



Maintaining Situational Awareness: Directing the Operator's Eyes

High performance graphics decrease operator errors.

\$85 million dollars - the average loss of major incidents caused by operational error.

— J & H Marsh & McLennan, Inc.

In creating an effective and efficient work environment for operators, graphics-design engineers must consider how to attract a person's attention, the impact of colors and shapes on perception, and the role patterns play in helping a person quickly scan and process information.

A high performance human-machine interface (HMI) inevitably leads to improved operator productivity and situational awareness. This in turn improves the control system effectiveness and leads to a safer, more efficient plant operation. But facilities and processes are becoming more and more complicated, so maintaining situational awareness is increasingly difficult.

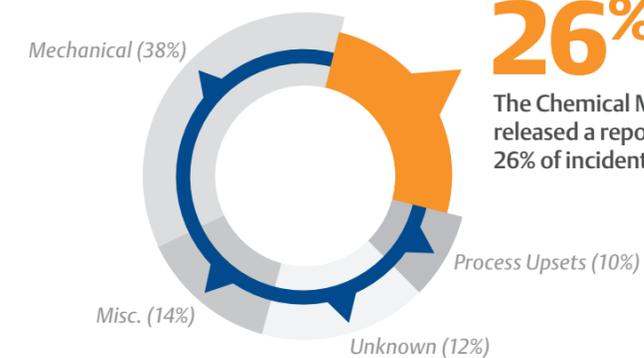
Many factors come to play, and facilities are seeing these painful situations become more common.

Finding information on the screen takes too much time — If your operators must scan through multiple graphics to check the state of the process, they are wasting valuable minutes that could be spent resolving issues. And when the process experiences an upset, an operator should be able to quickly identify where it started and how it ripples through the process. Ideally, when operators are optimizing the process, key performance indicators (KPIs) should be on the same graphic, rather than flipping among multiple screens.

Seeing the information is not easy — Small font size, ineffective colors, too many indicators on the screen. All of these characteristics on a graphic can hold back an operator from discerning relevant information among the flood of data. Because the operator workstation is the operator's window to the process, it must clearly help the operator pick out the important process conditions. Icons should not compete for attention with the process values and take up valuable screen space. If the operator cannot quickly recognize when the process is drifting, the opportunity to react is missed and safety can be jeopardized.

Graphics do not help operators determine actions — If the information presented on the screen does not make sense to an operator, or if they cannot quickly determine a set of actions based on what they see, even relatively small problems can grow quickly. Poorly organized data where grouped tasks aren't always performed from the same graphic impedes the operator from completing important tasks.

Causes of Plant Incidents



26% Operator Error

The Chemical Manufacturers' Association released a report that attributed 26% of incidents to operator error.

Create a Clear View to Assist with Operator Responsibilities

Graphics must help direct operators' actions by being seen and understood and must guide operators to easily find information. Emerson has been a key player in researching, developing, and implementing effective high performance operator graphics. Compliant to standards such as ISA-101, Emerson's DeltaV high performance dynamos fit into any graphic from Level 1 (for example, the dashboard view or overview display) to Level 4 (for example, diagnostic or special-use displays).

Human centered design (HCD) is central to Emerson's development and design of operator graphics. In fact, Emerson believes HCD is more than making products easier to use. HCD makes customers' jobs easier to do. Implementation of Emerson's research leads to enhanced operation performance — better productivity and profitability.

Establish and Maintain Situational Awareness via High Performance Dynamos

Finding information on an operator graphic becomes simple via graphical objects (or dynamos) that present a consistent visual representation, group information to provide appropriate context, and assist the operator to scan graphical elements quickly on a single display. Using high performance dynamos, Emerson's solution — in four seconds — provides operators a situational awareness of their entire area of responsibility.

The DeltaV Level 1 dynamos immediately guide the operator to the plant area that is in alarm and shows the changes to the process as the disruptions move through the plant. When the conditions have been assessed, the system guides the operator to a consolidated view of KPIs that can drive process efficiencies and optimization.

Graphics Visibility Promotes Understanding

Plainly, operators can only work with items they can see and interpret. Emerson's high performance graphics philosophy has been tested to magnify the operator's ability to see and process

information effectively and efficiently by employing visual representations that use space efficiently — even in information-dense graphics.

Dynamos support day-to-day operations for improved problem solving and investigation. Using high performance dynamos, the operator has access to complete module status information, yet the status doesn't compete for attention. If abnormal statuses are present, the operator can access information quickly by hovering, no need to click or switch screens to a faceplate.

Advances such as analog and qualitative indicators and pattern matching in graphical elements contribute to improving operator response from one minute to less than five seconds.

Seeing and Understanding Should Efficiently Lead to Appropriate Decisions

In the DeltaV system, high performance dynamos support task based graphics. Even if the operator's task is simply monitoring without immediate action, Emerson has developed best practices for assembling the graphics components that help lay out appropriate and safe responses. When graphics facilitate operator's situational awareness, the overall project and end-product outcome is more certain.

Emerson's High Performance Graphics Guide Operators to the Best Decisions

Situational awareness is key to operational excellence, but it's not the only capability that graphics should provide to operators. Contact Emerson to give operators the right information, when they need it, and in the right context for the actions required.

Learn more at www.emersonprocess.com/operationsperformance