month
- (3) Lower power consumption and heat steam energy as the result of stabilized operations and minimized operation time
- (4) Elimination of problems caused by operator errors

## Customer's Satisfaction

Nippon Shokubai has been highly satisfied with Exapilot's contributions as follows:

### **(1) Easy-to-understand sequence programs could be created.**

Exapilot's sequence programs are written in flow chart format. For easy visual confirmation of the progress through each sequence, icons in the chart change color as specific steps in the sequence are completed.

### **(2) Operators could build an entire programming system by themselves.**

No special skills are needed to build a sequence program system with Exapilot. Operators can easily incorporate their operation know-how in the system. Operation know-how can be standardized and shared among the operators.

### **(3) The know-how of expert operator's could be handed on to less experienced operators.**

The level of all operators' skills has been raised and the flow charts have become an excellent training tool.

### **(4) Operator workloads have been reduced.**

Exapilot makes a significant contribution to the automation of manual operations.

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## System configuration: Exapilot