

Iron Foundry Gains Competitive Edge & Increases Efficiency with Innovative Technology

New SCADA System Creates Foundation for Digital Transformation & Waste Reduction Initiatives

The process of iron production may date back to the late 1700s, but the business of running a foundry has changed dramatically since the first Industrial Revolution. As manufacturers embrace Industry 4.0, organizations like Ferroloy, Inc. — a 50,000 sq. ft. cast iron foundry and machine shop located in Wichita, Kansas — require new approaches to maintain a competitive edge.

Ferroloy needed to find an alternative to its highly manual data collection processes, which were riddled with inaccurate and unused data. The company was seeking to apply innovative technologies to improve throughput and quality, while reducing equipment downtime. Whichever solution Ferroloy chose also needed to integrate with its existing software and specialized machinery.

All of this was on the mind of Mark Soucie, President and Owner of Ferroloy, while he was attending a presentation by Folsom, California-based system integrator Artek Integrated Solutions about the benefits and ROI of a connected integrated factory. After that initial meeting at the AFS Conference, Ferroloy chose Artek to implement Ignition — an industrial automation platform for



Ferroloy and Artek did not want to distract operators while they were pouring 2,700-degree molten iron.

SCADA, HMI, IIoT, and more — into its foundry.

The Right Mix of Expertise

The majority of foundries in America are family-owned and privately-held small to mid-sized companies, meaning that they have less capital to invest in innovative technologies. As a result, SCADA is not nearly as common in foundries as Excel sheets or scratch paper.

“The truth is that a lot of other foundries are looking for something like what we’ve implemented for Ferroloy and they just don’t know where to start,” said Jerry Eppler, Co-Founder and CEO of Artek. “Mark [Soucie] was in the exact same position and thankfully found us at the right time and right

“The truth is that a lot of other foundries are looking for something like what we've implemented for Ferroloy.”

—Jerry Eppler

Co-Founder and CEO, Artek

when he was beginning his journey and we helped guide him through this process to really take the ideas that he had and the opportunities that he knew were there and really bring them to fruition.”

To ensure the success of the project, Soucie felt it was necessary to bring on an in-house engineer, eventually hiring Clint VenJohn as Process Engineer at Ferroloy. VenJohn, along with Jim LePratt, Design Service Engineer at Artek, were both instrumental in designing and implementing Ferroloy's Ignition system, even though each came into the project with vastly different levels of Ignition experience. LePratt had logged 25 years in the foundry industry, combined with extensive knowledge of Ignition. In contrast, VenJohn had no prior experience with the platform. Far from a setback, between VenJohn's OT background as a Plant Operations Manager and strong knack for IT, and Inductive Automation's free learning resources, he was quickly contributing “some marvelous ideas” to the project, as LePratt put it.

Data at the Core

With this Ignition system, Ferroloy wanted to implement lean manufacturing practices to drive overall behavioral change, and

generally to rely more on systems versus individual skill. “What we're trying to accomplish is to digitize an aged process and gain better visibility to unlock the latent potential within the process,” said VenJohn.

Previously, data was mostly used to solve individual problems rather than to bolster company-wide initiatives. To create a SCADA system that was beneficial to operators as well as upper management, Artek built and configured a MySQL database on Ferroloy's servers, which was then connected to Ignition, specifically the Tag Historian Module, as a centralized repository for maximizing data collection and analytics. This combination created a single source of truth that anyone could reference.

“The goal with the Ferroloy project was to digitally transform their disconnected foundry that relied heavily on manual paper data collection through efficient data collection and analysis,” said Eppler.

Ferroloy's target is to increase capacity by 25-30% while reducing scrap by 30-35%. The Ignition system allows Ferroloy to identify methods for improving efficiency, backed by quantitative data. “With Ignition, we're able to see more or less up-to-the-minute production data, whereas before we would lag behind by a week or so,” said VenJohn. “We're able to identify trends, shift reports and that type of thing can come out almost in real time. Those have been huge improvements and have allowed us to identify and more quickly react to problems.”

Ignition was a cost-effective solution for achieving this new level of data collection,



800.266.7798
inductiveautomation.com

which is critical for a foundry the size of Ferroloy. The low initial cost isn't what gives Soucie confidence; it's the flexibility to adapt and make changes quickly based on real-time data. With the data analytics facilitated through Ignition, Soucie said the opportunities could be endless.

Simple, Effective Screens

The digitization process proved more complicated than a simple transition from paper to HMI. There was also a human element. The last thing Ferroloy or Artek wanted was to distract operators in a fast-paced environment while they were pouring 2,700-degree molten iron.

While the initial impulse was to adhere to a high-performance greyscale philosophy, LaPratt and VenJohn adapted their approach to better suit the workforce, keeping the screens straightforward, with a focus on ease-of-use and legibility. "We have a lot of employees out there that are not very tech-savvy, some older, and some that there's a language barrier with. The simplicity of [the HMI] just makes it easy for them to interact with and be able to do what they need to do easily and properly," said VenJohn.

All visualization for the system was designed using the Perspective Module and each screen features a minimal set of buttons, reducing interaction to the essentials of a given process. With so few visual components, the HMIs needed to retain color to make key information "pop" so that operators could quickly ascertain the status of the process in progress. "Due to the extreme heat needed to melt iron, safety is a

high priority in a foundry. We wanted to make sure our screens were extremely intuitive and simple as to not distract operators from the potential hazards around them," said Eppler.

Critical Connectivity

Ferroloy, like many foundries, has a heterogeneous mix of PLCs from a variety of manufacturers across a range of vintages, plus other types of equipment that do not communicate via PLC at all.

Luckily, Ignition's built-in suite of device drivers allowed Ferroloy to connect to all of their hardware with ease. This freedom also sparked ideas for additional creative solutions.

The foundry environment is inherently dusty, making it particularly harsh on electronics, so Ferroloy needed a software that could run on equipment that was inexpensive to replace. Leveraging Ignition, Ferroloy is using smart televisions to display KPI dashboards above each of the six production lines for quick reference.

"Ferroloy's main problems were that the data that they were gathering on the floor was siloed from their Hitachi equipment through that software. If you needed that information, you had to walk there to get it," said LePratt. "Ignition brought the siloed data from their Hitachi and Heraeus equipment directly into screens that could be used on the floor for verification that the product was good at the point it was being used."

Another key aspect of the project was connecting Ignition to Ferroloy's Sinto molding machines so that molding production could be fed back to its Odyssey ERP system through an API. This eliminated the need for the operator to input the data on the floor and reduced the risk of data entry errors.

Originally, Artek planned on utilizing a third-party solution to connect Ignition to the Mitsubishi PLCs collecting data from the molding machines, but thanks to some fortuitous timing, Inductive Automation released the beta version of the Ignition Mitsubishi Driver during the project's development phase. The driver, which supports Mitsubishi MELSEC over TCP, allowed for a direct connection, eliminating the need for any additional software and lowering the overall cost of the project in the process.

From SCADA to ERP and Back

Beyond simply moving process data out of desk drawers and into a database, Artek needed to integrate Ignition with B&L's Odyssey software, an off-prem ERP software-as-a-service that Ferroloy had implemented over a decade prior.

Pulling data from Ferroloy's ERP system was a cornerstone of the project, eliminating data reentry and its corresponding human error. Artek created sync routines that run through an API interface to monitor Odyssey and look for changes in real time. When a change occurs, the updated information is brought into the Ignition system so that operators can have an immediate understanding of the order in progress,

including the work order and associated product, along with statistics like weight and temperature range.

The integration of Ignition and Odyssey is vital because certain steps in the iron casting process have rigorous time limits. The HMI displays what is currently on all six pour lines, each of which have molds coming down them, along with data synced from the ERP system. This allows operators to know what is being poured when they tap the furnace and put the molten iron into the ladle, because once a new ladle is started, the iron is only usable for 10 minutes.

The Journey Continues

Ferroloy now leverages Ignition from the plant floor to upper management, but even so, Soucie said that this is only the beginning of Ferroloy's Ignition journey. Befitting a server-centric platform with unlimited licensing, Ferroloy has found that the more they use Ignition, the more uses they find for it.

"Ignition is already expanding into other areas of the plant. As we speak, they're working on integrating their QA lab into Ignition. We're getting spectrometer data into Ignition now," said Eppler. "On top of that, now we're starting to work on getting some of the grinding room data into Ignition and also working on dashboards for the break room."

By integrating Ignition with their spectrometer, which analyzes the elemental content of the iron being poured, Ferroloy plans to increase the traceability of the iron production process. This also allows

Ferroloy to closely monitor variations across all measured elements and make small adjustments timelier. This improves the workflow for lab technicians, giving them direct data access instead of requiring them to hunt down the information on the foundry floor.

“Over the next several months, I can only imagine the level of knowledge and information I'll have available at my fingertips,” said Soucie.

Since inception, Artek has focused on three main objectives: building first-class industrial applications, providing the best customer service in the industry, and sharing knowledge to help empower the community. The team continues to grow, but these

principles have remained the foundation in which everything is built upon. Collaborating with others to do great things in industrial automation is what they are truly passionate about. For more information, visit artekis.io.

Ferroloy, Inc. is an iron foundry in Wichita KS. that manufactures ductile iron castings and gray iron castings for agricultural machinery, infrastructure, pumps and valves, transportation equipment and industrial equipment. Ferroloy began operations in 1969 and has dedicated itself to being the best iron foundry in Kansas ever since. Ferroloy is centrally located in the United States, giving us speed of delivery to our customers all across the United States. For more information, visit ferroloyinc.com.



inductive
automation.

800.266.7798
inductiveautomation.com