



A large smelter in Tasmania, operating with a Honeywell Experion® PKS DCS and HMI.

THE ISSUES

Unstructured HMI display growth, built organically as the plant grew. HMI Displays were previously developed with the plant equipment in mind. Operator workloads during plant events such as start-up and shutdown were quite high, requiring numerous pages to be navigated through to complete a single task.

Sub-optimal alarm and process representation meant that operators were required to monitor many displays closely to determine how the plant was operating.

THE PROJECT

Displays were to be engineered with the Abnormal Situation Management (ASM) methodologies employed to assist the operators in quicker and more effective responses to process requirements.

Studies were undertaken to determine the effectiveness of the current HMI Displays, the workflow required for operator tasks and also what the critical information the operators required to determine if the process was operating effectively.

From these studies a refactoring of the existing displays was made and a hierarchy of critical information requirements was developed.

A HMI design guideline document was created to ensure each equipment object, such as a pump, valve or drive, complied to the standard. The standard detailed the alarm colorisation and representation, error handling conditions, and Honeywell implementation specific requirements. Once the documentation was complete the equipment objects were developed, documented, and implemented in new displays.

Great care was taken to ensure the displays assisted operator situational awareness, with feedback often sought and changes recommended by the operators implemented.

CASE STUDY:

Tasmanian Smelter

CHALLENGE

Two Operators controlling each furnace and feed system (approximately 8 operators total). Operators were physically located in the Furnace buildings, creating a potential safety issue.

SOLUTION

Cromarty were engaged to be part of the HMI project team in what was part of a larger project to centralise and rationalise the operation of the plant.

RESULTS

Once operational, the customer now has a single operator per shift operating two furnaces plus their respective feed systems. Operators are able to monitor, assess and act on process issues far quicker and effectively than previously.

FIG.1

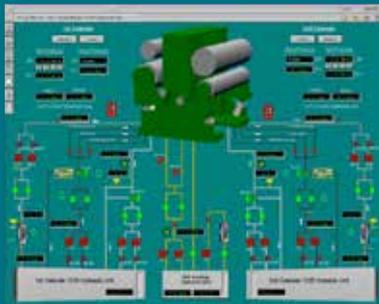


FIG.2



FIG.3



FIG.4



FIG.5

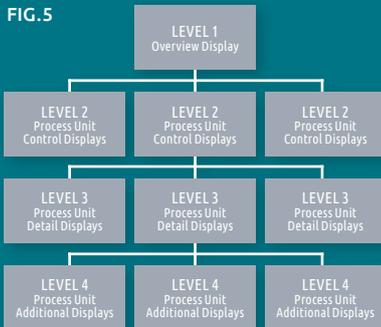


FIGURE 1. An example of a typical 'Traditional' HMI display. There are many elements on the screen competing for the operator's attention.

FIGURE 2. An example of an ASM HMI display. Operators can quickly tell if any part of the process is in alarm or in an abnormal state.

FIGURE 3. An example of an ASM shape. Alarm levels, setpoints and normal operating ranges can quickly.

FIGURE 4. Smarter displays can be developed; In this example the operator can see historical data to determine the rate of change in the vessel as well as the alarm limits.

FIGURE 5. Hierarchy of displays.



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ABOUT ASM

Traditional HMI screens suffer from many distracting design elements such as poor use of colour, excessive animation and needlessly detailed static objects. On a more traditional HMI display it is not uncommon to see elements on the screen competing for the operator's attention.

Abnormal Situation Management (ASM) methodologies give operators better visual feedback of the plant operation with an emphasis on operating state rather than hard numbers.

THE DISPLAYS

All the displays for the new central control room were created using a standard template designed on site as well as a comprehensive ASM library of shapes and objects to be used on the various displays. A rigorous approval and review process was implemented by the customer to ensure the best possible displays were produced as part of the project.

A hierarchy of displays were created, as well as navigation menus and information panels to provide unit or task specific information. Special task-based displays were also created for start-up of furnaces to allow operators to perform the task using far fewer displays than previously.

OUR SERVICES

Cromarty are able to provide services to help improve your operator effectiveness, with experience across many HMI systems, including: Honeywell Experion® PKS, ClearSCADA®, CitectSCADA®, WonderWare® and more!