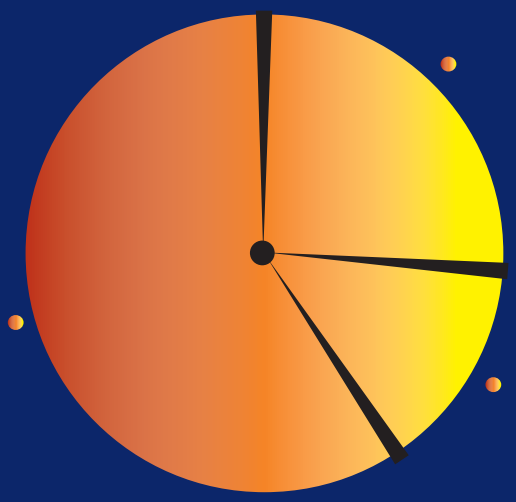
An Incuity EMI Case Study

Arkansas Steel



Arkansas Steel Adopts Incuity Business Intelligence for Manufacturing Software To Integrate Production Data, Enhance Process Optimization Via Portal Use

Although our plant is actually several decades old, we have accelerated our growth and modernized our operations considerably since the company's acquisition in October of 1989 by Sumitomo Corporation and Yamato Kogyo Company, Ltd. of Japan. This includes the addition of a 50-ton per hour automated electric arc furnace, a 3,000 horsepower breakdown mill, new walking beam reheat furnace, transfer tables and three vertical mills with associated conveyors and equipment.

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Arkansas Steel

Arkansas Steel Associates LLC is a leading producer of railroad tie plates for the U.S., Canadian and Mexican markets, with growing service to railroads in the rest of the world. We currently produce as much as 150,000 tons of tie plate per year for our major markets, plus other products such as grader blades, wide flats and semi-finished products for the global railroad industry.

In addition to plant equipment upgrades, we've also made major enhancements to both our plant control systems and our enterprise computing applications. We upgraded our human-machine interface (HMI) systems. We added Wonderware IndustrialSQL Server databases for collecting all process data from our furnace and caster systems. We deployed the ActiveFactory toolset to provide better data analysis and reporting capabilities for our production people, and we integrated our laboratory information management system (LIMS) and our oxygen and carbon analyzer to enable better data analysis.

As valuable as these upgrades were, perhaps our biggest strategic objective was facilitating compliance with the ISO 9000 standard for product quality. We wanted to create a manufacturing intelligence system that would allow us to:

- Do more with the information we already have in our manufacturing and business systems
- Provide more aggregated high level information to management via dashboards
- Provide our engineers and quality staffs with new tools to analyze the raw data and put it in better context for the users
- Reduce the complexity of these systems so they're easier to use
- Eliminate the need to install client copies of software on individual PCs around the company by deploying a server-based, service oriented architecture

This led us in 2006 to adopt the Incuity EMI™ business intelligence for manufacturing software to expand our ability to gather information from multiple different data sources, to analyze and manipulate it better, and to share the resulting information with any users in the company. Like most other manufacturing companies, our production information was fragmented, residing in multiple different systems and making it difficult for people to find, access, correlate and interpret data from the different systems to make timely and good decisions.

We installed a single server Incuity package in June of 2006, which was linked to our IndustrialSQL Server database and had connectors to our LIMS system and our furnace, caster and ladle metallurgy control systems (LMS). Our users on the plant floor and in our management offices can now review whatever information they want, from any of those data sources, by viewing information in portal dashboards that can be customized according to their own needs.

Gaining Insight into Production Operations

Incuity provides services for us that are the foundation of several new systems we've now implemented. These include collection services that gather data from both real-time production systems and business applications; information services that integrate and manage the information; and presentation services that provide insight to all end users.

Incuity manages the data and their relationships to present a

unified view of all data that's available and to abstract the specifics of where it comes from and where it is stored. Analysis services then can correlate transaction data with time series data and calculate, transform, summarize and aggregate it for analysis. The presentation services include tools for making the best use of information, including trend and X-Y plotting applications, an Excel add-in for analysis and reporting, and the Incuity Portal, which provides web reports and applications to users. In addition, security services manage users, roles and their access to data.

> *"IncuityEMI enables us to move forward more quickly with our ISO 9000 compliance program, maintain consistently higher overall product quality and better production control."*

Perhaps the most important application we created was our automated heat sheet systems for the furnace, caster and LMS (Ladle Metallurgy Station) operations. This has replaced manual systems that literally were handwritten reports on what ingredients went into each batch of steel and the details on how each batch was processed. While all the information was contained on each heat sheet, it was difficult to make good use of that data for guaranteeing product quality from batch to batch and for improving our process consistency when creating batches to meet particular customer specifications. Incuity has enabled us to better monitor our process from furnace to LMS to caster.

At the furnace, we collect and store data in IndustrialSQL Server on power levels, oxygen inputs, natural gas inputs, water cooling flows and other analog variables, plus the many discrete inputs that tell us furnace status. We also gather operator inputs on manual additions of chemistries and alloys being put into the steel. All of this information is used to generate the electronic heat sheets that tell us everything we'd need to know about what went into a batch of steel and how it was processed.

At the LMS station, the system captures all data on what happens to the molten steel batch as it's transported from the furnace to the caster. At the caster our primary concerns are casting speed, water temperatures and flows, plus we take spot temperatures of the steel in the tundish to optimize it for casting. All of this data is also captured in the heat sheets. In addition, our maintenance staff can monitor what occurs with the furnace, the LMS and the caster during each cycle. They monitor panel temperatures, hydraulic pressures and many other data items for faults and are alerted if equipment problems occur or if they're approaching a routine preventive maintenance point.

From Insight Comes Agility

This application has been a great success because it provides more insight into our process operations. We can now deal with each heat as a batch and we no longer have to use paper or electronic heat sheets. We can expose each batch as a time period in our Incuity model so all the information is available in one place and users can drag and drop objects onto trends and into reports. These also can be viewed in management dashboards within the Incuity portal, right on their desktops.

All of this has enabled us to move forward more quickly with our ISO 9000 compliance program, since it enables us to better monitor the specific chemistries involved in producing each customer's steel batches. It also helps us maintain more consistent product quality since we now can easily compare specifications as each batch moves from the furnace to the LMS to the caster. We can better utilize our LIMS data for enhanced quality control, to match test results with production data and track progress on what we planned to make versus what we actually produced.

In our next phase of implementation, we will begin using the higher level Incuity analytical tools, such as the X-Y plotter, to gain greater insight into our operations and facilitate even more sophisticated tracking and management of batch quality. For example, using the X-Y plotter tool will help us:

- Correlate billet length with temperature to better identify defects
- Match heat number with average heat temperature or total tons produced
- Measure average tons produced against power consumed

In addition, we plan to develop a variety of new applications for

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specific uses, such as a downtime application system that will let us make the most efficient use of our maintenance staff and keep production equipment running at the highest possible availability. Analyses like these can help us to achieve more consistently high quality product while increasing our throughput to serve higher customer volume, and all while making the most efficient use of our plant, equipment and people.

In addition, we'll use Incuity to access data from our ERP system and integrate it with our plant floor data. This will let us integrate our order system with production planning so that we're optimizing steel batch runs by correlating recipe changes with actual operation of the furnace, LMS and caster systems. This can be an important enhancement for us because we produce custom steels that aren't available from many other mills, such as high carbon grade steel and boron steel, so the ability to streamline production by making batch changeovers more efficiently can be valuable.

Ultimately, we plan on Incuity playing a key role in the complete integration of all our operations, including our rolling mill, because of the insight it provides for our people