



OpreX™ Operational Risk Management

Exapilot

Operation Efficiency Improvement Package

Yokogawa offers plant operation efficiency improvement opportunities

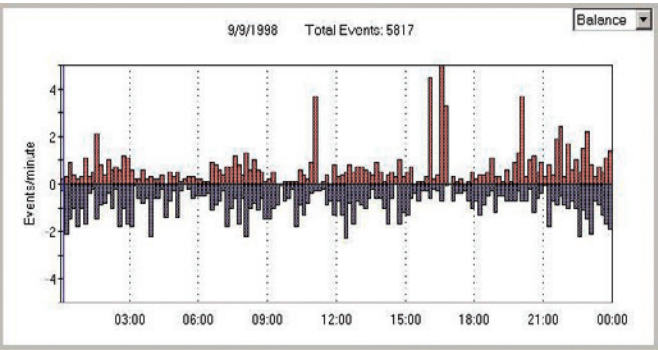
Plants are required to achieve optimal performance by increasing safety, stability and productivity, and improving product quality. Yokogawa offers operation efficiency improvement expertise to assist plant operations in achieving higher efficiency.

Yokogawa provides solutions for each of the steps See Clearly, Know in Advance, and Act with Agility. Exapilot is an operation support tool that assists quick and accurate decision-making and operation by allowing users to achieve these steps of “See Clearly,” “Know in Advance,” and “Act with Agility.” This contributes to the improvement of plant operation performance.

See Clearly

Visualize operation efficiency

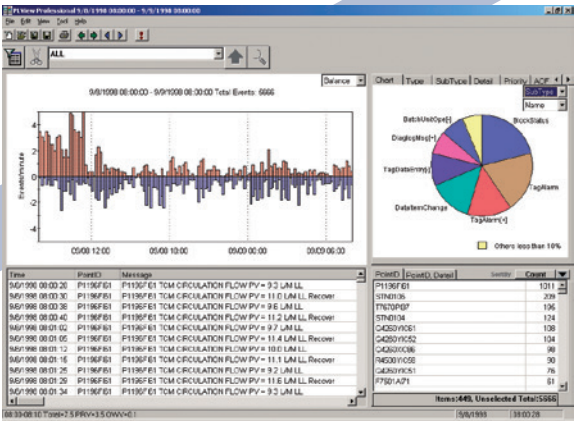
Visualizing current operation efficiency helps detect operation problems. Exaplog* displays manual events with alarm activities, which helps to determine at a glance whether there is any correlation between the two. The visualization of the quantity of events and alarms also assists in determining the types operation problems and the area that they occur.



Know in Advance

Analyze operations and review areas for improvement

Operation improvement involves analyzing the details of operation, identifying problems and considering ways to solve them.



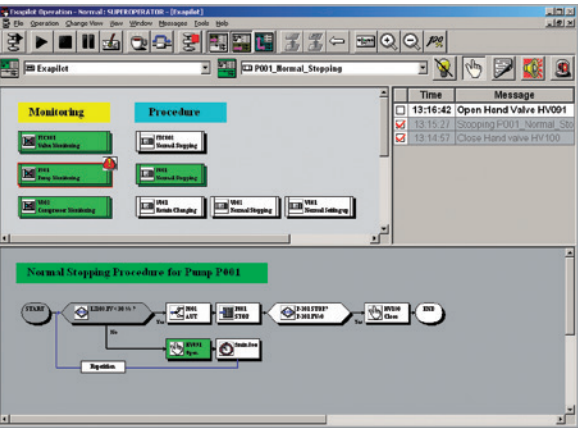
Alarm improvement involves analyzing and reviewing the quantity of alarm occurrences to determine the cause in order to prioritize and fix them. AAASuite* helps reduce alarm activations by suppressing nuisance alarm repetition. It also predicts potential abnormal process values such as level and temperature, and then notifies the operator.

Act with Agility

Ensure quick and accurate decision-making and operation

Highlighting operation problems and ensuring quick and accurate resolution enhances plant availability and productivity. Programs created with Exapilot automate manual operations, which reduces operation errors and minimizes variations in product quality and productivity caused by different operator skills.

The Exapilot’s advanced alarm function allows for early detection of abnormal device states and changes in processes, while the automation function helps deal with abnormalities quickly.



“Act with Agility” helps achieve improvements in plant operation performance

* Exaplog, AAASuite : See the last page for brief introduction

Exapilot ensures quick and accurate decision-making and operation

Exapilot automates Standard Operation Procedures (SOPs) and provides early detection of process and device abnormalities. Exapilot also provides easy to use tools that allow operators to create and automate their own operating procedures.

Automation of manual operation

User Benefits

- Reduce downtime caused by operation errors.
- Minimize variations in product quality and production volume caused by different operator skills.
- Reduce the time for starting up and shutting down the plant.

Able to create programs simply

Programs are created by placing and linking each of the manual operation icons in a flowchart diagram. Knowledge of programming languages is not required. The flowchart can also be printed for use as a standard operating procedure manual.

Monitor operation progress

Exapilot allows for monitoring the current operation progress because the color of the flowchart changes according to the operation progress.

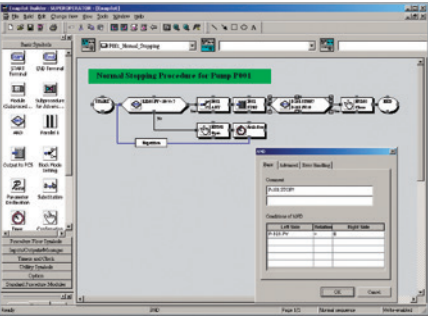
Navigate appropriate actions

Exapilot provides an icon that allows the field operator and board operator to make confirmation when determining and setting PCS* data, and for the board operator to give instructions for actions to the field operator at the proper timing.

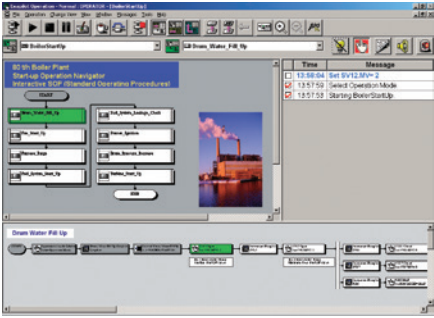
PCS program requires no changes to be implemented

The existing PCS program requires no changes to introduce Exapilot. This enables the launching of operation efficiency improvement activities without affecting currently running plants.

* PCS : Process Control System



Builder function for automation of manual operation



Operational function for automation of manual operation

Advanced alarm function

User Benefits

- Detect process abnormalities early.
- Detect device abnormalities early.
- Use in combination with the automation of manual operations reduces the time required to correct abnormalities.

Able to create advanced alarms simply

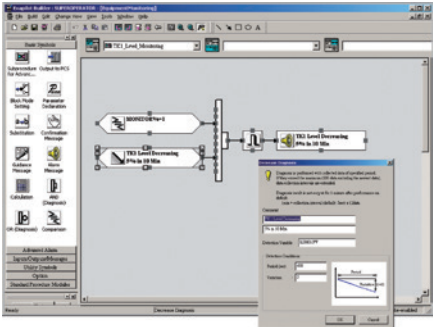
Monitoring programs are created by pasting each of the monitoring icons in a logic chart diagram.

Visualize process and device states

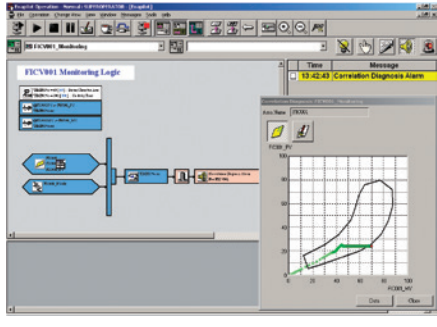
The advanced alarm function visualizes abnormal process states and device performance. For example, abnormal process values for level and temperature can be detected early and valve performance can be visualized based on the relation between the flow rate and aperture. In addition, the operator can be notified of abnormal states.

Detect abnormalities early and correct them quickly

Use in combination with the advanced alarm function and manual operation automation function allows for early detection of device abnormalities and dealing with them quickly. For example, adjusting the aperture of a control valve in response to changes in the performance of a compressor ensures stable operation of it.



Builder function for advanced alarm



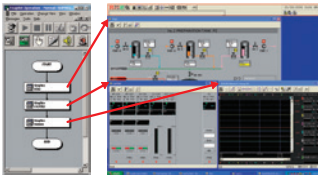
Operational function for advanced alarm

Example solutions

■ Examples of combination with other solutions

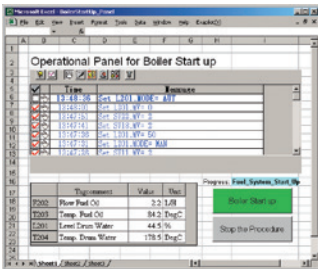
■ Combination with CENTUM VP

Exapilot can activate CENTUM VP's operation and monitoring screens according to the operation progress. It can generate CENTUM VP's operator guide message to support manual operations.



■ Combination with Microsoft Excel

Exapilot and Microsoft Excel can be connected to import an operation recipe from Excel and set it in PCS, and read an alarm set value from PCS and set it in Excel. In addition, Exapilot's buttons and message screens can be pasted into Excel to be used as an operation screen.



■ Examples of industrial application

■ Refining

- Automation of operation for crude switch
- Monitoring for abnormal operation

■ Petrochemicals

- Automation of operation for catalytic regenerator and grade change

■ Chemicals

- Automation of operation for dispensing, measuring, recording, and plant shutdown
- Monitoring for instructions of progress of batch process

■ Waste incinerator

- Automation of operation for startup/shutdown of combustion furnace, boiler, and turbine

■ Food & beverage

- Automation of operation for charging, dispensing, and measuring of materials

■ Pharmaceutical

- Monitoring for SOP instructions of pharmaceutical manufacturing process

■ Power

- Automation of operation for LNG unloading and boiler startup
- Monitoring for boiler abnormality diagnosis

■ Water supply

- Automation of operation for response to raw water accidents
- Monitoring for equipment abnormality

■ Pulp & paper

- Automation of operation for stock preparation, continuous digester startup/shutdown, and color kitchen

■ Cement

- Automation of operation for burning process trouble and kiln startup

Success story

Complete automation of operations reduces power consumption and operator workload at Sumitomo Chemical

About Sumitomo Chemical Co., Ltd., Ehime Plant

Sumitomo Chemical Co., Ltd. is one of Japan's leading chemical companies. 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 super phosphate 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.



Reasons for selecting Exapilot

- (1) Easy system configuration – does not require the use of complicated programming languages
- (2) Easy system maintenance due to simple flow chart logic
- (3) Exapilot data is easy to manipulate in MS-Excel and other general-purpose software applications

Results

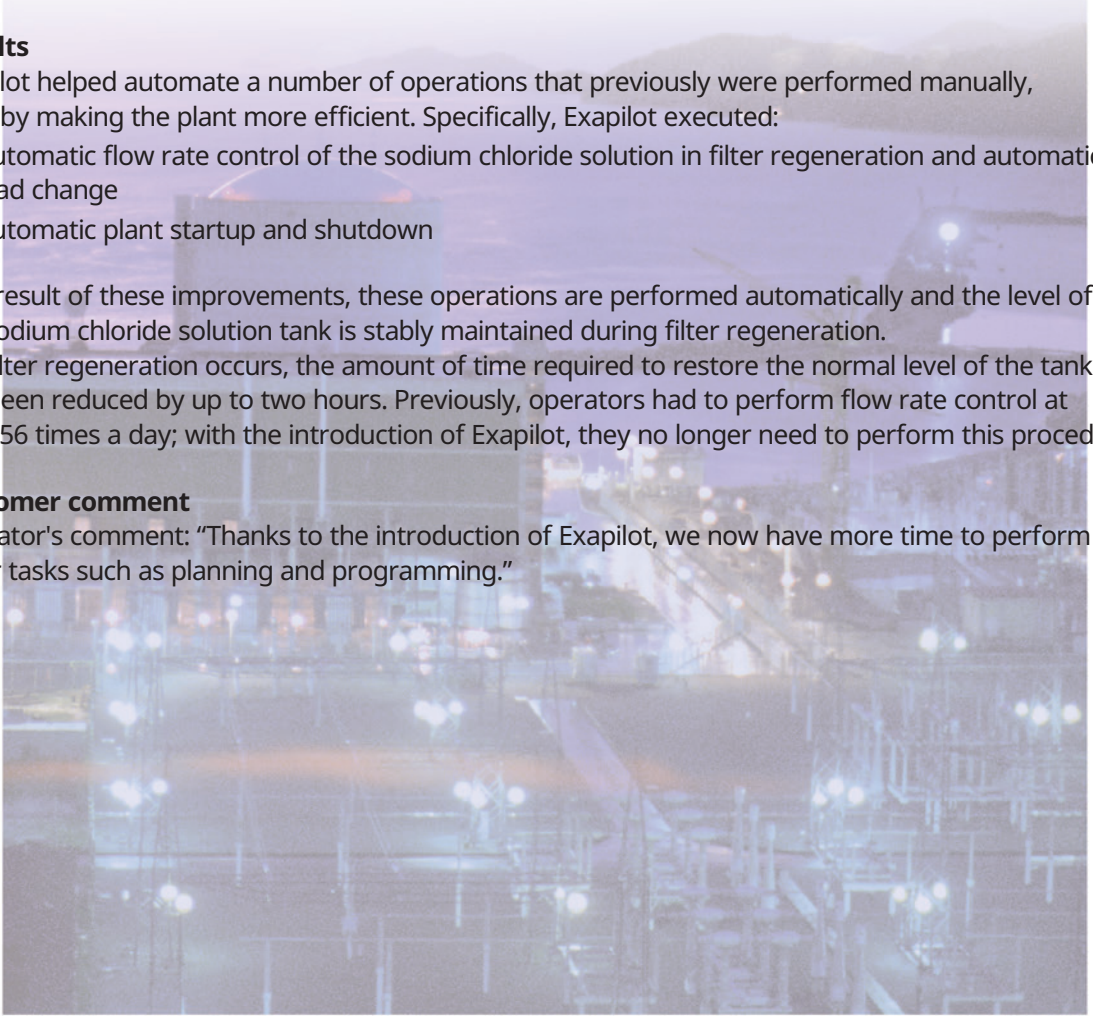
Exapilot helped automate a number of operations that previously were performed manually, thereby making the plant more efficient. Specifically, Exapilot executed:

- (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, these operations are performed automatically and the level of the sodium chloride solution tank is stably maintained during filter regeneration. If a filter regeneration occurs, the amount of time required to restore the normal level of the tank has been 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.

Customer comment

Operator's comment: "Thanks to the introduction of Exapilot, we now have more time to perform other tasks such as planning and programming."



Related packages for operation efficiency improvement

- **Exaplog** allows users to critically assess their alarm systems and identify several areas of improvement. Typically these are nuisance or chattering alarms, alarm flooding, operator responsiveness and volumes of alarms graded by area/time/priority.
- **AAASuite** comes with embedded diagnostic logic that automatically analyzes alarm patterns and suppresses the repetition of typical nuisance alarms. Only essential alarms are annunciated to the operators, thereby facilitating safer, more stable and efficient operation.

OpreX™ Through the comprehensive OpreX portfolio of products, services, and solutions, Yokogawa enables operational excellence across the enterprise.

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