

Transformation in plant operator process perception through implementation of HMI standards based on ISA 101

The experience from the City of Anaheim, California

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ABSTRACT

City of Anaheim operates single potable water treatment which provides fresh water to 350,000 residents. Legacy system was at the end of its life span and had to be replaced. The objective of City plant operator staff was to obtain a system which meets new expanded business requirements along with industry best recommended practice for supervisory control system functionalities. A four-stage implementation process was employed as method to deliver solution that meets Client requirements. The core of the process is focusing on effective display design tailored to specific needs of control system operators.

New HMI application was developed while following guidelines of ISA 101. Specific attention was given to the choice of color, size and shape of graphical symbols, layout of on the screen and proper selection of place for content. Design of faceplates was made through implementation on the principle of progressive elaboration. The idea of object oriented modeling on field devices was conveyed visually to operator's through clear distinction of individual control elements shown on process and area overview screens and associated faceplates to each of them. Speed of access to critical content was minimized programmatically down to four (4) mouse clicks to reach any screen or faceplate in the entire system. For faceplate or associated process screens a single suffice.

After system was put in service and plant operators completed appropriate training it was found that interactive pattern has changed substantially. Operators became aware of process situations without leaving control room. Number of plant walk out to investigate device or process state has been reduced. It has been found for the first time a possibility for successful investigation on event root cause by associations between past operator actions, past alarms, and past process time series records. Real time calculation of process related variables along with implementation of virtual sensors empowered system users to take real time decisions unforeseen before.

ABOUT THE AUTHORS

Dean Ford's entire 20+ year career has involved industrial automation. He is a Certified Automation Professional®, licensed Control Systems Engineer (CSE PE) and promotes manufacturing and automation to government and the public. He is an active Senior Member in the International Society of Automation (ISA), and many Standards Committees. He serves on the Government Relations and Workforce Development committee for the Automation Federation. As an advocate for the automation profession, Dean regularly travels to Washington, DC to educate policymakers and the public of the importance of the manufacturing and automation. Dean is currently making our Water Supply and Water Treatment systems more robust and safe by serving the outstanding professionals of Westin Engineering as Executive Vice President. Contact: dean.ford@we-inc.com

John Dulebohn is Water Systems Operations Superintendent who manages production, treatment and storage of potable water for the City of Anaheim. His leadership on the SCADA system upgrade project was essential for successful design and implementation of control system standards. Contact: jdulebohn@anaheim.net