

## Advanced Operator Workstation Display Design for a User Interface

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### 1. Introduction

The HANARO operator workstation in the main control room that continuously controls and monitors the overall reactor condition is being upgraded in various directions to catch up with the demand from operators. But the original design of OWS has some difficulties in the implementation of a more sophisticated system due to the poor software configuration that has a limitation in its hardware performance.

Such hardware restrictions as the resolution problem, system performance, and a utility which is behind the times result in retarding development of the OWS display design. But with hardware progress a more comprehensive control system can be realized and it satisfies more requirements with a high specification. It is demonstrated in this paper that the applied functions are shown through a remarkable example of a display.

### 2. Methods and Results

#### 2.1 Features of the upgraded OWS display

The display of the operator workstation(OWS) stands for the control information that includes the process values, set point values, alarm, trend and etc. The significant difference between the original OWS display and the upgraded display is in that the latter was designed by the style guide by focusing on the user and many reviews by the present operators were reflected in the test stage. The upgraded OWS display is roughly divided into parts that consist of a point and a group, a process diagram, a start-up/shutoff demand window including the key parameters and so on.

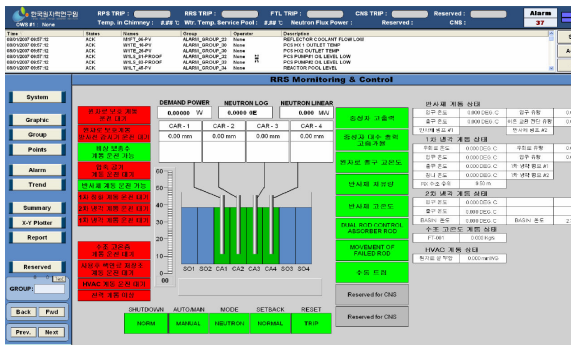


Figure 1. Overall window in start-up & shutoff

The upgraded displays are improved in aspect of an optimal font size, visual graphics and various functions of monitoring and controlling. The systematic

configuration is also modified comparing with the original displays. Figure 1 shows combination window used in the start-up/shutoff of a reactor. This provides operators with a concentrated environment that doesn't move the display. As a consequence the graphical user interface of OWS was reinforced and a more realistic function for administrative works was developed by considering the hardware, HMI tools, and the requirements from operators with a sufficient hands-on-background.

#### 2.2 Various function of developed display

It is the most remarkable functions that operator can control the system process directly through the P&ID display. As shown the left side of Figure 2, if an operator wants to run the pump in a display for example, the window that can control directly this pump appears immediately and an operator has only to do command.

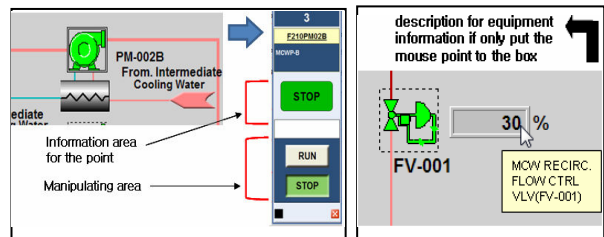


Figure 2. direct control function & description box

The right side of Figure 2 represents the function that shows up the information about an assigned device if a operator only approach the mouse point around a box. This helps operators to confirm an equipment operation and get the more information before the operation.

The next demonstrated function is the navigation that makes a present display move to an assigned page that operators require if he only clicks the arrow shown as Figure 3.

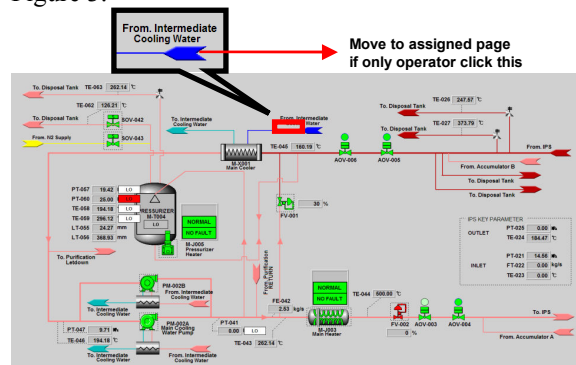


Figure 3. Navigation function in the P&ID

This also helps operators to save the time that is required when they are searching for a connected system that they want to see. If operators are not familiar with a reactor system yet, it is a big assist that they get more information about the system more easily and rapidly rather than surveying a real diagram.

In case of a group display, the overall frame and group arrangement is same as original displays, and then most of graphics are intimate to operators. In particular group displays are strictly designed to the style guide. In addition, many demands from operators are reflected in this group display. Figure 4 stands for the function that operators can confirm easily the operating direction of control valves.

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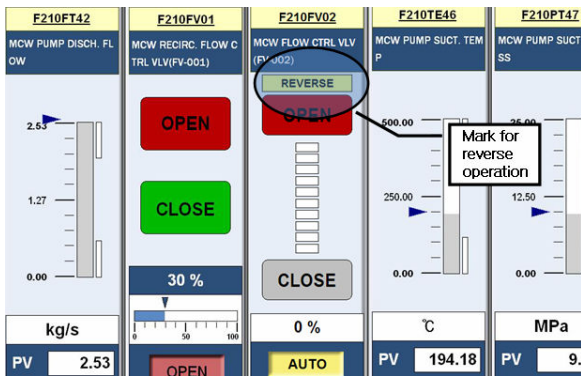


Figure 4. Indication of a reverse operation

As in the shown figure, control valves are usually operated in an open direction but reversely acted valve are operated in a close direction. Such an indication helps operators to operate control valves in a right direction through preventing mistake.

### 3. Further Works

In this paper, the function of the upgraded HANARO OWS graphic display was summarized and the upgraded functions were described. The user interface of OWS should be also continuously reviewed by operators. In these days the function that makes a simple table for the key parameters which operators frequently use is being added and the improvement of an alarm system is in the development stage.

### REFERENCES

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