Recent Research

Data Entry

I know of more than one example of an operator entering the wrong value into the DCS. As it turns out, the process industries are not unique in this regard. A recent study on medical devices (Wiseman, S., Cox, Anna, and Brumby, D. “Designing Devices with the Task in Mind: Which Numbers Are Really Used in Hospitals?” Human Factors, Vol 55, No 1, 2013 pp. 61-74) was prompted by data entry error with fusion pumps. While the researchers developed criteria for medical data devices, one suggestion might have applicability for process control. This was the use of a scroll wheel (see picture) which limits errors due to failure to enter a value or have the value not take. Cases of failing to sufficiently depress a key, so that 500 becomes 50, or depressing a key too often, so that 50 becomes 500, would not happen with a scroll wheel.

Expert Operators

All plants think they have expert operators, but exactly who they are is often a source of much debate. Can expert operators be objectively identified? This would assist in knowing from whom expertise needs to be gleaned for transfer to new operators. Two studies by Australian researchers have applied a technique that identifies (from lowest to highest skill level) novice, competent, and expert operators.

Invitation to 2013 Winter Meeting

The next meeting of the Center for Operator Performance will be November 19-21, 2013 in Corpus Christi, TX.

In addition to attending to board business, the meeting provides an opportunity to hear updates on the current research projects, meet with researchers, and network with other organizations working to improve operator performance.

NEW! There will also be an opportunity to attend two new short courses on Monday, November 18. In “Pitfalls of Alarm Management”, David Strobhar will present suggestions for improving alarm rationalization efforts. Dr. Laura Ikuma (LSU) will provide guidelines for using a display evaluation toolkit developed in a recent COP project.

Guests are welcome!

Registration details are available at OperatorPerformance.org

Some other things of note include --

The new members-only section of the website is now active at OperatorPerformance.net

If you work for any of the following, get your login & password to keep abreast of the latest research:


In both cases, the performance on their tool fell into three clusters generally matching levels of expertise. Interestingly, there was a linear relationship between experience moving from the novice to the competent level. However, no such relationship existed in moving from the competent to the expert levels.

Debriefing

The US military routinely uses debriefs and after-action reviews as a means to learn and impart lessons on the participants. An analysis of literature on the value of such debriefs shows that they improve performance 20-25% (Tannenbaum, S., and Cerasoli, C., “Do Team and Individual Debriefs Enhance Performance? A Meta-Analysis” Human Factors, Vol 55, No 1, 2013 pp. 231-245). The benefit was seen for both teams and individuals, with average debrief time less than 20 minutes. The debriefs contained four key elements: (1) active, leading to self-discovery; (2) developmental, what should be done next time; (3) specific event focus, allowing for deeper examination; and (4) multiple information sources, ensuring more complete account.

Center for Operator Performance Summer Meeting Update

May 13-16, 2013 was the summer meeting of the Center for Operator Performance (COP). Here are some items that you might find interesting from the various projects -

Display Design Handbook - This quick guide for display designers to understand alternative ways to present information is coming to fruition. An interesting discussion resulted between the display design professionals (“You need a LOT more detail) and operations management (“It’s too long, my operators won’t read it”). We will find out if we can strike the correct balance.

Training Methods - After visiting a refinery, experts in aviation/DOD training programs suggested several low-cost activities as part of this pilot project. One of the techniques is to conduct a drill in which a key resource is premised to be unavailable. This forces the team into an adaptation mode, often with very useful and interesting results.

Procedure Analyzer - A preliminary tool to modularize emergency procedures was put to the test on an entire unit. The result showed that only 10% of the material in the emergency procedures was unique (four pages). It just gets rearranged in different combinations to create over 40 pages of procedures. While results are not guaranteed to be this dramatic, the result is a system that is far easier to maintain.

Display Content - What happens when you ask your operators to create a display hierarchy? If you are like most places, it’s not pretty. With an earlier project, we were able to demonstrate a systematic way to create a hierarchy by simply asking operators questions about their process. The current effort will enable plants to formulate those questions.
Event Prediction - Detection of compressor surge an entire shift before it happens is but one result of an effort at early event prediction. The next phase is ensuring that the false alarm rate does not result in “cry-wolf” situations.

Hand-holds - One objective of the Center is to examine new technology. A project with tablet PCs has shown the ability to link to any DCS and also quickly bring procedures and decision aids to the operator.

Alarm Formatting - Some plants cannot understand how anyone can function without a chronological listing of alarms, while others wonder why it would ever be used. What are the other options for presenting alarm information? This is a new project that is examining alarm presentation formats in refineries, pipelines, and pulp/paper mills.

Overview Displays - Tapping on the expertise of Center members, guidelines for the creation of an overview display are being developed, implemented, and tested.

Twitter
David Strobhar is now on Twitter. Follow him at https://twitter.com/DavidStrobhar.