Savigent SOFTWARE

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CASE STUDY

OUT-OF-CONTROL ACTION PLANS

Savigent Reduces Downtime and Variability by Automating OCAPS

When one of the world's leading electronics manufacturers investigated the automation of workflows in their factories, automating out-of-control action plans (OCAPS) was identified as the largest opportunity for return on investment. An OCAP is the process flow for understanding and mitigating failures at any given stage or tool in the production process. In developing an overarching system for their manufacturing environment, the company leveraged Savigent Workflow™ software to provide the basis for a controlled system of workflow automation.

The End of Sneakernet

A senior manager in wafer engineering says that OCAPS is where the company started to think differently about automating its factory systems. "Historically, we had paper copies of OCAPS," he says. "If a statistical process control chart went out of control, the process would be locked out in the factory—that is, the tool would be stopped from processing and a complex series of tasks would be performed to return the tool to production. The problem was that correctly performing these tasks relied on a technician or shift engineer going to the document library, opening up the correct document, reading and understanding the instructions, performing them properly, and completing the OCAP while maintaining cross-shift communication spanning multiple days. With some out-of-control situations, it takes several days to fully recover. Almost all of this was documented by 'sneakernet.' Back when I was in school, that's what we used to call shuffling papers back and forth instead of using an electronic system. That was how we were doing OCAPS."

The company needed an automated OCAPS system that would take events, such as an SPC event, a qual event, or a key process input variable (KPIV), and walk through the process in a controlled way. "The problem with sneakernet is that things get lost," the engineer continues. "Not everybody does things the same way."

Furthermore, the manufacturer's systems did not talk to each other. In particular, its SPC system did not communicate with its tool management system or historical database. By enabling these disparate systems to work in concert, Savigent Workflow proved essential to ending "sneakernet" and enabling an efficient process to manage OCAPS.

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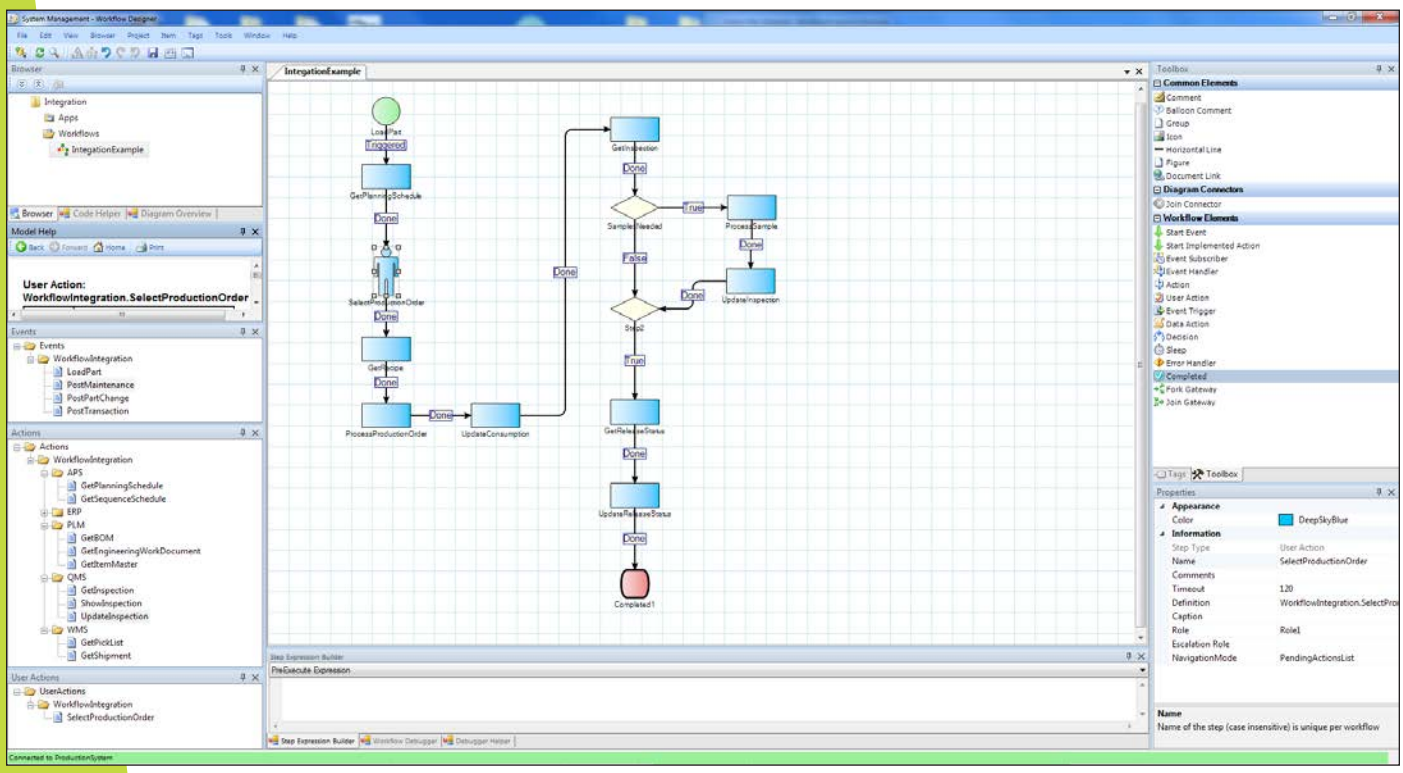
A System that Works

The new system automates SPC events. It creates an action for the appropriate level person that needs to be engaged in the OCAPS process. So now the right person responds to the event and becomes involved only when necessary.

The company also discovered in reviewing the pre-automated OCAPS methodology that much of the time-consuming work in gathering data was pulling information that already existed in database tables. This has changed. Now when an event occurs, the system automatically retrieves the dataset necessary for decision making, makes calculations on the data, and finally presents the person responding to the event with a recommendation. All this is based on an engineer's input to the OCAP. A process technician then makes the final decision on what to do with the event. In the end, it is all documented, the system captures and retains all relevant data about what happened and what was done to resolve the problem as well as all execution related data—a tremendous resource for continuous improvement teams.



The former manual routine introduced greater opportunity for human error. The technician would go to the library, open the OCAPS document, and then follow the document. But there was no means of tracking to ensure that the correct document was opened and that its instructions were followed correctly. "Another problem was that any time you went to find a document on the network, it might not be there, or it might be out of date," says one of the company's manufacturing engineers. "It simply wasn't a very workable system."

Now, when the system sees a failure, an OCAP workflow is launched based on that specific failure. The relevant information related to the OCAP are displayed to the engineer via a SharePoint Portal page. When the event occurs, the engineer is engaged in the workflow directly; there is no need to search for it. Once he decides the action to take, the workflow executes accordingly, driving the action into the fab.

According to the engineer, this will be a huge benefit going forward. "As we streamline the process, we're not going to have our technicians react to SPC events that don't make any sense or to respond when the event doesn't require them to do anything," he says. The company is tracking a metric to

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see how technicians respond to events, as well as what actions they take. This information will influence staffing levels and how work is allocated over the staff. "Now we can see the execution path and learn from it," says the engineer. "That is going to drive continuous improvement in the fab."

The system provides other metrics that the manufacturer is using to its advantage. For example, there had been inaccuracies in the equipment control software system since personnel weren't necessarily detailing what was physically happening on the fab floor. If someone changes a consumable on a machine and fails to log that into the equipment control system, the machine shows up as being in an up state when it has not been. This drives inaccurate state adherence.

"So when our industrial engineers looked at the data at the end of the year to figure if state adherence was not accurate, the data was inaccurate," explains the engineer. "We base many decisions on data from our equipment control system, and if it is flawed, then our capacity modeling going forward for production is going to be flawed. The new system is driving state accuracy back into equipment control, and that is huge."

The Standard Is Efficiency

The new system establishes a standardized workflow for how the OCAPS process is handled. Every time there is an event that requires intervention, a standard action is presented to the appropriate user, and only the appropriate user, which leads to significant efficiencies gained.

Less effort is spent on tracking down what is going on with an out-of-control chart. In addition, everything is documented and the proper communications between systems always occur. "With the manual OCAPS, we had to trust that information about the decision was passed from one shift to another," says an engineer involved in the new system development.

With some events, it's possible that the tool must go into an idle state for a number of hours. When the tool comes out of the idle state, the new system notifies the correct person. Again, in the past, there would have been a manual hand-off between shifts, which led to many mistakes. "Now we have a standardized procedure that is under the control of a process engineer, and standardized control of that procedure's implementation with full documentation," explains the engineer.

The reality in the factory is that communications between employees and between shifts are challenging with the manual system. "Word of mouth" also carried opportunities for miscommunication and inaccurate information being input into the tool data log. With the new system, comments are automated, standardized, and much clearer. "Now there's no question as to what a comment means when someone goes back and looks at it later," says the engineer.

He estimates that automating OCAPS is freeing up about one person's worth of time every 24-hour period, and also that improved communications has resulted in increased tool uptime of about 25 percent.

Savigent and the Power of Flexibility

According to an engineer involved in the OCAPS automation process from the beginning, one important lesson learned is to work with software partners who have a flexible tool. "We've gained an appreciation for having a flexible system that is not dedicated to any one vendor," he notes. "It's purposefully designed as composite blocks of functionality that can be arranged so that it can talk to products made by different vendors, and, when combined together, forms one overarching integrated system that builds bridges between disparate factory systems. As a customer, that's the biggest thing I've learned since this project began. That's the strength of Savigent and its suite of products."