Teel Plastics Reduces Human Error with IoT Strategy Powered by Kepware

The Customer

For more than six decades, Teel Plastics, Inc. has specialized in custom extruded plastic tubing and profiles. With highly-skilled employees and unique extrusion manufacturing techniques, Teel has earned a reputation for excellence in their field. Trusted by some of the world's largest companies, Teel Plastics products are used in geothermal pipes, solar film cores, coextruding products, healthcare tubing, film cores, converting cores, filtration components, industrial tubing, and more.

"On any given day, a consumer likely interacts with at least one product that we've had a hand in making," said Owen Gwynne, Senior Programmer, Teel Plastics. "We view our customers as partners and invite them to work collaboratively during the design and development of their projects. As such, we've been able to complete products quicker and innovate to keep up with demands and anticipate future needs."

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Organization:

Teel Plastics, Inc. specializes in custom extruded plastic tubing and profiles. With highly-skilled employees and unique extrusion manufacturing techniques, Teel Plastics has built a reputation of exceptional made-to-order plastic tubing, cores, and profiles.

Industry:

- Manufacturing

Solution:

- IoT Gateway for KEPServerEX®
- Manufacturing Suite

The Challenge

The Teel Plastics facility in Baraboo, Wisconsin has ten manufacturing lines that produce different products at various times throughout the day. Each line requires a custom recipe for every product. These recipes include different material inputs, equipment, heating components, and other variables. Recipes can change several times in one day, and ones that haven't been used in months can resurface when new orders come in.

All these variables quickly caused instances where human error deviated the recipes. These deviations inspired Teel Plastics to find a solution that would allow operators to control all pieces electronically and reduce human error.

"There are many variables that go into a single recipe, and our employees are interacting with and having to memorize and apply multiple recipes during a single shift," said Gwynne. "There are a lot of different reasons for errors—employees are moving too quickly, it's a recipe they are unfamiliar with, or they've entered in the middle of production—but what seems like a miniscule issue can lead to our products having flaws or manufacturing downtime. We knew there had to be a way to minimize some of this error."

The Approach

Recognizing the need for connectivity, data access, and scalability, Teel Plastics executives worked to develop a competitive strategy that would also enable them to capitalize on the benefits of the Internet of Things (IoT). They began by identifying the fundamental technology that would fuel their IoT effort. After evaluating several IoT offerings, they found that many solutions could address one component of their needs—such as a business aspect, protocol, or standard—but not everything. Further complicating the process, many of Teel Plastics machines are custom built—meaning they needed a solution capable of speaking to an entire range of PLCs from vendors including Allen-Bradley and Siemens.

Though at first they considered developing an in-house solution, they ultimately found that Kepware's IoT Gateway for KEPServerEX® provided the most seamless, reliable, and scalable way to control all the essential components through a single web interface.

The Results

Leveraging Kepware's software solutions, a Teel Plastics line operator can send a pre-saved recipe with more than 20 parameters from a web interface to the IoT Gateway, which then distributes the instructions to the machines on the line. This is a much more efficient and effective method than the previous manual process, and by providing device connectivity to multiple PLCs including Allen-Bradley and Siemens, Teel drastically reduces risk of human error. With these new processes, Teel reduced its set-up times by 30 percent.

"By incorporating the IoT throughout our shop floor, we've been able to take something that previously required memorization and 30 to 40 clicks and bring it down to a single click of a button," Gwynne said. "Working with the IoT Gateway is seamless. We're able to trust that as our recipes evolve, KEPServerEX will be able to take on anything and everything that we throw at it."

Since implementing the IoT Gateway, Teel Plastics has gained increased visibility into the granular details of its manufacturing process. This in-depth plant floor data enables Teel Plastics engineers to test different variables, which has led to decreased downtime. By monitoring different aspects of production (such as room temperature) and making slight adjustments, Teel Plastics has also made its recipes much more efficient. In addition, seamlessly aggregating data on indicators (such as humidity or wear on parts) into a central database enables operators to monitor equipment for predictive maintenance, and leadership to make more informed decisions on recipes— so the company can produce greater output at a much higher quality. For example, prior to the IoT Gateway implementation, one line was completing 18 units a minute. Now, it is outputting 35 units a minute—nearly doubling its capacity.

The IoT Gateway also provides Teel Plastics employees with ease of mind. Operators no longer have to memorize recipes, which allows them to complete tasks with greater confidence. Additionally, switching between shifts has never been smoother, as incoming operators can easily pick up right where the previous operator left off.

Organization Impact & Benefits:

- Increased visibility into the granular details of the manufacturing process
- Increased product output and quality through more informed decision making and reduced downtime
- Removed the risk of human error in manual tasks
- Provided future-ready manufacturing system with scalable solution for evolving processes and challenges
- Reduced stress and improved ease of mind for operators
- Provided data that proved customers' requests were being met

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Senior Programmer, Teel Plastics

Finally, Teel Plastics customers can now see detailed data that proves their requests are being met to their exact specifications. This visibility has increased customers' comfort with standard requests and has even led many to expand their requests.

"While we were initially focused on eliminating human error in our manufacturing process, the IoT Gateway is empowering us to do so much more," said Gwynne. "Our employees are a huge asset to our company's success, and this new technology empowers them in their positions and allows them to do a better job. Additionally, we're able to produce many more units a minute and can reduce our waste from erroneous products. All in all, we're providing our customers with more product at a higher quality, and they are taking notice."

TEELCS–EN–0117