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**CASE STUDY**

DATA COLLECTION
**Uponor**

# Leveraging Data Collection for Visibility: Savigent Historian™ Helps Uponor Focus on Continuous Improvement

Apple Valley, Minnesota-based Uponor North America (Uponor NA) is a leading supplier of plumbing, fire sprinkler, and radiant heating and cooling systems for residential and commercial spaces worldwide. The North American headquarters employs 380 people and houses corporate offices and a state-of-the-art training center. It is also home to a manufacturing facility that produces thousands of feet of cross-linked polyethylene (PEX) tubing every day for use in those plumbing, fire sprinkler, and radiant heating and cooling systems.



Mitch Swenson, IT project manager at Uponor NA, recalls the difficulties they faced in assessing and understanding their manufacturing processes before automating data collection: "We used to gather all the information on what was happening on the production floor on paper. This gave us a reasonable view, but it was based on human input that was collated at day's end and ultimately input into spreadsheets. This whole process took about four to five days. On Fridays, we could tell you what happened on Monday. It was like trying to drive your car by looking into the rear view mirror the whole time: you don't necessarily know where you are going, but you have a little idea of where you have been."

According to Rusty Callier, director of operations at Uponor NA, this approach was impeding the company from reaching its goals. "We were heading towards Lean, and we hadn't gone far before we realized that we weren't turning data into actions, into continuous improvement items," he says. "So we set out to find a software system that would allow us to do data capture with a historian feature so we could query based on any circumstance we wanted to look into, for any of our assets."

That search, which began with what Callier calls "casting a wide net," employed everyone from operations and IT to Uponor's international colleagues, and ended with the discovery of the Savigent software suite, specifically Savigent Historian.™

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"With Savigent, we could look at the data, drill into it immediately, write an incident around a reoccurring issue, and explore it," explains Callier. The tool enabled Uponor to create a series of protocols built off the exception or incident, then drive action that would not only record the data that was happening, but also avoid the continuance of that condition. "When we saw this, it was a no-brainer to get this product," says Callier.

## The Power of Savigent Historian

Savigent Historian is a context-aware process data historian, a high-performance database for historical manufacturing information, and a highly scalable and distributable data collection infrastructure based on the Savigent Platform.™ The historian has been optimized to capture and store both time-series process data as well as event-based context data, such as temperatures and pressures (time-series process data) and equipment state (event-based context data). Combining event-based context data with process data yields contextualized information about manufacturing equipment and processes. At Uponor, the Savigent Historian server resides in the back office and on multiple data collection nodes, running on virtual machines that aggregate and forward data to the historian for storage.
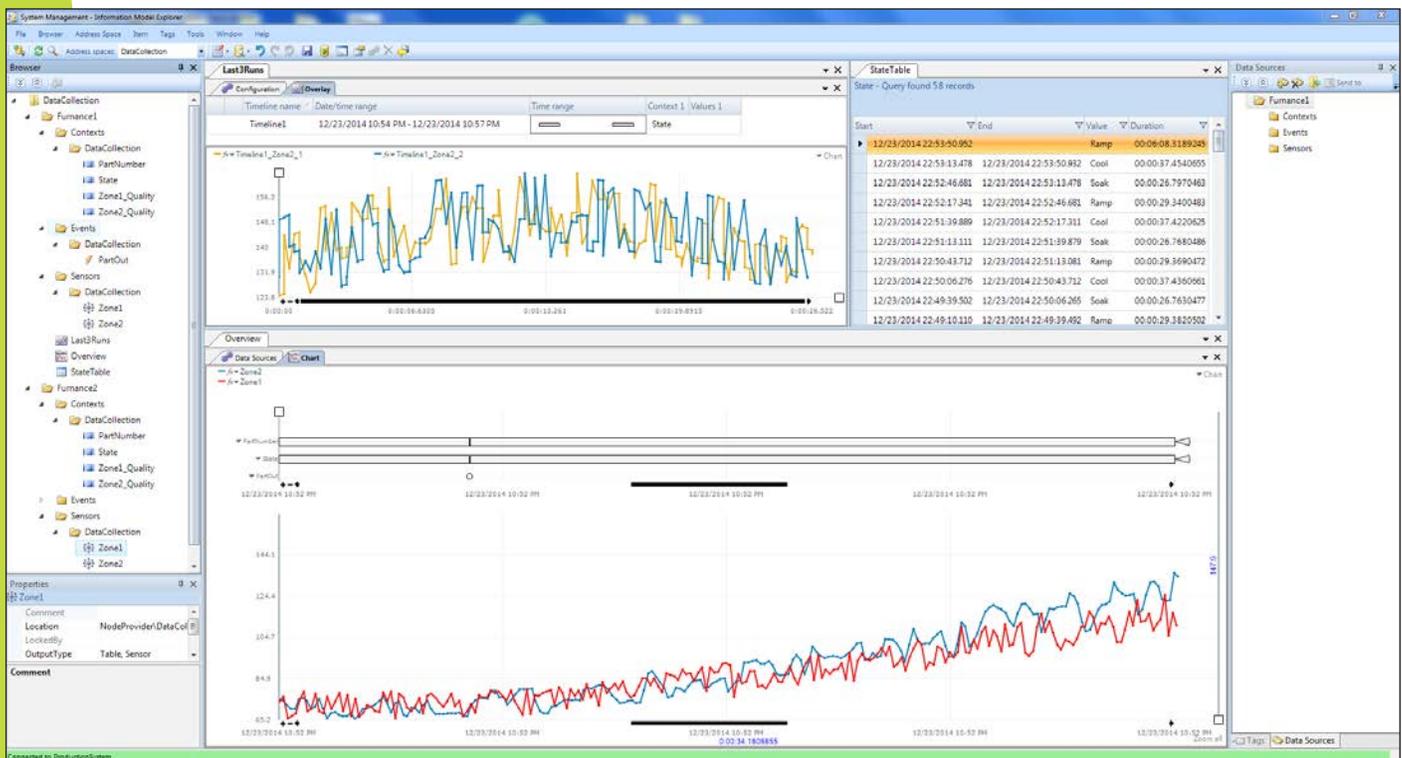


Callier cites how Savigent Historian works in daily operations as an indication of its power: on an extruding machine where an operator is doing a tool change and the machine is in the phase going from pre-heat into start-up, it should take a certain amount of time. If the machine gets stuck in that phase or an operator isn't available, the machine will literally sit in a non-productive state, a situation that obviously costs time and money.

"There was an incident with an operator who was running eight machines," says Callier. "He was at another bank of machines he was helping cover, due to someone calling in sick. One of his machines was warming up—it actually went from pre-heating into a ready-to-start state—but he wasn't there to pay attention to it."

When the time limit hit, Savigent Historian initiated an exception that notified a floor lead of the situation. So he went to that machine and got the line started. "That's a small, but powerful, example of what Historian does," says Callier. "It could have just kept logging the data, but it did more. Based on the exception, it fired off a response to the lead and a suitable action was taken."

If the lead hadn't responded, the exception would have been escalated up another level, until a response was made. "The key is that the machine got into a productive state much faster," says Callier. In this case, it saved at least 35 minutes. That assumes the operator would have finished what he was working on, then returned to this machine immediately.

"Historian gives us the ability to understand what is taking place on the floor in real time; that provides visibility and the ability to put together workflow processes when we detect something isn't going according to plan," says Swenson.

## Mining Data for Greater Efficiency and Effectiveness

According to Scott Kies, software architect at Uponor NA, before the data collection initiative, the company had no ability to mine data. "Now we have a much more organized dataset," he says. "Our process engineering team is starting to see behaviors in the line they couldn't see before, due to the granularity of data Historian provides. So now they can dig for root cause analysis."

As an example, Kies cites a recent incident where a power supply was identified as a problem with a particular machine. No one knew there was anything amiss with the power supply because the data readily available on the HMI screen didn't indicate a problem. But when process engineers analyzed the data from Savigent Historian, the power supply issue became apparent. "As a result of the deeper data we're getting, we're making smarter decisions," says Kies.

Callier references the company's quest for higher overall equipment effectiveness (OEE) as an effort that Savigent Historian is supporting. OEE is a key performance indicator where performance, availability, and quality come together. An OEE of 83 percent is considered world class. "We're not quite there yet, but we're using this software to drive us there," says Callier.

Uponor is using the software to go into the downtime code and performance characteristics of its assets to identify areas of potential improvement in each OEE area. "For example, we were recently looking at data and saw that our availability side of the OEE triangle was lacking," says Callier. "We went into Savigent Historian, ran some reports, and identified opportunities for improvement. We found several instances that happened with some frequency that didn't seem to make sense. We wrote an incident and stopped their occurrences. Our OEE went from 56 percent to 63 percent in a four-week period! That was just from focusing on items that drive availability."

Another example of data mined effectively is reduced scrap. Recently, staff at Uponor observed a scrap type they hadn't seen before that had become one of the top three scraps for the day: literally, tens of thousands of feet of pipe. Using Historian, they went into the data and drilled down to where the nonconformity was probably happening, based on parameters being awry. They identified that the vacuum was too low on the machine generating the scrap; they associated this situation with a particular operator, so at one level it was an operator training issue. Since then, they have added a monitor on the vacuum gauge to alert if the pressure drops below the set point for operation. This will fire off an alert to an operator, lead, or supervisor, as appropriate.

## Real Data Advantages

Swenson and Kies say they have seen a host of advantages; some were expected, and others surprising. "To me, it is critical to get the right personnel to a particular machine in a timely manner," says Kies. "In the past, it was all based on human communications. A line might be down half an hour before anyone realized it was not producing properly. This could have been from something as common as noise on the factory floor and habits people develop in response to it." Adds Swenson, "with Historian, we can be more surgical and more responsive. It allows us to focus on areas of highest impact, which helps keep our variable production costs in control."

Swenson notes that the data collection initiative has helped the company focus in a broader sense as well. "When something happens on the floor, we can review the data in the Savigent Historian to understand if there are some KPIs that could detect these incidents in advance," he says. This ability is part of the facilitative power of data, according to Mike Stuedemann, engagement manager at Savigent. "Savigent Historian is providing them data that prompts meaningful conversations internally," he says. "They're moving from what's going on to why something is going on, and that's an important step."

Kies says the software also provides a grounding of perspective. "Real data allows us to understand the size of an issue," he notes. "Before, we often had to rely on anecdotal reporting." Swenson agrees on this point. "Further, it takes personalities out of the mix," he explains. "In the past, the messenger often trumped the message. Whether something was attended to often depended on who brought it to attention. The same information could be treated differently depending on who articulated it. We don't care about that anymore. We look at the real data."

## Preliminary Returns

Uponor has selected seven scrap codes to follow to gauge return on investment. For the past six months—the time the company has been using Historian on a full-time basis—scrap has been reduced by 6 percent. "That's just the tip of the iceberg," Callier says. "It is a number we can measure now (based on the scrap codes), but we know there are another dozen codes that we can reduce. Additionally, we've had a number of continuous improvement projects that were realized due to faster data mining."

The bottom line: Callier expects that 6 percent to double or triple. "So, we've saved a significant amount by reducing scrap with this automation, and we've been able to reduce headcount by one-half person per shift, saving more than $100,000. (Callier notes that personnel have not been laid off, but moved from data acquisition and process to more value-added work.) "That's just seven scrap codes, and we're rapidly approaching a cash-on-cash return for the project in six months' time."

A further benefit, says Callier, is how easy it has been to work with Savigent.

"They 'get' production," he says. "They understand what makes a company money and how to use their tool to their client's benefit."