Automation World®

November 2007

CONTROL SYSTEM SKILLS

Improving Human Effectiveness

Born on May 25, 2007, the Center for Operator Performance (COP, www.operatorperformance.org), in Dayton, Ohio, provides a unique setting for operating companies and vendors to hold open discussions and focus on mutually beneficial research, states Duane Toavs, director of the Ease of Use Center of Excellence at process controls vendor Emerson Process Management (www.emersonprocess.com), in Austin, Texas. Besides research, COP will provide continuing education and seminars on research topics, and also serve as a repository and clearinghouse for related data.

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By design, operating companies outnumber vendors as COP members, Toavs notes. Though members have equal votes, the hope is that operating companies will drive the research in the direction that has the most impact on their businesses, he explains. "End-users are ultimately the experts in how well overall projects go," he notes.

Wright State University, Dayton, Ohio, provides the umbrella under which the center operates. Dayton-based Belville Engineering Inc. (www.belville.com) provides human-factors-engineering resources. Current participating automation vendors include ABB and Emerson, while production companies consist of BP, Flint Hills Resources LP, Marathon Pipeline LLC, Nova Chemicals Corp. and Suncor Energy Inc.

Decision making

The center's first research project involves adapting military combat-decision-making exercises (DMXs) to improve decision-making capabilities for refinery and pipeline operators. Project completion is forecast for December, with a report to the companies in Jan. 2008, says David Strobhar, Belville Engineering's chief human-factors engineer, and the bridge between Wright State and industrial partners. He notes that DMXs were developed by retired Maj. John Schmitt, U.S. Marine Corps, who authored "Mastering Tactics: A Tactical Decision Games Workbook," published in 1994.

Retirement-related personnel attrition facing companies motivates the project, Strobhar explains. "Companies needed something to train operators faster." Marathon Pipeline and Flint Hills volunteered personnel from two refineries and a pipeline operation. And Klein Associates Inc. (www.decisionmaking.com), Fairborn, Ohio, which heads the study, identified 13 expert characteristics to test with those companies' personnel.

Some surprises have already materialized from the study. Operators at a refining unit considered most difficult in the plant had the fewest number of the expert characteristics, only eight, for example. The refinery owner says that's because the unit has advanced controls, while the other unit doesn't. Finding no correlation between operator age and experience was another surprise, he says. "This finding caused a shift to solutions, rather than expanding the study to other units."

Yet another surprise surfaced when an expert operator talked about applying simulation to reality. "One pipeline operator said she knows she'll see a leak in the high-fidelity simulator, but doesn't know that when sitting in front of a [a real operator] console," Strobhar recalls. In the simulator, she treated ambiguous data as a leak, but in front of the console, she said she was unsure what to do with such data, he elaborates.

This revelation showed "simulator training is good for shutting down processes," Strobhar concludes, but "some decision-making is not as well supported." Recognizing that fact increased plant-level operational awareness, he says. Regarding what the project has confirmed thus far, he believes "the impact of advanced control has the potential of lowering needed expertise. That's something the refinery had suspected."

The center planned a project to begin this fall on early-event detection. The first goal is to define opportunities for research. "From there, the membership will decide how to develop the project more fully," Strobhar explains.

Both projects fit Emerson's view that overall performance of operations directly relates to plant operators' effectiveness. But there's a key question to be answered, Toavs suggests: "What influences the effectiveness of these plant personnel?" Fortunately, the COP is on the case.

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